

February 23, 2022

**STORMWATER
REPORT**

For

NEW ELEMENTARY SCHOOL
Swampscott, MA

Prepared for:

Lavelle Bresinger Architects
155 Dow Street
Manchester, NH 03101

Prepared by:

NITSCH ENGINEERING, INC.
2 Center Plaza, Suite 430
Boston, MA 02143

Nitsch Project #13858

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	EXISTING CONDITIONS.....	1
2.1	Existing Drainage Infrastructure	1
2.2	NRSC Soil Designations	2
2.3	On-Site Soil Investigations.....	2
2.4	Wetland Resource Areas	2
3.0	PROPOSED CONDITIONS	2
3.1	Project Description.....	2
3.2	Stormwater Management System.....	3
3.3	Stormwater Management During Construction.....	4
4.0	STORMWATER MANAGEMENT ANALYSIS	4
4.1	Methodology	4
4.2	HydroCAD Version 10.00.....	5
4.3	Existing Hydrologic Conditions.....	5
4.4	Proposed Hydrologic Conditions	5
4.5	Peak Flow Rates.....	5
5.0	TOWN STORMWATER REGULATIONS	6
6.0	MASSDEP STORMWATER MANAGEMENT STANDARDS	7
	Standard 1: No New Untreated Discharges.....	7
	Standard 2: Peak Rate Attenuation	7
	Standard 3: Groundwater Recharge.....	7
	Standard 4: Water Quality Treatment.....	7
	Standard 5: Land Uses with Higher Potential Pollutant Loads.....	8
	Standard 6: Critical Areas	8

Standard 7: Redevelopments.....	8
Standard 8: Construction Period Pollution Prevention and Sedimentation Control	8
Standard 9: Operation and Maintenance Plan.....	8
Standard 10: Prohibition of Illicit Discharges	8
7.0 CLOSED DRAINAGE SYSTEM DESIGN.....	8
8.0 CONCLUSION.....	9

FIGURES

EX-DA	Existing Watershed Areas
PR-DA	Proposed Watershed Areas
DR-BMP	Proposed Structures Drainage Map

APPENDICES

Appendix A	Stormwater Management Standards Documentation
	MassDEP Checklist for Stormwater Report
	Standard 4: TSS Removal Calculations
	Phosphorous Removal Calculations
	Standard 4: Proprietary Water Quality Structure Calculations
	Isolator Row Sizing
	Isolator Row Phosphorous Removal Research
	Standard 10: Illicit Discharge Compliance Statement
Appendix B	Existing Conditions – HydroCAD Calculations
Appendix C	Proposed Conditions – HydroCAD Calculations
Appendix D	Closed Drainage System Design
Appendix E	Long-Term Pollution Prevention and Stormwater Operation and Maintenance Plan
Appendix F	DRAFT Stormwater Pollution Prevention Plan (SWPPP)
Appendix G	Soil Investigations
	NRCS Soil Maps and Descriptions
	Compiled Test Pit Information

1.0 INTRODUCTION

Nitsch Engineering has prepared this Stormwater Report to support the Notice of Intent application to the Town of Swampscott for the New Elementary School located in Swampscott, MA. The Project site is located at 10 Whitman Road (subsequently referred to as the "Site"). The Project includes the demolition of the existing Stanley School, and the construction of the new school and associated site improvements.

The site improvements include the following:

1. Construction of parking facilities and pedestrian walkways;
2. Demolition of the existing building;
3. Construction of a new building;
4. Installation of new utilities to support the proposed building;
5. Improved circulation through the western parcel; and
6. Construction of a new stormwater management system.

The proposed stormwater management system has been designed to comply with the requirements of the Town of Swampscott Rules and Regulations for Stormwater Management and Erosion Control (the Town Stormwater Regulations) and the Massachusetts Department of Environmental Protection (DEP) Stormwater Management Standards.

2.0 EXISTING CONDITIONS

The 7.5-acre Project Site located at 10 Whitman Road is bounded by Forest Avenue and the Charles Ewing Woods to the south, residential properties to the east, Whitman Road to the North, and the Unitarian Universalist Church of Lynn to the west. The Unitarian Universalist Church site (Church Site) includes a paved parking lot and wooded area. Pedestrian and vehicular access for the school through the Church Site will be provided. Work on the Church Site will include the construction of a pedestrian walkway/sidewalks and the construction of a short section of drive to connect the school drive to the Church parking lot.

The existing site development is concentrated in the eastern of the site and contains driveways and parking, paved play surfaces, walkways, landscaped areas, and the existing school building. The existing play fields are located on the west side of the site.

The existing school building has gas, electric, telecom, sanitary sewer, water and drain utility services. Stormwater runoff from the site generally flows overland to a wetland to the south of the Site or overland a wetland to the west of the Site, located north of the Church Site parking lot.

2.1 Existing Drainage Infrastructure

There is no/minimal stormwater quality treatment and no stormwater peak rate mitigation on the existing Site.

Majority of the Site impervious area and athletic field is collected by a closed drainage system, which discharges to an 18-inch drainpipe that flows north through the Site and towards Cedar Road. The eastern portion of the Site sheet flows to an existing catch basin at the northeastern edge of the Site, which discharges to a 6-inch drain line flowing east. The southeastern portion of the Site drains to the existing wetland system south of Forest Avenue. A large portion of the athletic fields and landscape areas sheet flows northwest towards the northwest wetland.

The Church Site drains north via a closed drainage system and sheet flow to the northwest wetland.

2.2 NRSC Soil Designations

The Soil Classification Summary (Table 1) outlines the Natural Resources Conservation Services (NRCS) designation of the soil series at the Site. The majority of soils are classified as urban land with an unclassified hydrologic soil group (HSG) - (refer to the NRCS Soil Maps and Descriptions in Appendix G).

Table 1. NRCS Soil Classification Summary

Soil Unit	Soil Series	Hydrologic Soil Group
651	Udorthents, smoothed	--
602	Urban Island	--
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15% slope	B

2.3 On-Site Soil Investigations

Nobis Group performed subsurface exploration with testpits within the Site to determine soil conditions and the extent and depth to ledge within the Site. Ledge was encountered throughout the Site, ranging from 0.1-ft to 9-ft below grade. Majority of the Site indicated ledge within 4-ft of existing grade. These test pit logs are provided in Appendix G.

Due to the ledge conditions, infiltration within the Site is not feasible.

2.4 Wetland Resource Areas

The Project site is bordered to the west by a wetland system on the Unitarian Universalist Church of Lynn property and to the south by a wetland system on the Charles Ewing Woods property. The Site contains 100-foot buffer to Bordering Vegetated Wetlands (BVW). LEC Environmental Consultants Inc. conducted site visits on March 9, 2021 and December 16, 2021 to delineate these resource areas. Detailed information on these resources is provided in the Wetland Resource Area Analysis Report, prepared by LEC, provided in Section 3 of the Notice of Intent.

3.0 PROPOSED CONDITIONS

3.1 Project Description

The proposed site improvements include the following:

1. Construction of parking facilitates and pedestrian walkways;
2. Demolition of the existing building;
3. Construction of a new building;
4. Installation of new utilities to support the proposed building;
5. Improved circulation through the Church Site; and
6. Construction of a new stormwater management system.

The Project is a new development per DEP standards. The Project is anticipated to increase the overall impervious area for the Project by approximately 2.5 acres. Refer to Table 2 for a comparison of the existing and proposed land use for the Site.

Table 2. Proposed land use for Site¹ (in acres)

Land Use	Existing Site (acres)	Proposed Site (acres)	Change
Buildings	0.45	1.36	+0.91
Site Pavement	2.17	3.75	+1.58
Landscaped Areas	3.52	1.94	-1.58
Undeveloped Areas	1.37	0.46	-0.91
Total	7.51	7.51	---

1) Land use areas and analysis include the existing Church Site to understand impact on the northern wetland.

3.2 Stormwater Management System

The Site will include the installation of a stormwater management system that is being designed to meet the MassDEP Stormwater Management Standards and the Town of Swampscott Rules and Regulations for Stormwater Management and Erosion Control to the maximum extent practicable. Due to the constraining condition of subsurface ledge throughout the Site, the Project is not able to meet the groundwater recharge requirements through infiltration. The Project will provide water quality treatment for Total Phosphorous and TSS removal and peak rate mitigation via BMPs. All impervious area within the Site (including roof, vehicular and pedestrian), plus the new vehicular access constructed within the Church Site, will be collected and treated by the proposed stormwater management system.

The proposed stormwater management system for the Project will include deep sump and hooded catch basins, subsurface detention systems with isolator rows, and proprietary water quality structures. Stormwater overflow from these systems will either discharge to the one of the existing closed drainage system within the Site, or to the existing wetlands.

Deep Sump and Hooded Catch Basins

Deep sump and hooded catch basins are proposed to provide pretreatment in the impervious areas of the parking lot and driveways. Stormwater captured in the catch basins will be directed to another treatment or infiltration BMP prior to discharge.

Subsurface Detention Systems with Isolator Row

Stormwater will be collected via a closed drainage system and majority of the runoff will discharge to one of two subsurface detention systems.

Detention System #1 and #2 are proposed to collect runoff from a portion of the proposed building, impervious and landscaped site area. The systems consist of StormTech SC-740 chambers enveloped by crushed stone and wrapped in an impermeable liner. The systems will include isolator rows, comprised of chambers wrapped in a fabric, which have been shown to treat for TSS and TP

(see Appendix A for documentation backup calculations). The system significantly reduces the peak runoff rates in the 2-, 10-, 25- and 100-year design storms.

Isolator Row

Stormwater from a portion of the new building roof will be directed to a subsurface isolator row to treat the runoff from TSS and TP prior to discharging to the existing wetland system south of the School Site.

The isolator row will consist of SC-310 chambers within stone with an underdrain, wrapped in an impermeable liner. Stormwater treated by the system will be collected by the underdrain pipe and will connect to the large storm bypass pipe.

Water Quality Structure

One proprietary water quality structure is proposed for water quality treatment for the portion of the Site that bypasses the detention systems prior to discharging to the existing drain pipe. This area includes vehicular pavement and the loading area. The water quality structure will contain filters within a chamber, and is designed to remove greater than 80% TSS and 50% TP in conjunction with the upstream associated deep sump and hooded catch basins. Sizing calculations are provided in Appendix A.

3.3 Stormwater Management During Construction

The Site Contractor will be responsible for stormwater management of the active construction site and is required to adhere to the conditions of the 2017 Construction General Permit under the Environmental Protection Agency through the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP). A draft SWPPP has been prepared in accordance with the MassDEP Stormwater Management Standards and the 2017 Construction General Permit (Appendix F).

4.0 STORMWATER MANAGEMENT ANALYSIS

4.1 Methodology

Nitsch Engineering completed a hydrologic analysis of the existing project site utilizing Soil Conservation Service (SCS) Runoff Curve Number (CN) methodology. The SCS method calculates the rate at which the runoff reaches the design point considering several factors: the slope and flow lengths of the subcatchment area, the soil type of the subcatchment area, and the type of surface cover in the subcatchment area. HydroCAD Version 10.00 computer modeling software was used in conjunction with the SCS method to determine the peak runoff rates and runoff volumes for the 2-, 10-, 25-, and 100-year, 24-hour storm events. The proposed project site is being analyzed with the same methodology.

The Site was divided into multiple drainage areas, or subcatchments, which drain to the design points along the property boundary and within the site. For each subcatchment area, SCS Runoff Curve Numbers (CNs) were selected by using the cover type and hydrologic soil group of each area. The peak runoff rates and runoff volumes for the 2-, 10-, 25- and 100-year 24-hour storm events were then determined by inputting the drainage areas, CNs, and time of concentration (T_c) paths into the HydroCAD model.

The National Oceanic and Atmospheric Administration Atlas 14 precipitation frequency estimates were used to calculate the 2-, 10-, 25-, and 100- year 24-hour storm events in HydroCAD. Refer to the HydroCAD calculations in Appendix B and C for rainfall information.

4.2 HydroCAD Version 10.00

The HydroCAD computer program uses SCS and TR-20 methods to model drainage systems. TR-20 (Technical Release 20) was developed by the Soil Conservation Service to estimate runoff and peak discharges in small watersheds. TR-20 is generally accepted by engineers and reviewing authorities as the standard method for estimating runoff and peak discharges.

HydroCAD Version 10.00 uses up to four types of components to analyze the hydrology of a given site: subcatchments, reaches, basins, and links. Subcatchments are areas of land that produce surface runoff. The area, weighted CN, and T_c characterize each individual subcatchment area. Reaches are generally uniform streams, channels, or pipes that convey water from one point to another. A basin is any impoundment that fills with water from one or more sources and empties via an outlet structure. Links are used to introduce hydrographs into a project from another source or to provide a junction for more than one hydrograph within a project. The time span for the model was set for 0-48 hours in order to prevent truncation of the hydrograph.

4.3 Existing Hydrologic Conditions

As summarized in Section 2.1, Nitsch Engineering delineated the project site into five (5) on-site subcatchment (watershed) areas discharging to four (4) design points utilizing an existing conditions survey and on-site observations (See Figure DR-1).

The design points (DP) are defined as the northwestern wetland (DP-1), the 18-inch drain main (DP-2), the 6-inch drain pipe (DP-3), and the southern wetland (DP-4). The HydroCAD model for existing conditions is provided in Appendix B and results from the HydroCAD calculations are summarized below in Table 3.

4.4 Proposed Hydrologic Conditions

The proposed project has been designed to mitigate the change in stormwater runoff at each of the design points as required by the DEP Stormwater Management Standards and the Town Stormwater Regulations. The existing watershed areas were modified to reflect the proposed topography, storm drainage structures and BMPs, and roof areas. (See Figure DR-2). The HydroCAD model for proposed conditions is provided in Appendix C and results from the calculations are summarized in Table 3.

4.5 Peak Flow Rates

The proposed stormwater management system is expected to reduce the proposed peak runoff rates to at or below the existing rates for Design Points DP-1, DP-2, DP-3 and DP4. Table 3 below summarize the existing and proposed hydrologic analyses for the site at each design point.

Table 3 – Peak Rates of Runoff in Cubic Feet per Second (cfs)

	Storm Event	2-year	10-year	25-year	100-year
DP-1 (NW Wetland)	Existing	3.25	6.92	9.34	13.16
	Proposed	2.83	5.39	7.00	9.48
DP-2 (18" Drain)	Existing	6.94	13.09	16.95	22.88
	Proposed	4.90	10.22	13.86	22.34
DP-3 (6" Drain)	Existing	1.79	3.48	4.56	6.21
	Proposed	0.42	0.88	1.18	1.65
DP-4 (South Wetland)	Existing	0.37	0.93	1.32	1.95
	Proposed	0.35	0.55	0.68	0.88

5.0 Town Stormwater Regulations

Per the Town Regulations, Section 8.0, the stormwater management system shall meet the US EPA Total Phosphorus (TP) and Total Suspended Solids (TSS) design requirements for new development and redevelopment per the Federal NPDES Permit.

Per the NPDES definition, the site is considered a redevelopment:

New development is defined as any construction activities or land alteration resulting in total earth disturbances equal to or greater than 1 acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) on an area that has not previously been developed to include impervious cover.

Redevelopment is defined as any construction, land alteration, or improvement of impervious surfaces resulting in total earth disturbances equal to or greater than 1 acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) that does not meet the definition of new development (see above).

Stormwater management systems on redevelopment sites shall be designed to meet an average annual pollutant removal equivalent to 80% of the average annual postconstruction load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 50% of the average annual load of Total Phosphorus (TP) related to the total post-construction impervious surface area on the site.

The Project will treat all impervious areas, including vehicular areas, pedestrian areas and roof areas, to 80% TSS removal and 50% TP removal via the isolator rows within the subsurface detention systems and the water quality structure.

TSS and TP removal calculation spreadsheets and water quality structure sizing calculations are provided in Appendix A.

6.0 MassDEP Stormwater Management Standards

The Project is considered a **new development** under the DEP Stormwater Management System. The Site will be designed to meet and exceed the MassDEP Stormwater Management Standards as summarized below:

Standard 1: No New Untreated Discharges

The Project will not discharge any untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. Stormwater from the Site will be collected and treated in accordance with the MassDEP Stormwater Management Standards and stormwater outfalls will be stabilized to prevent erosion.

Standard 2: Peak Rate Attenuation

The proposed stormwater management system will be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates. To prevent storm damage and downstream flooding, the proposed stormwater management practices will mitigate peak runoff rates for the 2-, 10-, 25- and 100-year, 24 hour storm events. Refer to Table 3 for a pre- and post-development peak runoff rate comparison.

Standard 3: Groundwater Recharge

Due to unsuitable subsurface conditions, groundwater recharge is not feasible.

Standard 4: Water Quality Treatment

The proposed stormwater management system will be designed to remove greater than 80% of the average annual post-construction load of Total Suspended Solids (TSS). Structural stormwater BMPs including deep sump and hooded catch basins, and water quality structures are sized to exceed the required water quality volume of 0.8-inches by providing 1-inch water quality volume treatment, removing a minimum of 80% of total suspended solids and 50% of total phosphorous.

Table 4. Proposed Treatment Train Summary

Watershed	Treatment Train
PR-2A, PR-2B	Deep Sump and Hooded Catch Basin → Detention System with Isolator Row
PR-2C	Deep Sump and Hooded Catch Basin → Water Quality Structure
PR-4	Isolator Row

TSS removal calculation spreadsheets and water quality structure sizing calculations are provided in Appendix A.

Source control and pollution prevention measures, such as vacuum cleaning, street sweeping, proper snow management, and stabilization of eroded surfaces, are included in the Long-Term Pollution Prevention Plan and Operation and Maintenance Plan (Appendix E).

Standard 5: Land Uses with Higher Potential Pollutant Loads

The project is not considered a LUHPPL and therefore, this standard is not applicable.

Standard 6: Critical Areas

The Project is not located within any critical areas. Therefore, this standard is not applicable.

Standard 7: Redevelopments

The Project is not considered a redevelopment under the MassDEP Stormwater Management Standards. Therefore, this standard is not applicable.

Standard 8: Construction Period Pollution Prevention and Sedimentation Control

A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) will be developed and implemented during the Notice of Intent permitting process.

Because the Project will disturb more than one (1) acre of land, a Notice of Intent will be submitted to the Environmental Protection Agency (EPA) for coverage under the National Pollution Discharge Elimination System (NPDES) Construction General Permit. As part of this application the Applicant is required to prepare a Stormwater Pollution Prevention Plan (SWPPP) and implement the measures in the SWPPP. The SWPPP, which is to be kept on site, includes erosion and sediment controls (stabilization practices and structural practices), temporary and permanent stormwater management measures, Contractor inspection schedules and reporting of all SWPPP features, materials management, waste disposal, off-site vehicle tracking, spill prevention and response, sanitation, and non-stormwater discharges. A draft SWPPP is provided in Appendix F.

Standard 9: Operation and Maintenance Plan

A post-construction operation and maintenance plan has been prepared and will be implemented to ensure that stormwater management systems function as designed. Source control and stormwater BMP operation requirements for the site are summarized in the Long-Term Pollution Prevention Plan and Operation and Maintenance Plan provided in Appendix E.

Standard 10: Prohibition of Illicit Discharges

There will be no illicit discharges to the stormwater management system associated with the Project. An Illicit Discharge Compliance Statement is provided in Appendix A.

7.0 CLOSED DRAINAGE SYSTEM DESIGN

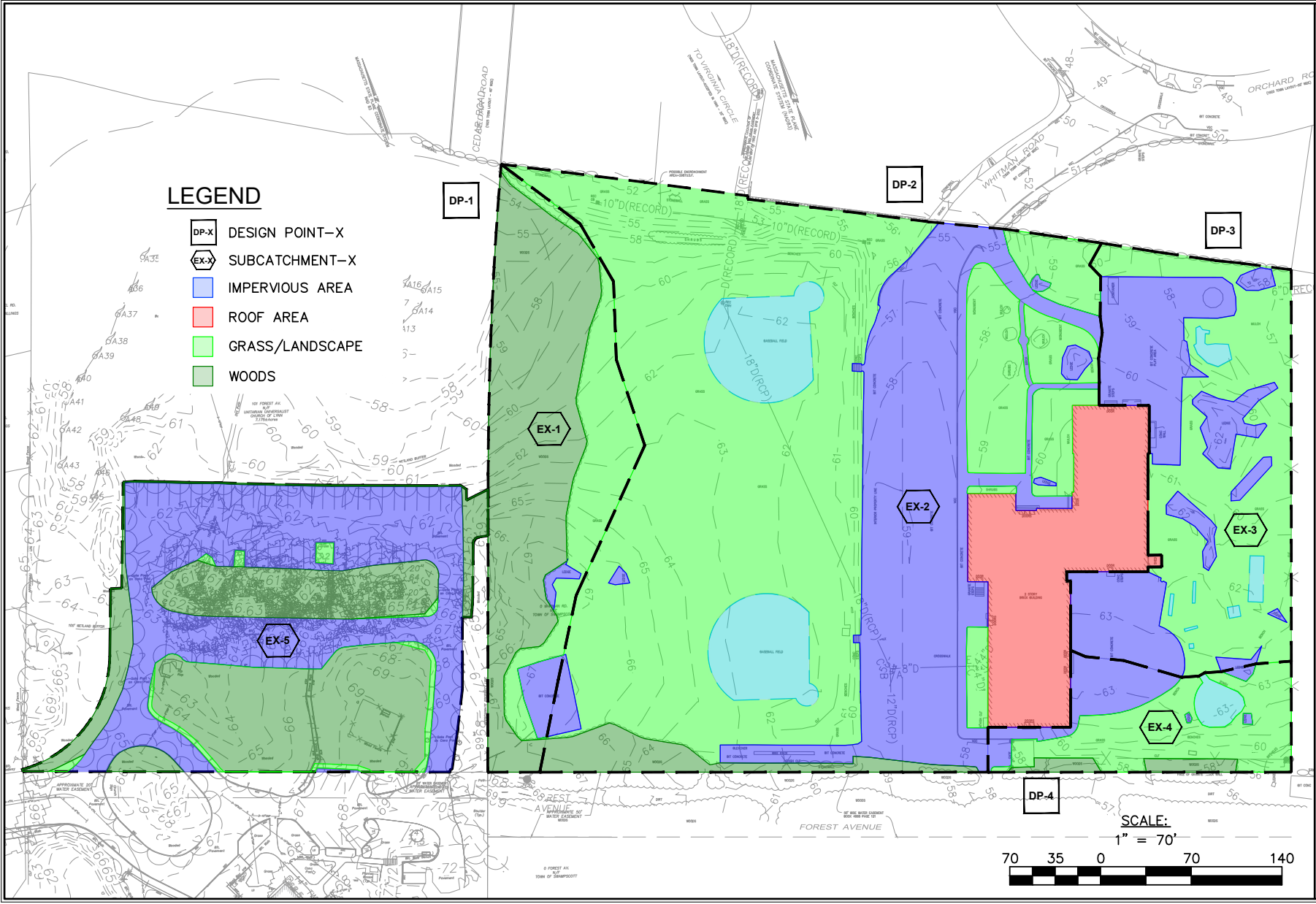
The proposed closed drainage system consists of deep sump and hooded catch basins, drainage manholes, and proprietary water quality treatment units connected with corrugated polyethylene pipe. The closed drainage system was designed to convey the 25-year storm event using the Rational method. Refer to Appendix D for more information.

8.0 CONCLUSION

In conclusion, the Project's stormwater management system will reduce or maintain peak runoff rates and improve the water quality of stormwater being discharged from the Site. The Project is being designed to meet and exceed the MassDEP Stormwater Management Standards and Town of Swampscott Rules and Regulations for Stormwater Management and Erosion Control.

FIGURES

EX-DA	Existing Watershed Areas
PR-DA	Proposed Watershed Areas
DR-BMP	Proposed Structures Drainage Map



www.nitschengineering.com

2 Center Plaza, Suite 430
Boston, MA 02108
T: (617) 338-0063
F: (617) 338-6472

- Civil Engineering
- Land Surveying
- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

EXISTING SUBCATCHMENT PLAN
SWAMPSCOTT ELEMENTARY SCHOOL
10 WHITMAN RD, SWAMPSCOTT, MA 01907

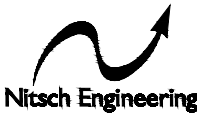
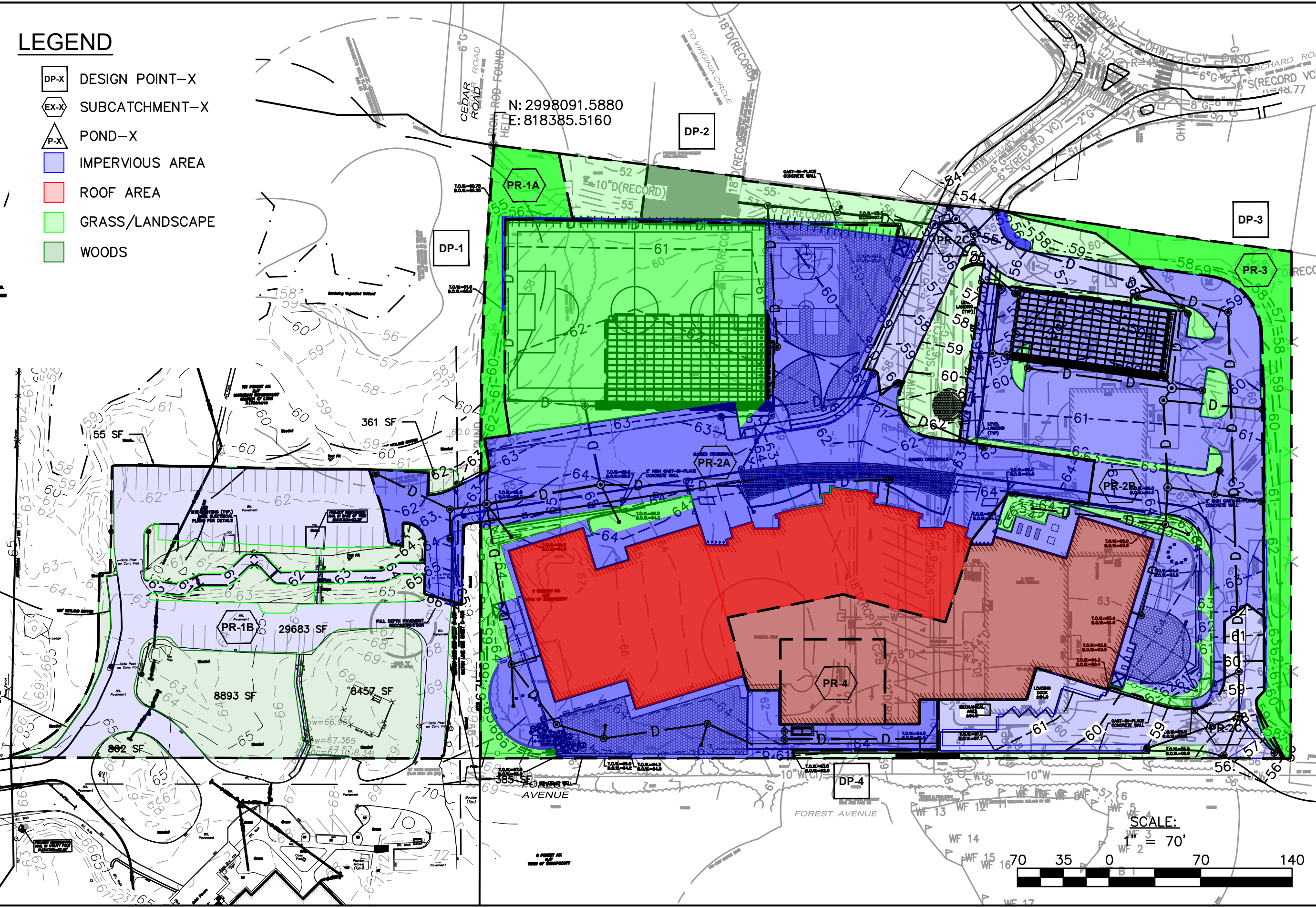
PREPARED FOR
LAVALLEE BRENSINGER ARCHITECTS
155 DOW STREET, MANCHESTER, NH 03101

PROJECT # 13858.1
FILE: DA-EX
SCALE: 1"=60'
DATE
PROJECT FOR: DMC
SURVEYOR: NITSCH
DRAFTED BY: WLI
CHECKED BY: NOB

EX-DA

LEGEND

- DP-X DESIGN POINT-X
- EX-X SUBCATCHMENT-X
- P-X POND-X
- IMPERVIOUS AREA
- ROOF AREA
- GRASS/LANDSCAPE
- WOODS



Nitsch Engineering
www.nitscheng.com
2 Center Plaza, Suite 430
Boston, MA 02108
T: (617) 338-0063
F: (617) 338-6472

- Civil Engineering
- Land Surveying
- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

POST-DEVELOPMENT SUBCATCHMENT PLAN

SWAMPSCOTT ELEMENTARY SCHOOL
10 WHITMAN RD, SWAMPSCOTT, MA 01907

PREPARED FOR:
LAVALLEE BRENSINGER ARCHITECTS
155 DOW STREET, MANCHESTER, NH 03101

PROJECT #	13858.1
FILE:	DA-EX
SCALE:	1"=60'
DATE:	
PROJECT MGR:	DMC
SURVEYOR:	NITSCH
DRAFTED BY:	WLI
CHECKED BY:	NOB

DA-PR

TOWN OF SWAMPSCOTT

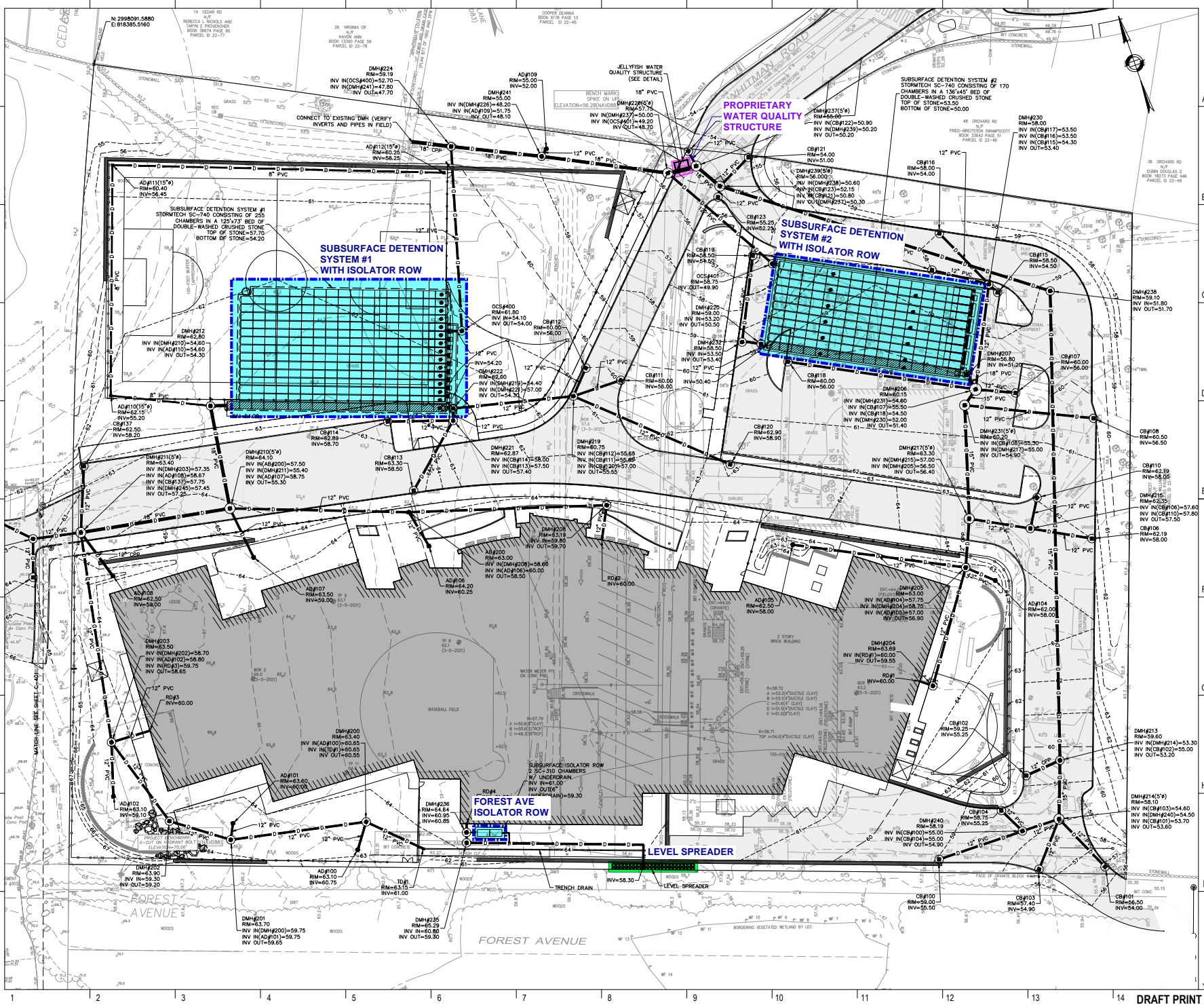
NEW
ELEMENTARY
SCHOOL

10 WHITMAN ROAD,
SWAMPSCOTT, MA 01907

NO.	DESCRIPTION	DATE
1	PERMIT SET	02/26/2022

CONTENT:	
SITE DRAINAGE PLAN	
DRAWN BY:	19-07-40
PROJECT NO:	19-07-40
DATE:	02/26/2022
REVIEWED:	
SCALE:	
Project Phase:	DESIGN DEVELOPMENT SUBMISSION
Copyright © 2021	BY LAVALLÉE BRENSINGER ARCHITECTS, INC. ALL RIGHTS RESERVED. NO REPRODUCTION WITHOUT PERMISSION.

DR-BMP



APPENDIX A

Stormwater Management Standards Documentation

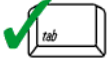
- MassDEP Checklist for Stormwater Report
- Standard 4: TSS Removal Calculations
- Phosphorous Removal Calculations
- Standard 4: Proprietary Water Quality Structure Calculations
- Isolator Row Sizing
- Isolator Row Phosphorous Removal Research
- Standard 10: Illicit Discharge Compliance Statement



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 8²
- 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 must be submitted with the Stormwater Report.

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.



Checklist for Stormwater Report

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 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 Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

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 for Stormwater Report

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): Subsurface Detention Systems, Isolator Rows, Water Quality Structure
-

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 for Stormwater Report

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 Field¹
- ☐ 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 for Stormwater Report

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 Report 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 for Stormwater Report

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)

- ☐ 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

- ☐ 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 Report.



Checklist for Stormwater Report

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

**NEW ELEMENTARY SCHOOL, SWAMPSCOTT, MA
TSS REMOVAL – WATER QUALITY TREATMENT SUMMARY**

Nitsch Engineering has prepared this Water Quality Treatment Summary for the proposed New Elementary School in Swampscott, MA. In compliance with MassDEP Stormwater Management Standard #4, the proposed stormwater management system is designed to remove at least 80% of the average annual post-construction load of TSS prior to discharge.

A summary of treatment trains proposed to provide water quantity control and water quality improvement at the proposed project site is provided below.

Treatment Train A: Detention System

Catchment Areas: PR-2A, PR-2B

Catch Basin → Detention System with Isolator Row

Treatment Train B: Water Quality Structure

Catchment Areas: Offsite Watershed (Vinedale Rd, Beechwood Rd)

Catch Basin → Water Quality Structure

Treatment Train A:

Deep Sump & Hooded Catchbasin → Isolator Row in Detention System

B BMP	C TSS Removal Rate	D Starting TSS Load	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump & Hooded Catch Basin	0.25	1.00	0.25	0.75
Isolator Row	0.81	0.75	0.61	0.14

Total TSS Removal =

86%

**Meets 80% TSS
removal requirement**

Treatment Train B:

Deep Sump & Hooded Catch basin → Water Quality Structure

B BMP	C TSS Removal Rate	D Starting TSS Load	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump & Hooded Catch Basin	0.25	1.00	0.25	0.75
Water Quality Structure	0.89	0.75	0.67	0.08

Total TSS Removal =

92%

**Meets 80% TSS
removal requirement**

PHOSPHORUS REMOVAL CALCULATIONS

Project: Swampscott Elementary School

Prepared by: Nitsch Engineering

Phosphorus Reduction Summary (Table 1)

	Existing			Proposed		
	Area ac	Export Rate lbs/acre/yr	Phosphorus Load lbs P/yr	Area ac	Export Rate lbs/acre/yr	Phosphorus Load lbs P/yr
Impervious	1.91	1.78	3.40	4.43	1.78	7.89
Pervious	4.18	0.29	1.21	1.77	0.29	0.51
Total	6.09		4.61	6.20		8.40
Phosphorus Reduction Required (50% of Ex. Phosphorus Load)						4.20
Phosphorus Reduction Provided Through Structural Stormwater Strategies (Table 2)						4.23
Total Phosphorus Reduction Provided by Project (% Reduction)						50%

Structural Stormwater Strategies Table 2)

	Surface Type	Treated Area (ac)	P Load Rate (lbs/ac/yr)	Starting P Load (lbs/yr)	P Removal (%)	P Removed (lbs/yr)
Proprietary Water Quality Structure ⁵						
	Impervious	0.51	1.78	0.91	59%	0.54
	Landscape	0.42	0.29	0.12		0.07
Detention Isolator Row ⁴						
(chamber/pipe in filter fabric)	Impervious	3.92	1.78	6.97	50%	3.49
	Landscape	0.96	0.29	0.28		0.14
				7.25		3.62

Total Phosphorus Removed through Structural Stormwater Strategies	4.23
--	-------------

Notes

- Export rate referenced from Table 3-1 of Attachment 3 to Appendix F (MA MS4 General Permit).
- Play areas assumed to be pervious.
- Pollutant removal for BMPs referenced from Attachment 3 to Appendix F (MA MS4 General Permit).
- Pollutant removal for Isolator Row referenced from University of New Hampshire Stormwater Center Annual Report, dated 2009.
- Pollutant removal for Water Quality Structure based on Contech Jellyfish removal rate:
<https://www.conteches.com/stormwater-management/treatment/jellyfish-filter>



2 Center Plaza, Suite 430
 Boston, MA 02108-1928
 T: 617-338-0063
 F: 617-338-6472
www.nitscheng.com

Nitsch Job # 13858
 Calc: Water Quality Flow Rate
 Date: 2/18/2022

1" Calculation Sheet

This spreadsheet should be used to convert water quality volume to an equivalent water quality peak flow rate as outlined in the new MA DEP guidelines that take effect on October 15, 2013.

Glossary

Water Quality Flow Rate = WQF
 Water Quality Volume = WQV*
 unit peak discharge (csm/in) = qu**
 Impervious Area in watershed (square miles) = Ai

*WQV is expressed in watershed inches (you must use 1.0-inches in all cases with this method and not 0.5-inches)

** calculate the qu based on the time of concentration (see 1" - qu Table)

Compute Water Quality Flow with the following Equation

$$WQF = (qu)(A)(WQV)$$

Input Information (in colored cells only)

Site Plan Callout		Enter qu (from 1" - qu Table)	Enter Impervious Area (SF)	Ai (sq/mi)	WQV		Water Quality Flow Rate	
ISO ROW SS#1	=	774	97022	0.003480	1	=	2.69	cfs
ISO ROW SS#2	=	774	68348	0.002452	1	=	1.90	cfs
WQS200	=	774	22196	0.000796	1	=	0.62	cfs
ISO ROW - FOREST AVE	=	774	5200	0.000187	1	=	0.14	cfs



STORMTECH ISOLATOR ROW SIZING CHART					
	SC-310	SC-740	DC-780	MC-3500	MC-4500
Chamber Area (Sq.Ft.)	20	27.8	27.8	43.2	30.1
Treated Flow Rate per chamber (CFS)	0.11	0.15	0.15	0.24	0.17
NOTE: Testing of the Isolator Row completed by Tennessee Tech has been verified by NJCAT and it has shown to have a TSS removal efficiency of 84% for SIL-CO-SIL 250 NJCAT verified Treated Flow Rate (GPM / Sq.Ft.) 2.5					

SUBSURFACE DETENTION SYSTEM #1

ISOLATOR ROW:

CONTRIBUTING IMPERVIOUS AREA TOTAL: 97,022 SF
 WQF = 2.69 CFS

18 SC-740 CHAMBERS

SUBSURFACE DETENTION SYSTEM #2

ISOLATOR ROW:

CONTRIBUTING IMPERVIOUS AREA TOTAL: 68,348 SF
 WQF = 2.08 CFS

14 SC-740 CHAMBERS

FOREST AVE TREATMENT

ISOLATOR ROW:

CONTRIBUTING IMPERVIOUS AREA TOTAL: 5200 SF
 WQF = 0.14 CFS

2 SC-310 CHAMBER



University of New Hampshire Stormwater Center



2009 BIENNIAL REPORT



UNIVERSITY
of NEW HAMPSHIRE



Contents

3	Directors' Message
4	Highlights
8	Field Research Site
10	Applying UNHSC Research
12	Reading this Report
14 – 30	Stormwater Treatment System Data
14	Porous Asphalt
16	Pervious Concrete
18	Subsurface Gravel Wetland
20	Bioretention Systems
22	Tree Box Filter
24	StormTech Isolator Row
26	Retention Ponds
28	Deep Sump Catch Basins
30	Filter Berm Swales
32 – 34	Targeted Research
35	Administration

Workshop at
UNHSC field site



About the Center

The University of New Hampshire Stormwater Center (UNHSC) is dedicated to the protection of water resources through effective stormwater management.

Center researchers evaluate and enhance the ability of stormwater treatment systems to treat the pollution in stormwater runoff and reduce the flooding that it can cause. The Center provides information on performance, cost, design, and maintenance to people who select, review, permit, design, install, and maintain stormwater management systems. The research is integrated with an evolving outreach

program that supports a wide range of stormwater managers and professionals who seek to build programs that protect water quality, preserve environmental values, and reduce the impact of stormwater runoff.

The Center receives its primary funding and program support from the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET), a partnership of UNH and the National Oceanic and Atmospheric Administration (NOAA). It is housed within the University's Environmental Research Group, a division of the College of Engineering and Physical Sciences.

Resources for Stormwater Managers

The Center's research has served as the foundation for a range of outreach products—from best management practice (BMP) workshops geared to support municipal decision makers and stormwater engineers to peer-reviewed publications that explore the frontiers of stormwater science. Learn more about these resources at www.unh.edu/erg/cstev.



- BMP Fact Sheets
- Data Reports
- Design Drawings
- Design Specs
- Journal Articles
- Web Resources

Directors' Message



UNH Stormwater Center
field site

These economic times challenge all of us to make difficult choices about what we can and cannot afford. For state and local governments facing budget shortfalls, the University of New Hampshire Stormwater Center has some welcome news: when it comes to effective stormwater management, you do not have to choose between affordability and healthy waters.

People often tell us that they think they do have to choose, that even if Low Impact Development (LID) stormwater techniques do a better job of protecting water quality, they are too costly to install and maintain. Yet our research is demonstrating that this is not the case. Since 2004 we have monitored the ability of 23 stormwater systems to treat pollution and reduce the volume of runoff. We have worked with hundreds of municipal officials, regulators, engineers, contractors, and educators on dozens of stormwater demonstration and education projects.

In the process, we have found that projects that use LID approaches to managing stormwater runoff can be both more effective in treating pollution and in some instances less expensive to install than those that rely on curbs, pipes, and ponds. LID systems do require maintenance to function properly, but so do all of the commonly used systems that are believed to require little or no attention. In particular, our research has demonstrated that when retention ponds are not adequately maintained, they not only fail to remove pollutants from runoff; they can magnify the negative impact of polluted stormwater on receiving waters.

Using LID approaches for stormwater management involves decentralizing runoff and maximizing infiltration, which ultimately reduces the stress on urban stormwater infrastructure. Metropolitan areas like Portland, OR., are already seeing the economic benefits of using LID to reduce the runoff flowing through their combined sewers. These savings extend to residential and commercial development and redevelopment projects. Homeowners that use techniques like rain barrels, drought resistant rain gardens, and porous pavements can save on water utility bills and help prevent flooded basements.

By allowing for these less familiar but more effective techniques in stormwater ordinances, municipalities can help insure these benefits at every level. In so doing, they anticipate the inevitable. Federal laws requiring LID-style approaches to stormwater are already in place as part of Phase II of the Clean Water Act. It is only a matter of time before all municipalities will have to comply with mandates to clean up impaired waters, and our research is showing that in many cases an LID approach to stormwater management is essential in meeting that goal.

A proactive response to federal regulations has the added benefit of preparing us for the impacts of climate change. Whether climate change has brought severe storms or drought to a community, LID stormwater techniques can help mitigate the flooding associated with impervious surfaces, can allow rainfall to replenish aquifers, and can be powerful tools for adaptive management.

This report is one of many tools we use to communicate our work in a way that we hope stormwater managers from many backgrounds will find useful. We welcome your comments and questions, about this report and all of the work we do.

Sincerely,

A handwritten signature in black ink, appearing to read 'Robert Roseen'.

Robert Roseen
Director

A handwritten signature in black ink, appearing to read 'Thomas Ballestero'.

Thomas Ballestero
Senior Scientist

A handwritten signature in black ink, appearing to read 'Jamie Houle'.

Jamie Houle
Program Manager
and Outreach Coordinator

StormTech Isolator Row



The StormTech Isolator Row is an effective filtration/infiltration system best suited to locations where space is at a premium and the system's relatively expensive installation cost can be offset by increasing available space for development.

About the StormTech Isolator Row

The StormTech Isolator Row is a manufactured system designed to provide subsurface water quality treatment and easy access for maintenance. It is typically used to remove pollution from runoff before it flows into unlined infiltration chambers designed for detention and water quantity control. The Isolator Row consists of a series of StormTech chambers installed over a layer of woven geotextile, which sits on a crushed stone infiltration bed surrounded with filter fabric. The bed is directly connected to an upstream manhole for maintenance access and large storm bypass. At UNHSC, the Isolator Row has met a TSS median annual removal standard of 80 percent, and exhibited an enhanced capacity to remove phosphorus. The Isolator Row is well suited for urban environments where space is at a premium.

Implementation

The StormTech Isolator Row is part of a class of manufactured, subsurface filtration/infiltration systems that are being used more and more throughout the United States. In general, these systems are best suited to locations where above ground space is at a premium. They are often used in urban areas, where they are located beneath parking lots and other

infrastructure. As with any infiltration system, care must be taken when locating these systems near pollution hotspots, or where seasonal high groundwater levels may lead to groundwater contamination. In such cases, if installed, the systems should be lined to prevent infiltration into groundwater, and outfitted with subdrains that discharge to the surface. Designs for the StormTech Isolator Row are available from the manufacturer.

System Performance

Cost & Maintenance

While subsurface HDPE systems such as the Isolator Row tend to be more expensive than conventional stormwater treatments like retention ponds, the costs are ameliorated by the increase in available space for development. The cost to install a StormTech Isolator Row system large enough to treat runoff from one acre of impervious surface was \$34,000 in 2006.

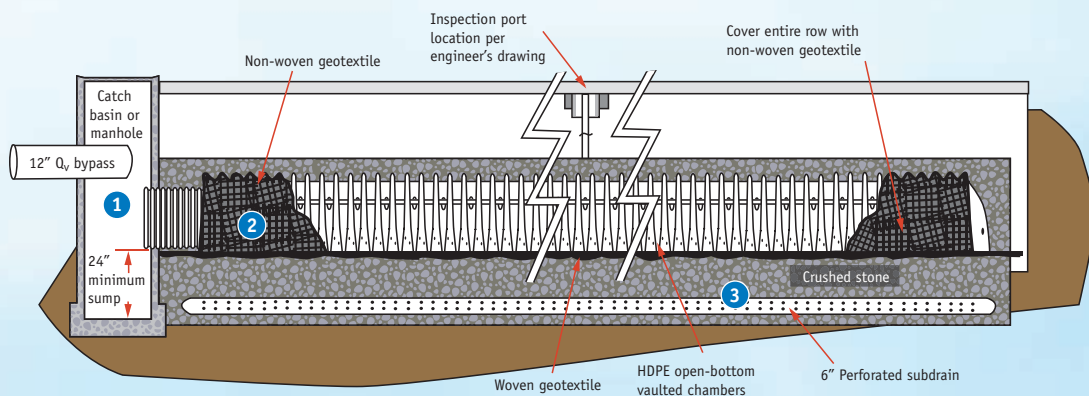
In more than two years of operation, the system is at less than 50 percent of its recommended maintenance trigger point. Maintenance should be conducted when the sediment in the chambers reaches approximately three inches in depth according to recommendations from the manufacturer. Sediment accumulation can be monitored through inspection ports. When maintenance is needed, the entire row can be

CATEGORY / BMP TYPE	Water Quality: Physical (Sedimentation, Filtration) & Chemical (Sorption)	SPECIFICATIONS	MAINTENANCE	Fast Facts
Filtration, Infiltration, Manufactured Treatment Device		Catchment Area: 1 acre	Maintenance Sensitivity: Low	
UNIT OPERATIONS & PROCESSES	DESIGN SOURCE StormTech, LLC	Water Quality Flow: 1 cfs	Inspections: High	
Hydrologic (Flow Alteration)	BASIC DIMENSIONS Chamber: 51" wide X 30" high X 85.4" long	Water Quality Volume: 3,300 cf	Sediment Removal: Moderate	
		INSTALLATION COST \$34,000 per acre treated		

How the System Works

WATER QUALITY TREATMENT PROCESS ▼

1. Runoff flows into the Isolator Row chambers from a catchbasin or pipe.
2. Runoff slowly passes from the chambers through a woven geotextile fabric and into the crushed stone reservoir below the system. The runoff passes through the fabric, leaving behind sediments and associated contaminants through the physical unit operations of filtration and sedimentation. As an organic filter cake develops over the fabric, phosphorus is also removed via the chemical process of sorption.
3. Filtered runoff collects in a perforated subdrain and returns to a storm drain system, infiltrates into the subgrade, or is discharged to the surface.



washed clean through an access manhole and by a hydro-jet with sediment removed by vactoring (vacuuming). Entry into the system is considered a confined space entry and requires trained personnel and equipment.

During two years of evaluation at UNHSC, the Isolator Row has accumulated, at most, one and one half inches of sediment in its chambers. As a result, researchers have not performed maintenance on the system. The Isolator Row presents an interesting opportunity to study the relationship between maintenance and performance. Researchers have observed enhanced phosphorus removal as the system develops an organic filter cake between the chambers and the woven geotextile fabric that lies beneath them. This enhancement is tempered by the likelihood that, as the filter cake continues to grow, hydraulic efficiency will decline and more runoff will bypass the system untreated until maintenance is performed. Analyses are underway to develop maintenance recommendations that balance and optimize the water quality and water quantity management abilities of this system.

Cold Climate

This system's water quality treatment and volume control capacity remained strong in all seasons, reinforcing the conclusion that filtration and infiltration systems perform well, even in cold climates.

Water Quality Treatment

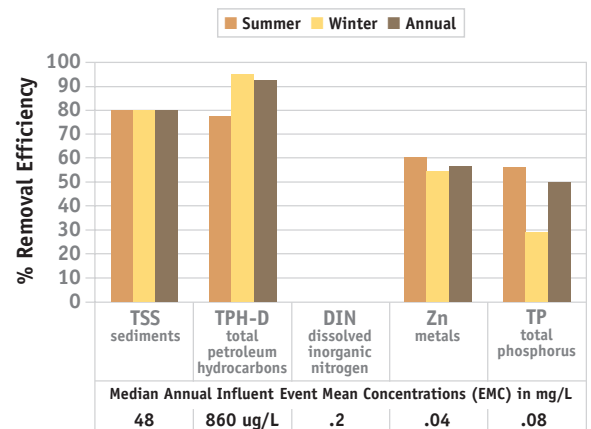
The StormTech Isolator Row system does a good job of reducing the concentration of common pollutants associated with stormwater performance assessment with the exception of nitrogen. It generally meets EPA's recommended level of removal for total suspended solids, and meets regional ambient water quality criteria for heavy metals and petroleum hydrocarbons. The system has a capacity to achieve modest levels of total phosphorus removal, which may be enhanced over time. (See Cost & Maintenance Section.) The lack of nitrogen treatment is typical for non-vegetated aerobic systems. Nutrient load reduction would be further increased through volume reduction by infiltration. Like all other systems monitored at UNHSC, it does not provide chloride removal.

The chart at top right reflects the system's performance in removing total suspended solids, total petroleum hydrocarbons, dissolved inorganic nitrogen, total phosphorus, and zinc. Values represent results recorded over a two-year monitoring period, with the data further divided into summer and winter components.

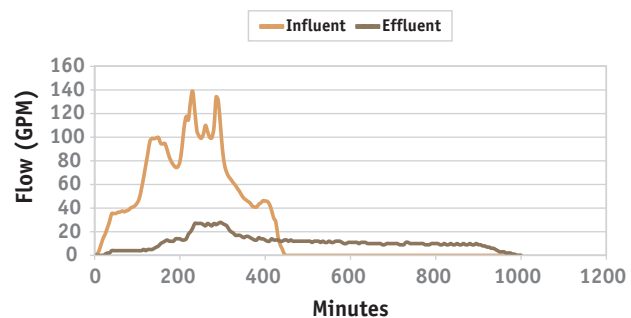
Water Quantity Control

Like other infiltration and filtration systems, the StormTech Isolator Row system exhibits the capacity to reduce peak flows and could be used to reduce runoff volume in appropriate soils, such as those belonging to groups "A" or "B." The figure at bottom right provides information on peak flow reduction and lag times for the system.

POLLUTANT REMOVAL: 2006–2008



HYDRAULIC PERFORMANCE



	Winter	Summer	Annual Average
Average Peak Flow Reduction	71%	81%	76%
Average Lag Time (minutes)	358	190	274

SYSTEM DESIGN ▼

The StormTech Isolator Row is designed to provide subsurface water quality treatment for small storms. The manufacturer adapts the system's design in accordance with local watershed conditions and target treatment objectives.

Chamber units are made of high-density polyethylene (HDPE) pipe and are designed to bear loads consistent with those experienced by parking lots. The UNHSC chamber dimensions are 51 x 30 x 85.4 inches and can be linked together to form linear rows up to 200 feet long. The chambers are laid over woven geotextile, which rests on an infiltration base composed of one foot of three quarter inch crushed stone. The entire excavation is then wrapped in nonwoven geotextile to protect the system from the migration of fine particles from the surrounding soil.

A three- to five-foot separation from seasonal high groundwater table (as designated by regulations) is necessary to minimize the potential for groundwater contamination. Stormwater flows of

up to one cubic foot per second (cfs) enter the system through an upstream manhole or other flow diverter. This is representative of flow-based sizing of a BMP common for devices that have limited detention or storage. Such devices are often better described by a maximum treatable flow rate as opposed to a treatment volume.

A bypass is incorporated in the StormTech system where flows exceeding the design rate are bypassed around the device and flow directly into adjacent chambers that can be sized to treat the C_p and Q_p . Because of the bypass design, maintenance requirements are extremely important. A poorly maintained device would bypass prematurely into the unlined chamber systems and eventually clog subsurface soils resulting in system failure.

STANDARD 10: Illicit Discharge Compliance Statement

Project Name: New Elementary School	Nitsch Project #: 13858
Location: Swampscott, MA	Checked by: DC
Prepared by: JW	Sheet No. 1 of 1
Date: 2/18/22	

Standard 10 states: All illicit discharges to the stormwater management system are prohibited.

This is to verify:

1. Based on the information available there are no known or suspected illicit discharges to the stormwater management system at the New Elementary School located in Swampscott, MA as defined in the MassDEP Stormwater Handbook.
2. The design of the stormwater system includes no proposed illicit discharges.

David Conway, PE

Date

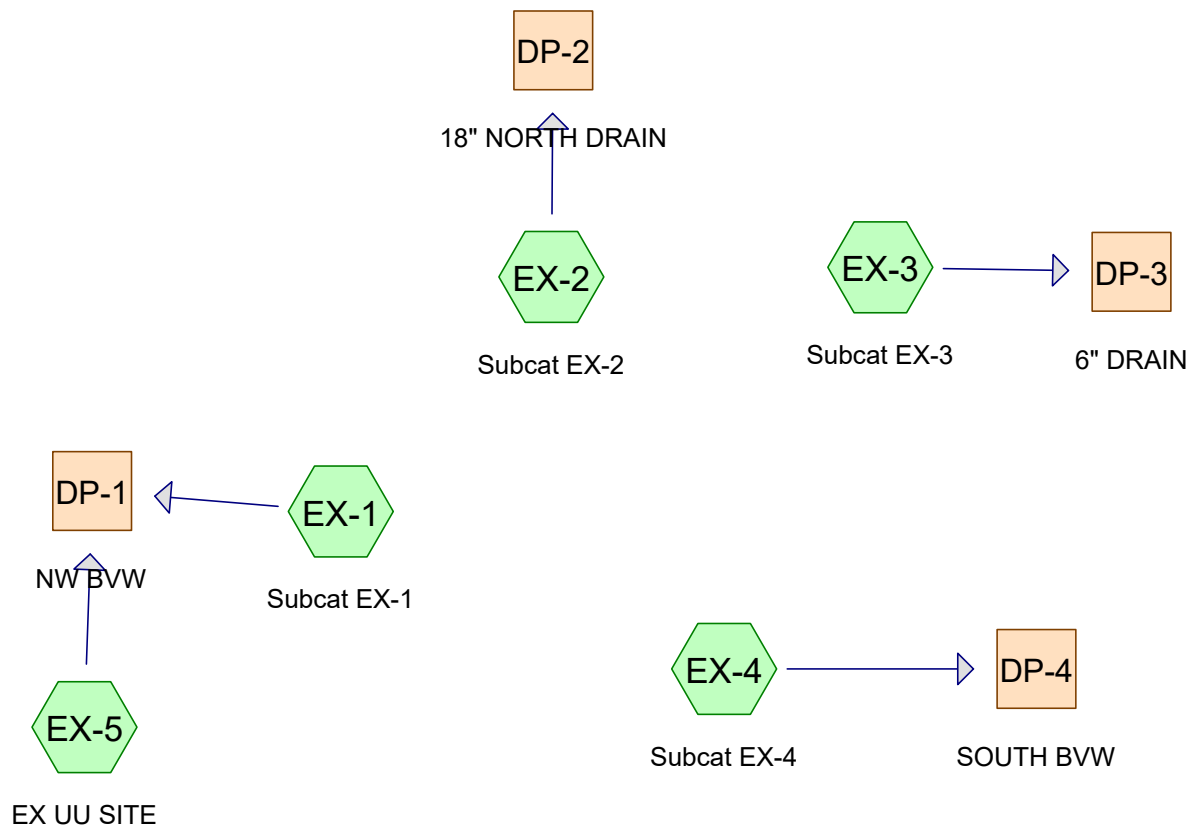
APPENDIX B

Pre-Development Conditions – HydroCAD Calculations

EXISTING HYDROCAD ANALYSIS

NEW ELEMENTARY SCHOOL

SWAMPSCOTT, MA



Routing Diagram for 13858 - EX Conditions

Prepared by {enter your company name here}, Printed 2/17/2022
HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

13858 - EX Conditions

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 2

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2year 24-hr	NOAA 24-hr	D	Default	24.00	1	3.17	2
2	10year 24-hr	NOAA 24-hr	D	Default	24.00	1	5.01	2
3	25year 24-hr	NOAA 24-hr	D	Default	24.00	1	6.16	2
4	100year 24-hr	NOAA 24-hr	D	Default	24.00	1	7.93	2

13858 - EX Conditions

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 3

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
22,319	61	>75% Grass cover, Good, HSG B (EX-1, EX-2, EX-3, EX-4)
1,538	74	>75% Grass cover, Good, HSG C (EX-5)
115,353	80	>75% Grass cover, Good, HSG D (EX-1, EX-2, EX-3)
1,630	82	Dirt, HSG B (EX-3, EX-4)
12,441	89	Dirt, HSG D (EX-2, EX-3)
10,681	98	Impervious, HSG B (EX-1, EX-2, EX-3, EX-4)
52,665	98	Impervious, HSG D (EX-2, EX-3, EX-4)
30,982	98	Paved parking, HSG B (EX-5)
159	98	Paved parking, HSG D (EX-1)
551	98	Roofs, HSG B (EX-2)
19,119	98	Roofs, HSG D (EX-2)
21,821	55	Woods, Good, HSG B (EX-1, EX-2, EX-4)
29,665	70	Woods, Good, HSG C (EX-5)
8,345	77	Woods, Good, HSG D (EX-1, EX-2)
327,269	83	TOTAL AREA

13858 - EX Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 4

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEX-1: Subcat EX-1	Runoff Area=36,178 sf 4.63% Impervious Runoff Depth>0.67" Flow Length=202' Tc=6.0 min CN=67 Runoff=0.56 cfs 2,020 cf
SubcatchmentEX-2: Subcat EX-2	Runoff Area=169,293 sf 35.08% Impervious Runoff Depth>1.81" Flow Length=385' Tc=10.0 min CN=86 Runoff=6.94 cfs 25,466 cf
SubcatchmentEX-3: Subcat EX-3	Runoff Area=43,439 sf 41.34% Impervious Runoff Depth>1.65" Flow Length=246' Tc=7.8 min CN=84 Runoff=1.79 cfs 5,989 cf
SubcatchmentEX-4: Subcat EX-4	Runoff Area=16,174 sf 25.68% Impervious Runoff Depth>0.91" Tc=6.0 min CN=72 Runoff=0.37 cfs 1,226 cf
SubcatchmentEX-5: EX UU SITE	Runoff Area=62,185 sf 49.82% Impervious Runoff Depth>1.66" Tc=6.0 min CN=84 Runoff=2.69 cfs 8,578 cf
Reach DP-1: NW BVW	Inflow=3.25 cfs 10,598 cf Outflow=3.25 cfs 10,598 cf
Reach DP-2: 18" NORTH DRAIN	Inflow=6.94 cfs 25,466 cf Outflow=6.94 cfs 25,466 cf
Reach DP-3: 6" DRAIN	Inflow=1.79 cfs 5,989 cf Outflow=1.79 cfs 5,989 cf
Reach DP-4: SOUTH BVW	Inflow=0.37 cfs 1,226 cf Outflow=0.37 cfs 1,226 cf

Total Runoff Area = 327,269 sf Runoff Volume = 43,280 cf Average Runoff Depth = 1.59"
65.12% Pervious = 213,112 sf 34.88% Impervious = 114,157 sf

13858 - EX Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 5

Summary for Subcatchment EX-1: Subcat EX-1

Runoff = 0.56 cfs @ 12.14 hrs, Volume= 2,020 cf, Depth> 0.67"
 Routed to Reach DP-1 : NW BVW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Area (sf)	CN	Description
1,840	61	>75% Grass cover, Good, HSG B
7,992	80	>75% Grass cover, Good, HSG D
* 1,515	98	Impervious, HSG B
159	98	Paved parking, HSG D
17,152	55	Woods, Good, HSG B
7,520	77	Woods, Good, HSG D
36,178	67	Weighted Average
34,504		95.37% Pervious Area
1,674		4.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0480	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.17"
1.5	152	0.0579	1.68		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5					Direct Entry,
6.0	202	Total			

13858 - EX Conditions

Prepared by {enter your company name here}

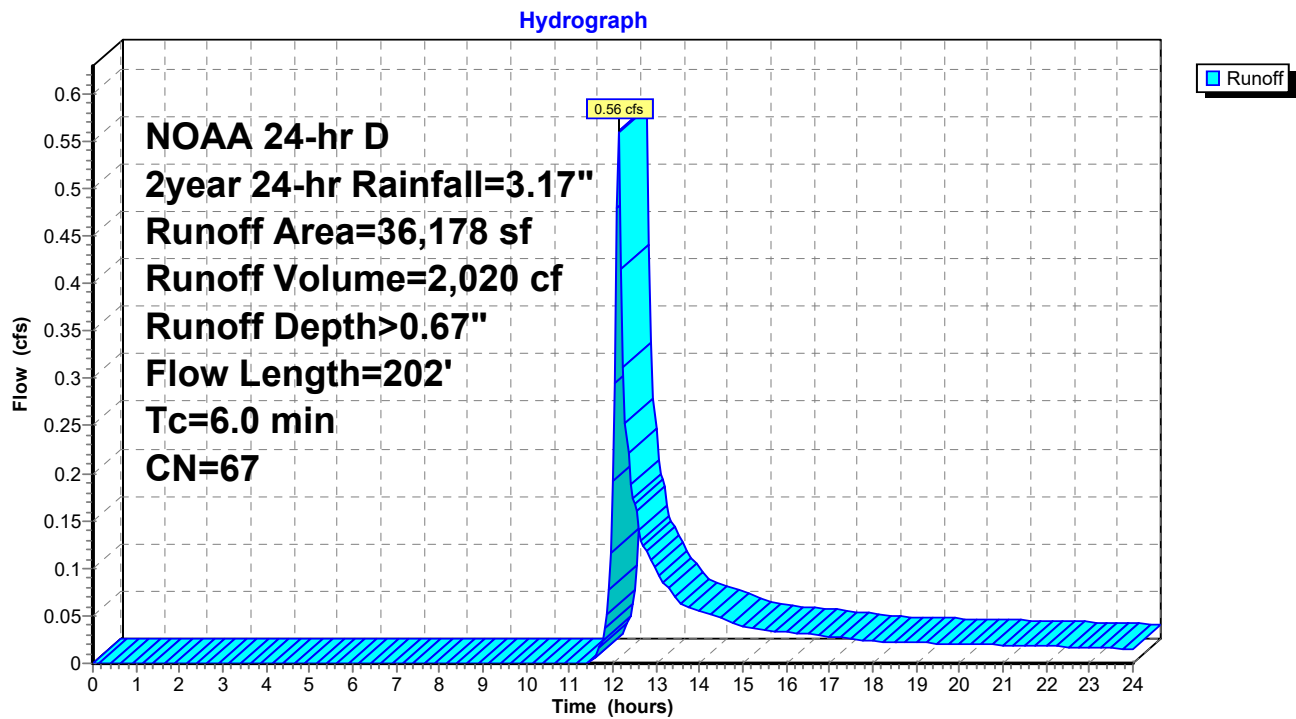
HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Printed 2/17/2022

Page 6

Subcatchment EX-1: Subcat EX-1



13858 - EX Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 7

Summary for Subcatchment EX-2: Subcat EX-2

Runoff = 6.94 cfs @ 12.17 hrs, Volume= 25,466 cf, Depth> 1.81"
 Routed to Reach DP-2 : 18" NORTH DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Area (sf)	CN	Description
1,906	61	>75% Grass cover, Good, HSG B
91,166	80	>75% Grass cover, Good, HSG D
* 11,943	89	Dirt, HSG D
4,461	98	Impervious, HSG B
35,258	98	Impervious, HSG D
551	98	Roofs, HSG B
19,119	98	Roofs, HSG D
4,064	55	Woods, Good, HSG B
825	77	Woods, Good, HSG D
169,293	86	Weighted Average
109,904		64.92% Pervious Area
59,389		35.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.0180	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.17"
4.1	335	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.0	385	Total			

13858 - EX Conditions

Prepared by {enter your company name here}

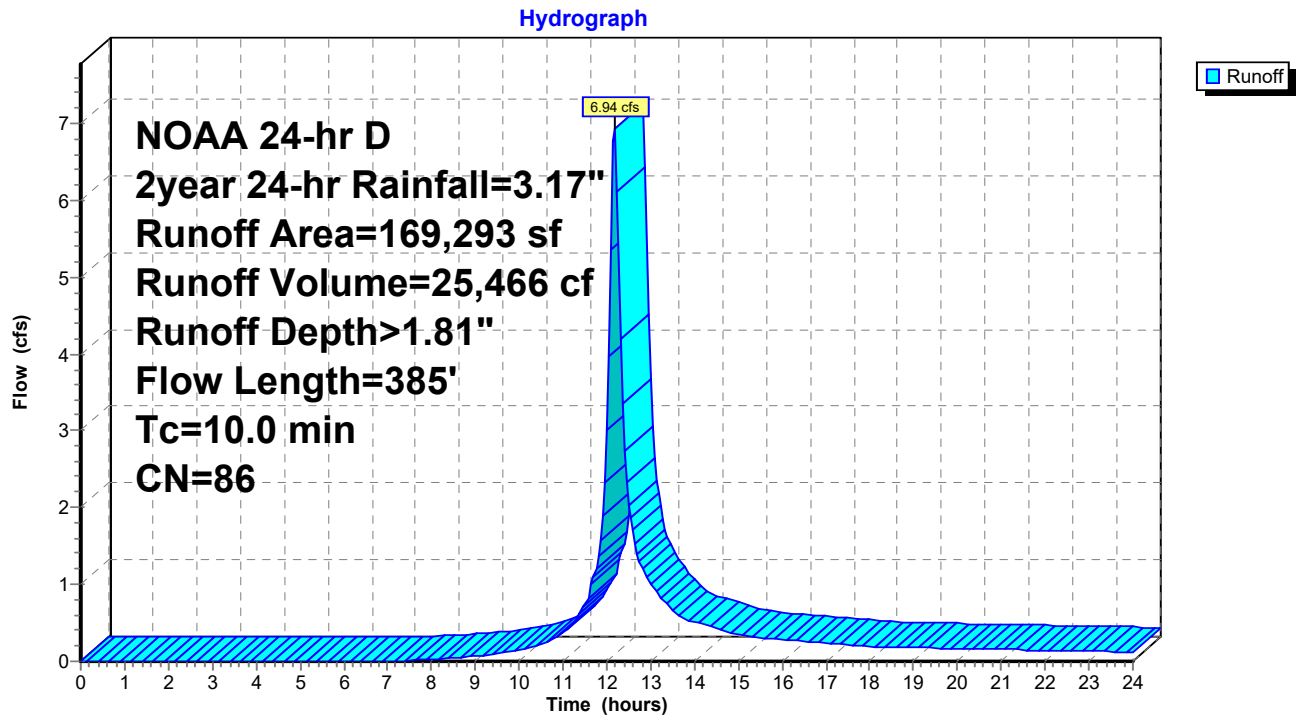
HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Printed 2/17/2022

Page 8

Subcatchment EX-2: Subcat EX-2



13858 - EX Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 9

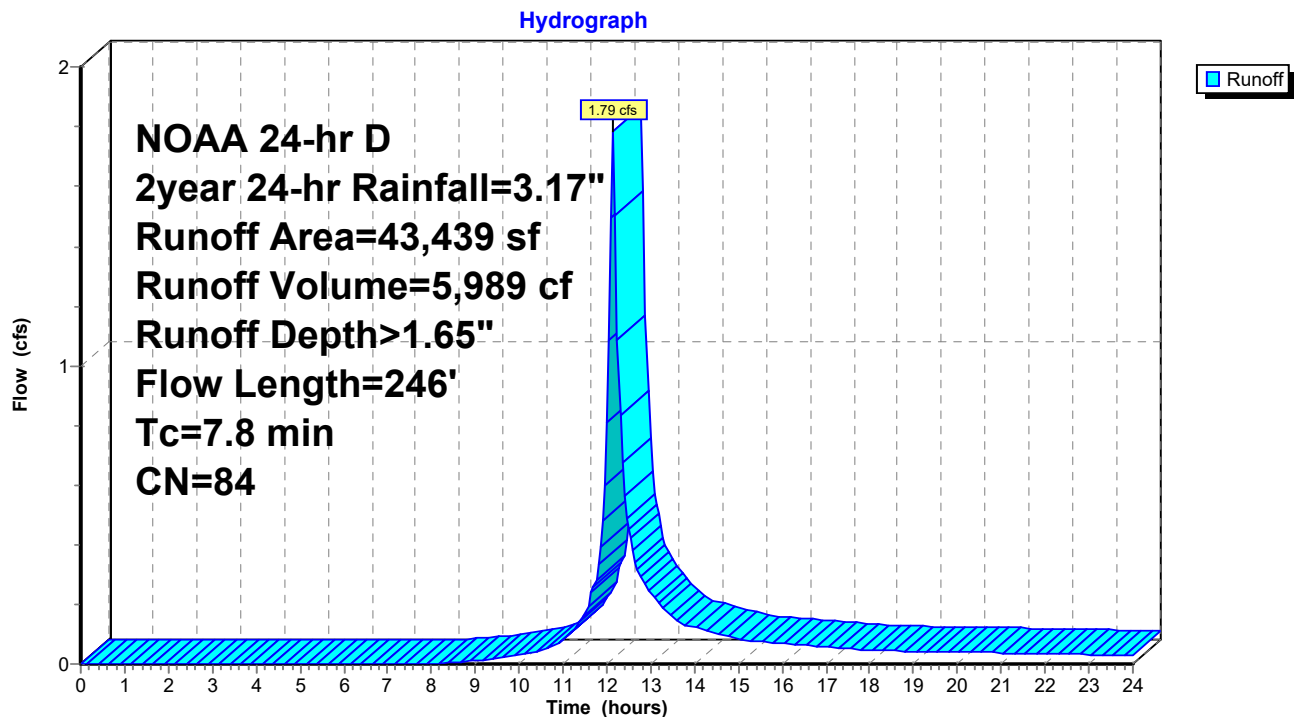
Summary for Subcatchment EX-3: Subcat EX-3

Runoff = 1.79 cfs @ 12.15 hrs, Volume= 5,989 cf, Depth> 1.65"
 Routed to Reach DP-3 : 6" DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Area (sf)	CN	Description
8,239	61	>75% Grass cover, Good, HSG B
16,195	80	>75% Grass cover, Good, HSG D
* 549	82	Dirt, HSG B
* 498	89	Dirt, HSG D
1,325	98	Impervious, HSG B
16,633	98	Impervious, HSG D
43,439	84	Weighted Average
25,481		58.66% Pervious Area
17,958		41.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0150	0.13		Sheet Flow,
					Grass: Short n= 0.150 P2= 3.17"
1.5	196	0.0200	2.12		Shallow Concentrated Flow,
					Grassed Waterway Kv= 15.0 fps
7.8	246	Total			

Subcatchment EX-3: Subcat EX-3

13858 - EX Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 10

Summary for Subcatchment EX-4: Subcat EX-4

Runoff = 0.37 cfs @ 12.14 hrs, Volume= 1,226 cf, Depth> 0.91"
 Routed to Reach DP-4 : SOUTH BVW

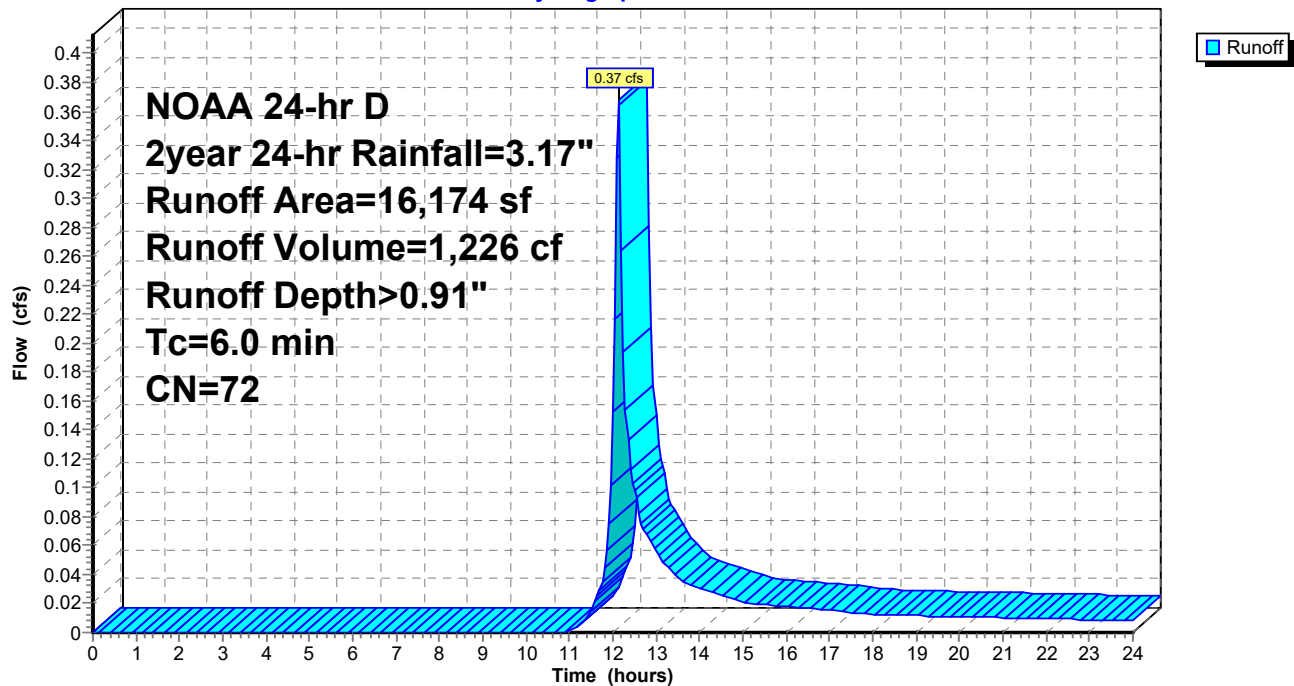
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Area (sf)	CN	Description
10,334	61	>75% Grass cover, Good, HSG B
* 1,081	82	Dirt, HSG B
3,380	98	Impervious, HSG B
774	98	Impervious, HSG D
605	55	Woods, Good, HSG B
16,174	72	Weighted Average
12,020		74.32% Pervious Area
4,154		25.68% Impervious Area

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

Subcatchment EX-4: Subcat EX-4

Hydrograph



13858 - EX Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 11

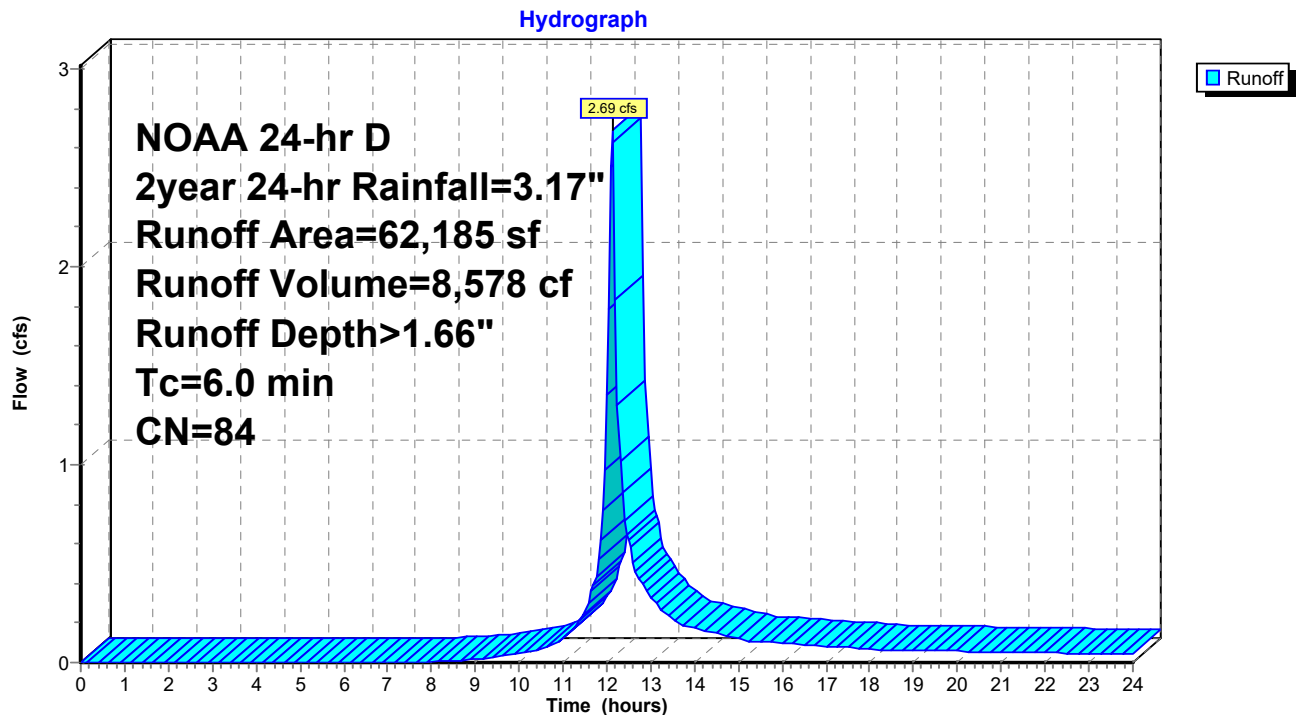
Summary for Subcatchment EX-5: EX UU SITE

Runoff = 2.69 cfs @ 12.13 hrs, Volume= 8,578 cf, Depth> 1.66"
 Routed to Reach DP-1 : NW BVW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Area (sf)	CN	Description
30,982	98	Paved parking, HSG B
29,665	70	Woods, Good, HSG C
1,538	74	>75% Grass cover, Good, HSG C
62,185	84	Weighted Average
31,203		50.18% Pervious Area
30,982		49.82% Impervious Area

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

Subcatchment EX-5: EX UU SITE

13858 - EX Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 12

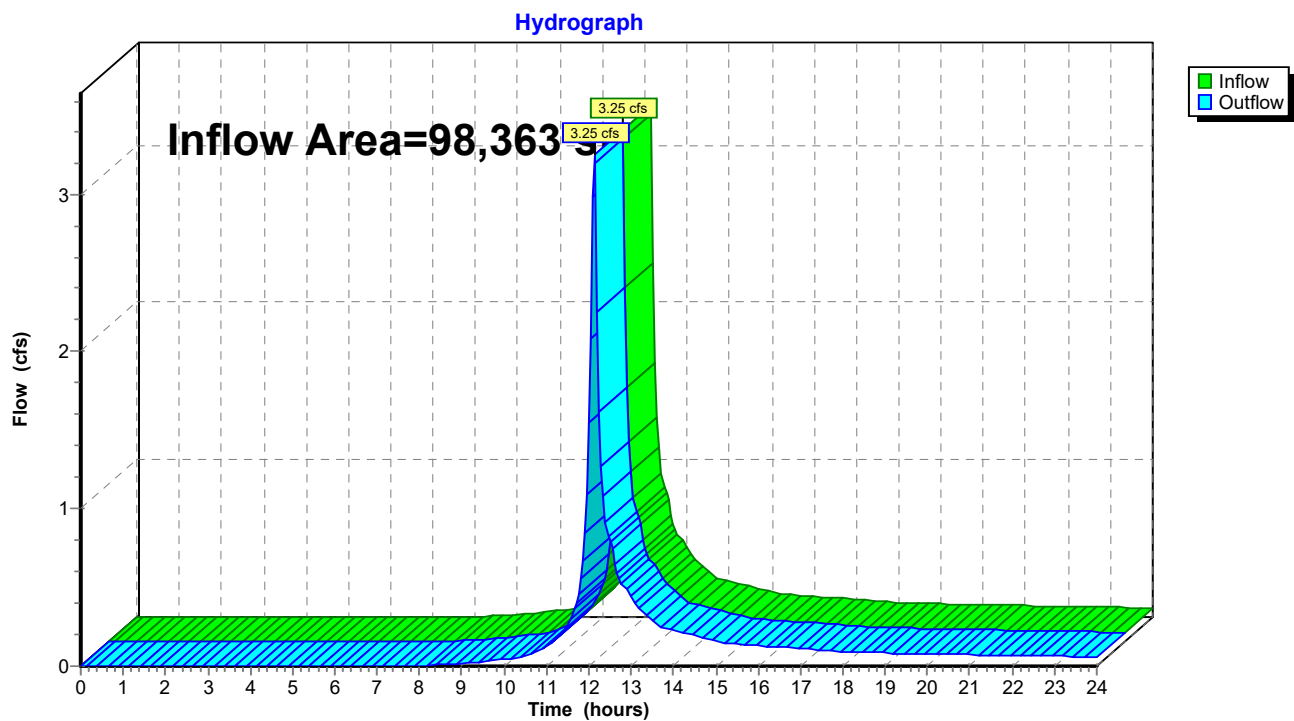
Summary for Reach DP-1: NW BVW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 98,363 sf, 33.20% Impervious, Inflow Depth > 1.29" for 2year 24-hr event
Inflow = 3.25 cfs @ 12.13 hrs, Volume= 10,598 cf
Outflow = 3.25 cfs @ 12.13 hrs, Volume= 10,598 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: NW BVW



13858 - EX Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 13

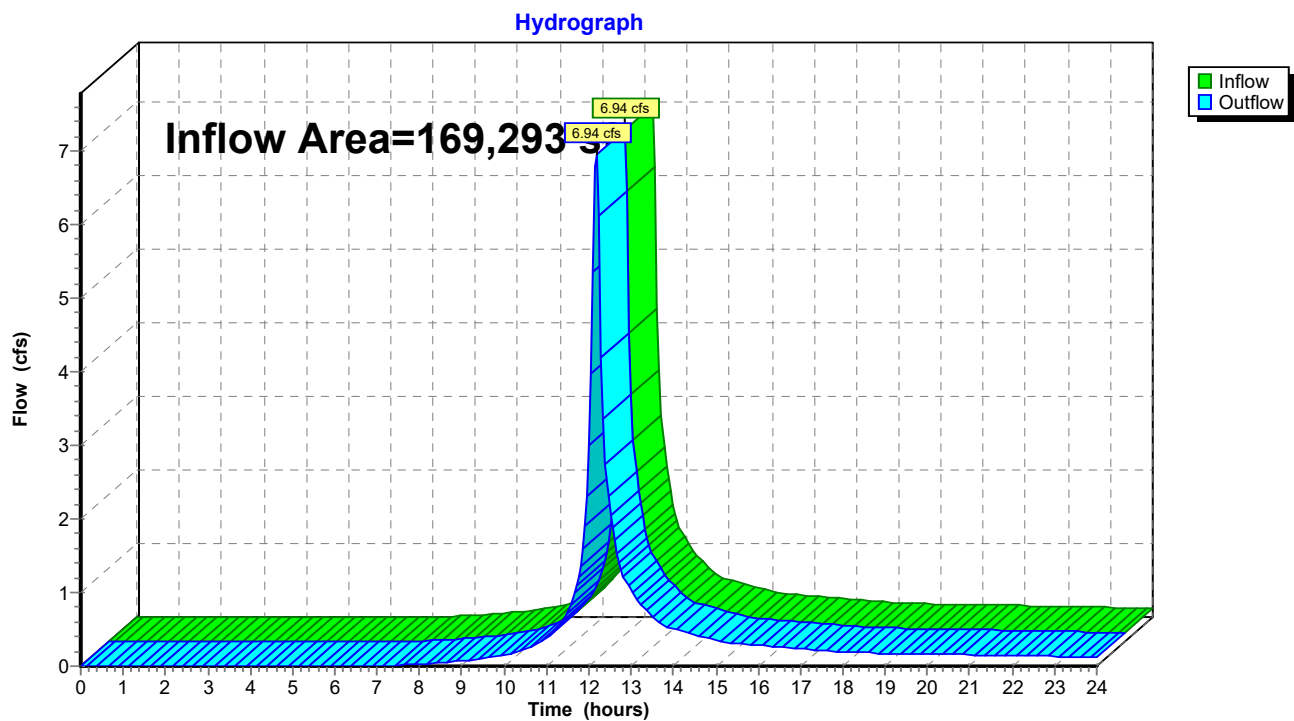
Summary for Reach DP-2: 18" NORTH DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 169,293 sf, 35.08% Impervious, Inflow Depth > 1.81" for 2year 24-hr event
Inflow = 6.94 cfs @ 12.17 hrs, Volume= 25,466 cf
Outflow = 6.94 cfs @ 12.17 hrs, Volume= 25,466 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: 18" NORTH DRAIN



13858 - EX Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 14

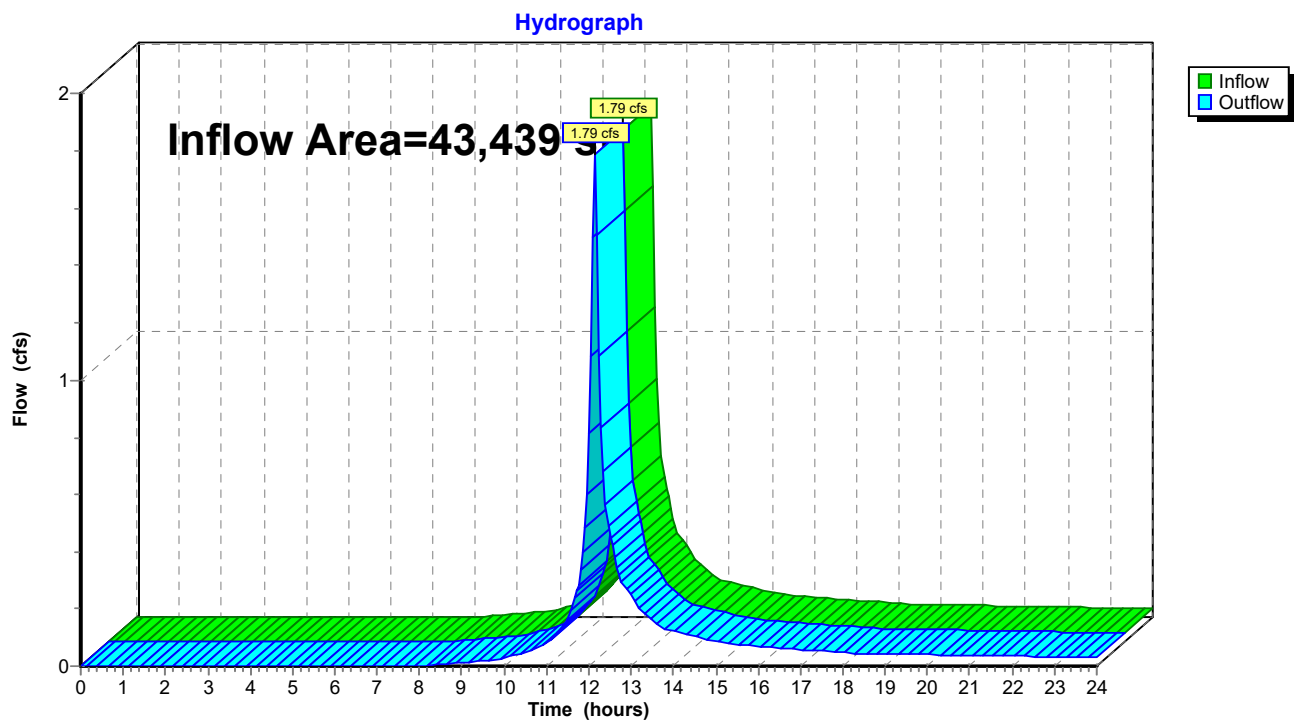
Summary for Reach DP-3: 6" DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 43,439 sf, 41.34% Impervious, Inflow Depth > 1.65" for 2year 24-hr event
Inflow = 1.79 cfs @ 12.15 hrs, Volume= 5,989 cf
Outflow = 1.79 cfs @ 12.15 hrs, Volume= 5,989 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-3: 6" DRAIN



13858 - EX Conditions

Prepared by {enter your company name here}

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Printed 2/17/2022

Page 15

Summary for Reach DP-4: SOUTH BVW

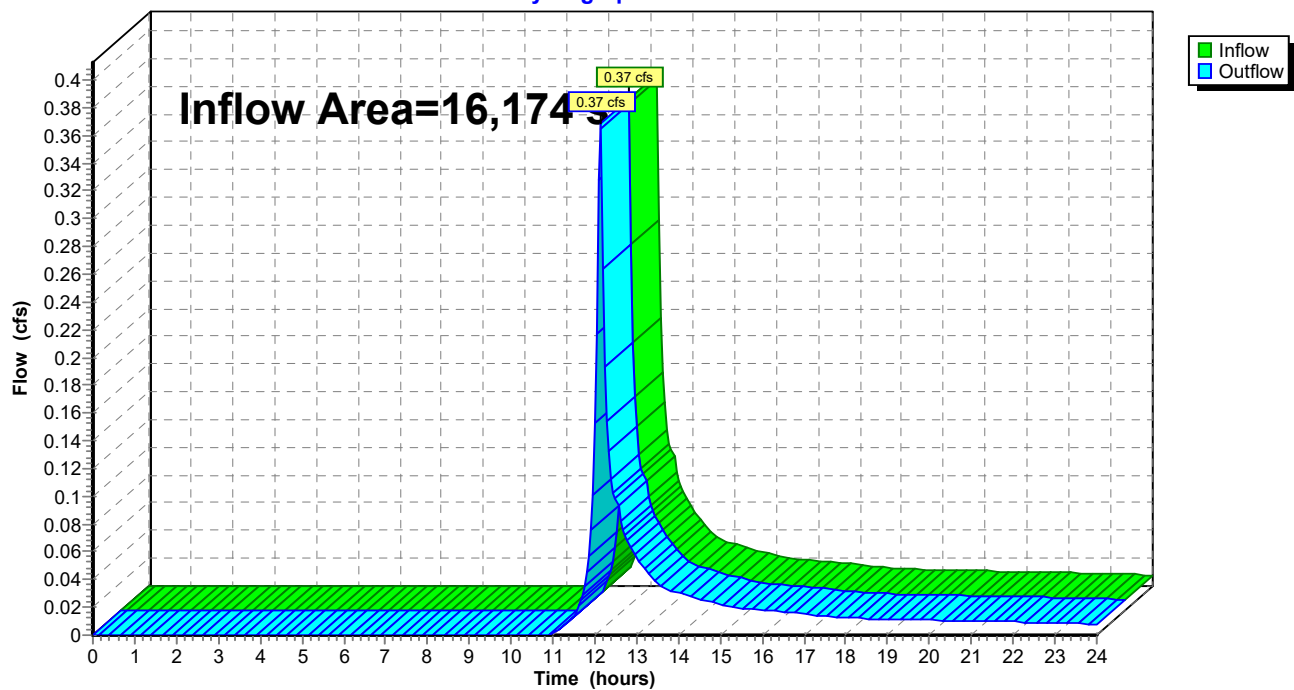
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16,174 sf, 25.68% Impervious, Inflow Depth > 0.91" for 2year 24-hr event
Inflow = 0.37 cfs @ 12.14 hrs, Volume= 1,226 cf
Outflow = 0.37 cfs @ 12.14 hrs, Volume= 1,226 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-4: SOUTH BVW

Hydrograph



13858 - EX Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 16

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEX-1: Subcat EX-1 Runoff Area=36,178 sf 4.63% Impervious Runoff Depth>1.81"
Flow Length=202' Tc=6.0 min CN=67 Runoff=1.69 cfs 5,449 cf

SubcatchmentEX-2: Subcat EX-2 Runoff Area=169,293 sf 35.08% Impervious Runoff Depth>3.47"
Flow Length=385' Tc=10.0 min CN=86 Runoff=13.09 cfs 48,949 cf

SubcatchmentEX-3: Subcat EX-3 Runoff Area=43,439 sf 41.34% Impervious Runoff Depth>3.27"
Flow Length=246' Tc=7.8 min CN=84 Runoff=3.48 cfs 11,854 cf

SubcatchmentEX-4: Subcat EX-4 Runoff Area=16,174 sf 25.68% Impervious Runoff Depth>2.20"
Tc=6.0 min CN=72 Runoff=0.93 cfs 2,969 cf

SubcatchmentEX-5: EX UU SITE Runoff Area=62,185 sf 49.82% Impervious Runoff Depth>3.28"
Tc=6.0 min CN=84 Runoff=5.23 cfs 16,977 cf

Reach DP-1: NW BVW Inflow=6.92 cfs 22,426 cf
Outflow=6.92 cfs 22,426 cf

Reach DP-2: 18" NORTH DRAIN Inflow=13.09 cfs 48,949 cf
Outflow=13.09 cfs 48,949 cf

Reach DP-3: 6" DRAIN Inflow=3.48 cfs 11,854 cf
Outflow=3.48 cfs 11,854 cf

Reach DP-4: SOUTH BVW Inflow=0.93 cfs 2,969 cf
Outflow=0.93 cfs 2,969 cf

Total Runoff Area = 327,269 sf Runoff Volume = 86,198 cf Average Runoff Depth = 3.16"
65.12% Pervious = 213,112 sf 34.88% Impervious = 114,157 sf

13858 - EX Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 17

Summary for Subcatchment EX-1: Subcat EX-1

Runoff = 1.69 cfs @ 12.14 hrs, Volume= 5,449 cf, Depth> 1.81"
 Routed to Reach DP-1 : NW BVW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Area (sf)	CN	Description
1,840	61	>75% Grass cover, Good, HSG B
7,992	80	>75% Grass cover, Good, HSG D
* 1,515	98	Impervious, HSG B
159	98	Paved parking, HSG D
17,152	55	Woods, Good, HSG B
7,520	77	Woods, Good, HSG D
36,178	67	Weighted Average
34,504		95.37% Pervious Area
1,674		4.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0480	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.17"
1.5	152	0.0579	1.68		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5					Direct Entry,
6.0	202	Total			

13858 - EX Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

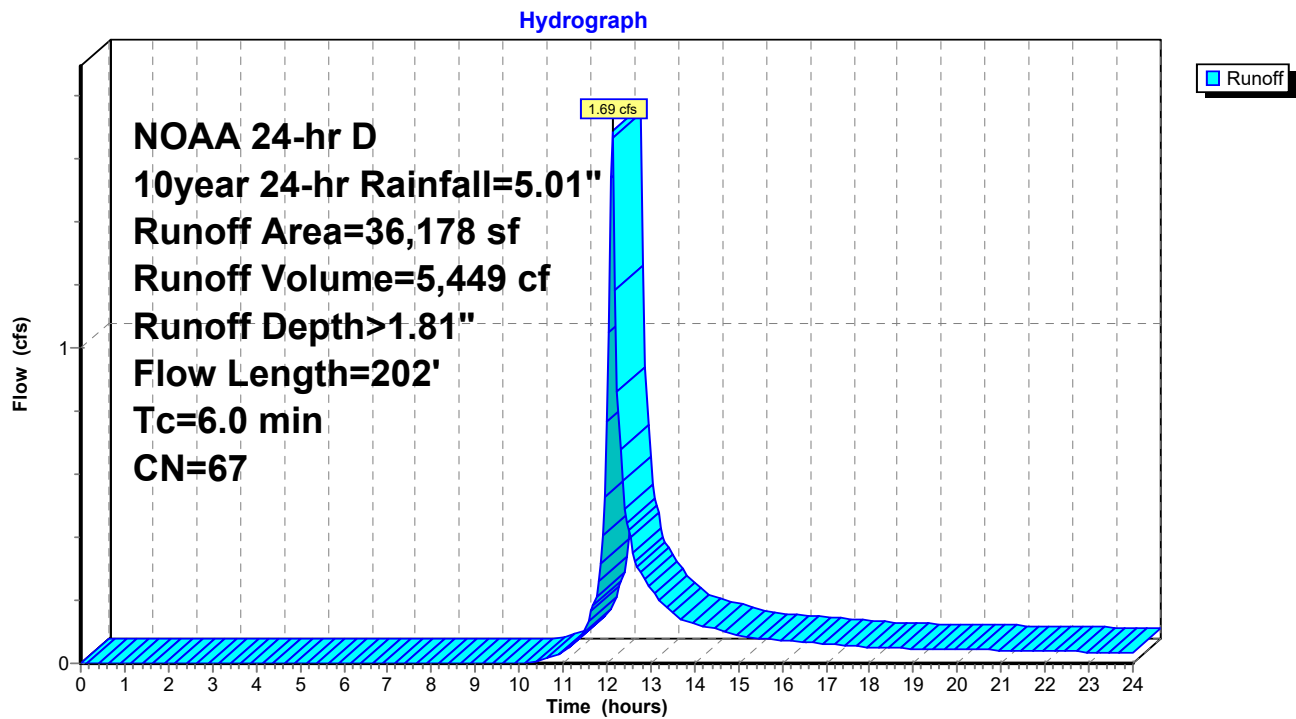
Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 18

Subcatchment EX-1: Subcat EX-1



13858 - EX Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 19

Summary for Subcatchment EX-2: Subcat EX-2

Runoff = 13.09 cfs @ 12.17 hrs, Volume= 48,949 cf, Depth> 3.47"
 Routed to Reach DP-2 : 18" NORTH DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Area (sf)	CN	Description
1,906	61	>75% Grass cover, Good, HSG B
91,166	80	>75% Grass cover, Good, HSG D
* 11,943	89	Dirt, HSG D
4,461	98	Impervious, HSG B
35,258	98	Impervious, HSG D
551	98	Roofs, HSG B
19,119	98	Roofs, HSG D
4,064	55	Woods, Good, HSG B
825	77	Woods, Good, HSG D
169,293	86	Weighted Average
109,904		64.92% Pervious Area
59,389		35.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.0180	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.17"
4.1	335	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.0	385	Total			

13858 - EX Conditions

Prepared by {enter your company name here}

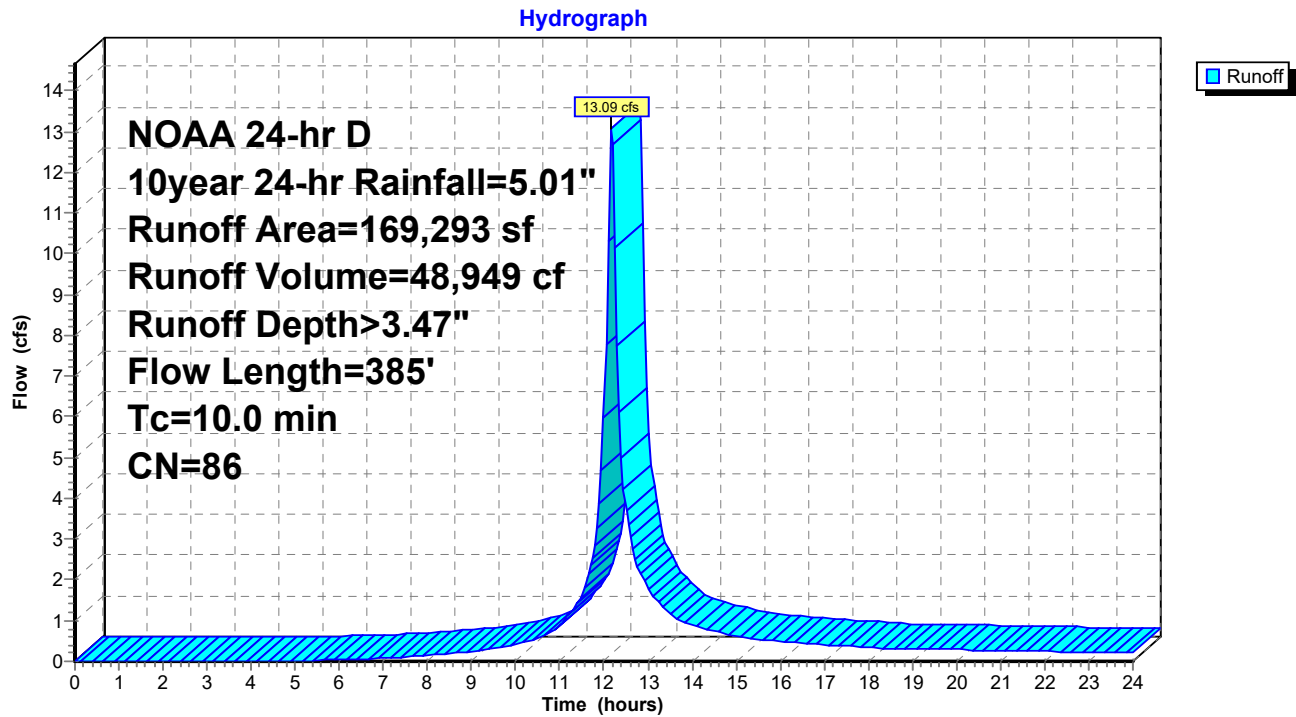
HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Printed 2/17/2022

Page 20

Subcatchment EX-2: Subcat EX-2



13858 - EX Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 21

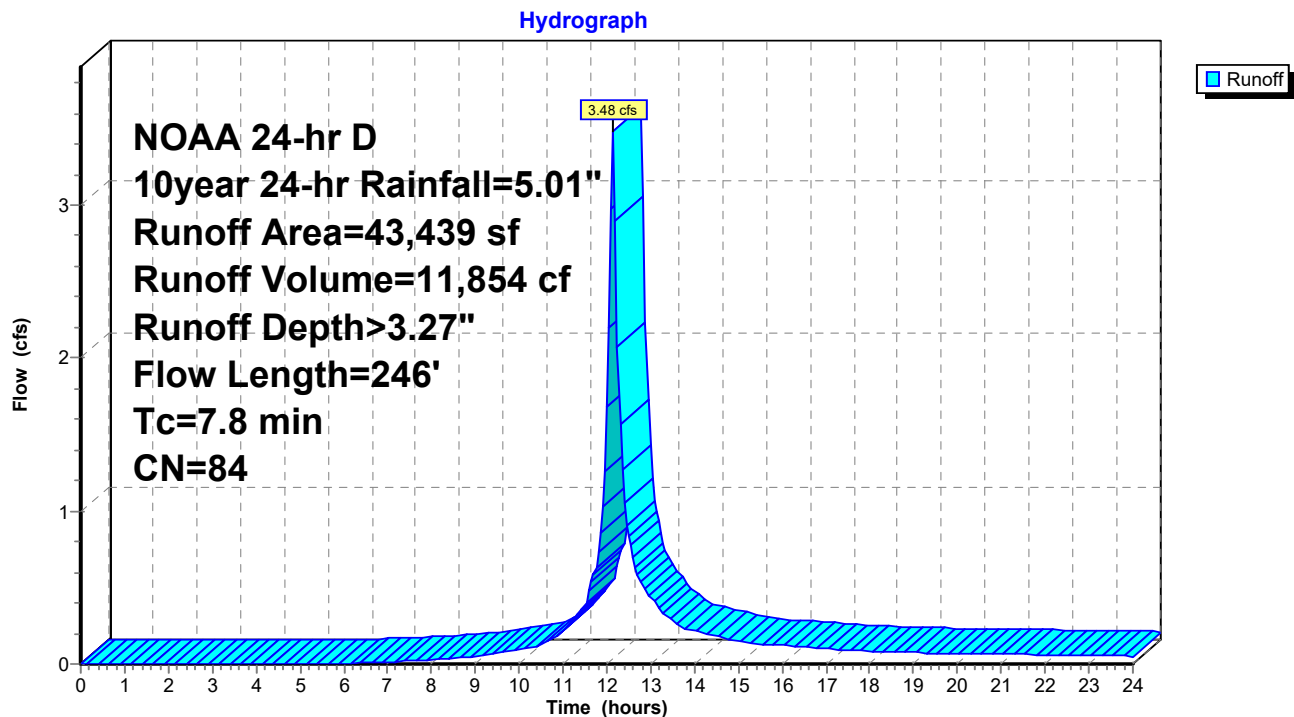
Summary for Subcatchment EX-3: Subcat EX-3

Runoff = 3.48 cfs @ 12.15 hrs, Volume= 11,854 cf, Depth> 3.27"
 Routed to Reach DP-3 : 6" DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Area (sf)	CN	Description
8,239	61	>75% Grass cover, Good, HSG B
16,195	80	>75% Grass cover, Good, HSG D
* 549	82	Dirt, HSG B
* 498	89	Dirt, HSG D
1,325	98	Impervious, HSG B
16,633	98	Impervious, HSG D
43,439	84	Weighted Average
25,481		58.66% Pervious Area
17,958		41.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0150	0.13		Sheet Flow,
					Grass: Short n= 0.150 P2= 3.17"
1.5	196	0.0200	2.12		Shallow Concentrated Flow,
					Grassed Waterway Kv= 15.0 fps
7.8	246	Total			

Subcatchment EX-3: Subcat EX-3

13858 - EX Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 22

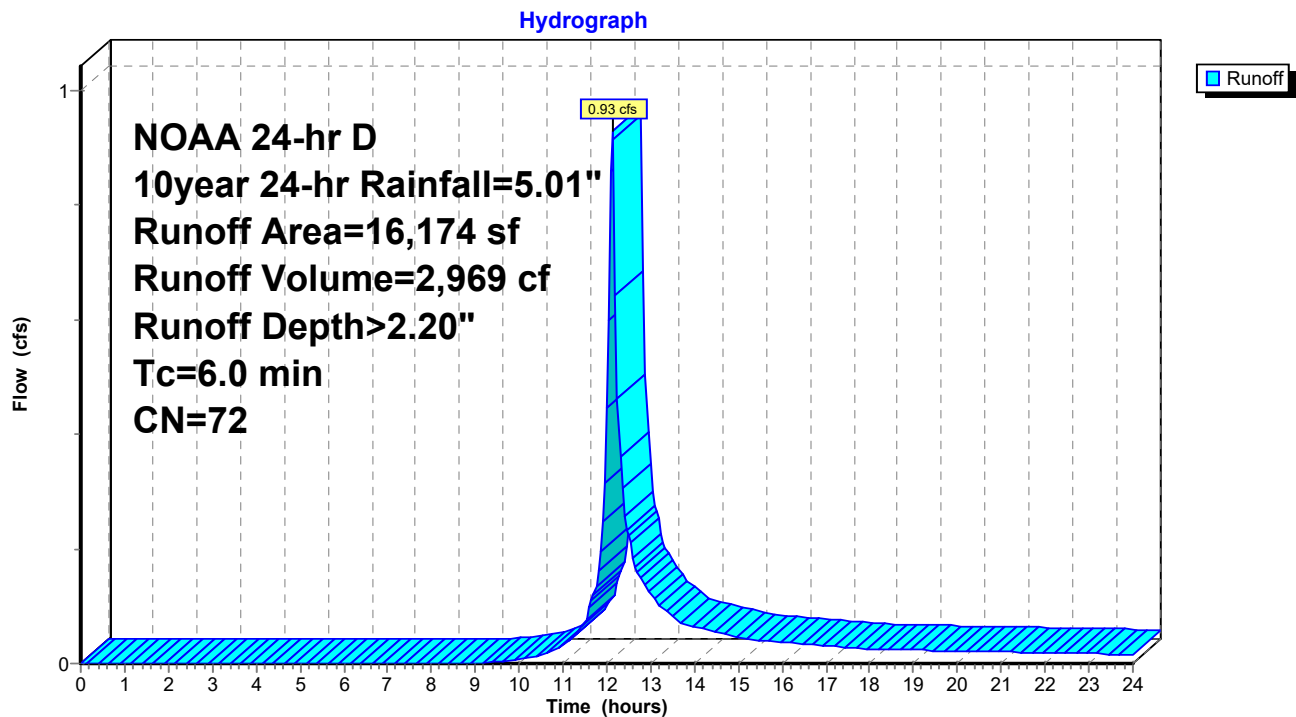
Summary for Subcatchment EX-4: Subcat EX-4

Runoff = 0.93 cfs @ 12.13 hrs, Volume= 2,969 cf, Depth> 2.20"
 Routed to Reach DP-4 : SOUTH BVW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Area (sf)	CN	Description
10,334	61	>75% Grass cover, Good, HSG B
* 1,081	82	Dirt, HSG B
3,380	98	Impervious, HSG B
774	98	Impervious, HSG D
605	55	Woods, Good, HSG B
16,174	72	Weighted Average
12,020		74.32% Pervious Area
4,154		25.68% Impervious Area

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

Subcatchment EX-4: Subcat EX-4

13858 - EX Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 23

Summary for Subcatchment EX-5: EX UU SITE

Runoff = 5.23 cfs @ 12.13 hrs, Volume= 16,977 cf, Depth> 3.28"
Routed to Reach DP-1 : NW BVW

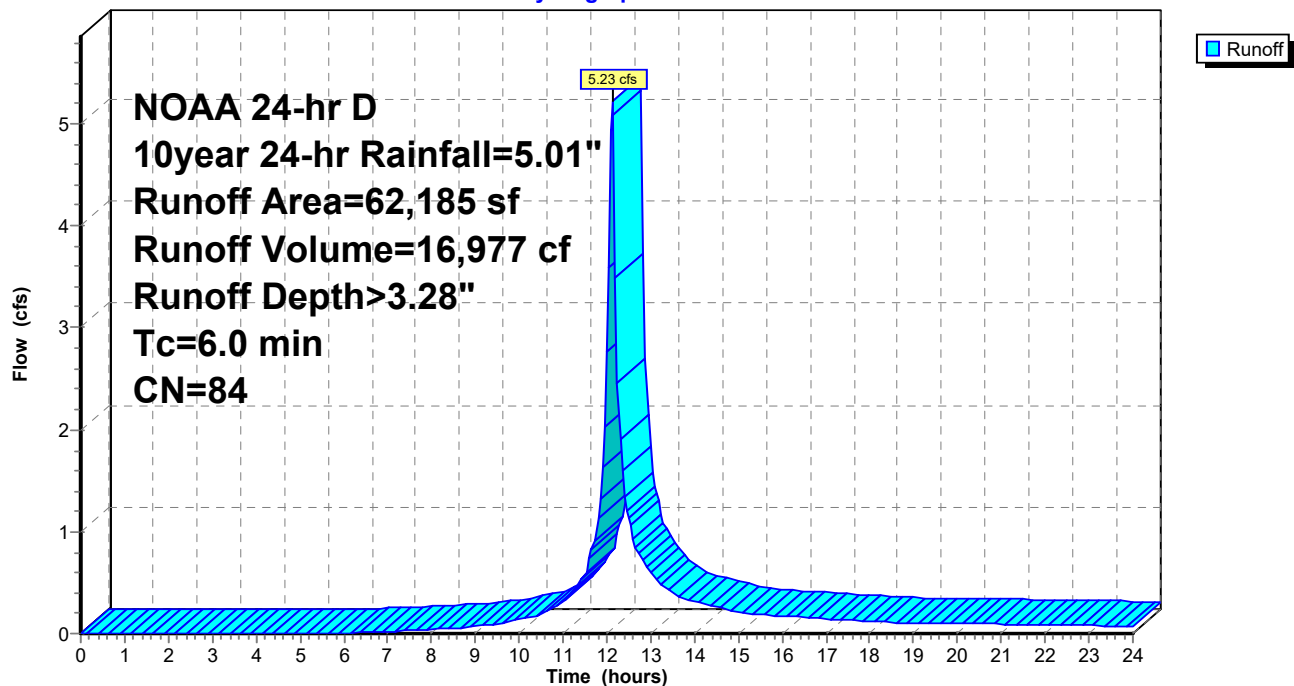
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Area (sf)	CN	Description
30,982	98	Paved parking, HSG B
29,665	70	Woods, Good, HSG C
1,538	74	>75% Grass cover, Good, HSG C
62,185	84	Weighted Average
31,203		50.18% Pervious Area
30,982		49.82% Impervious Area

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

Subcatchment EX-5: EX UU SITE

Hydrograph



13858 - EX Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 24

Summary for Reach DP-1: NW BVW

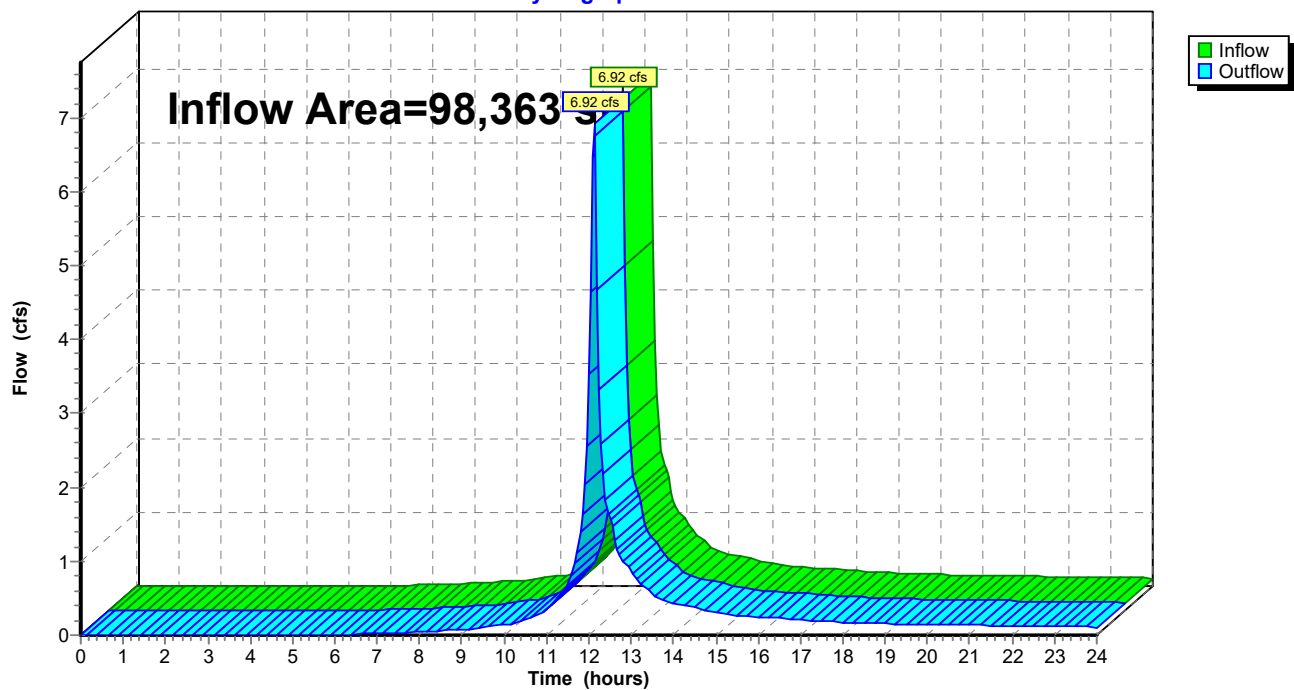
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 98,363 sf, 33.20% Impervious, Inflow Depth > 2.74" for 10year 24-hr event
Inflow = 6.92 cfs @ 12.13 hrs, Volume= 22,426 cf
Outflow = 6.92 cfs @ 12.13 hrs, Volume= 22,426 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: NW BVW

Hydrograph



13858 - EX Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 25

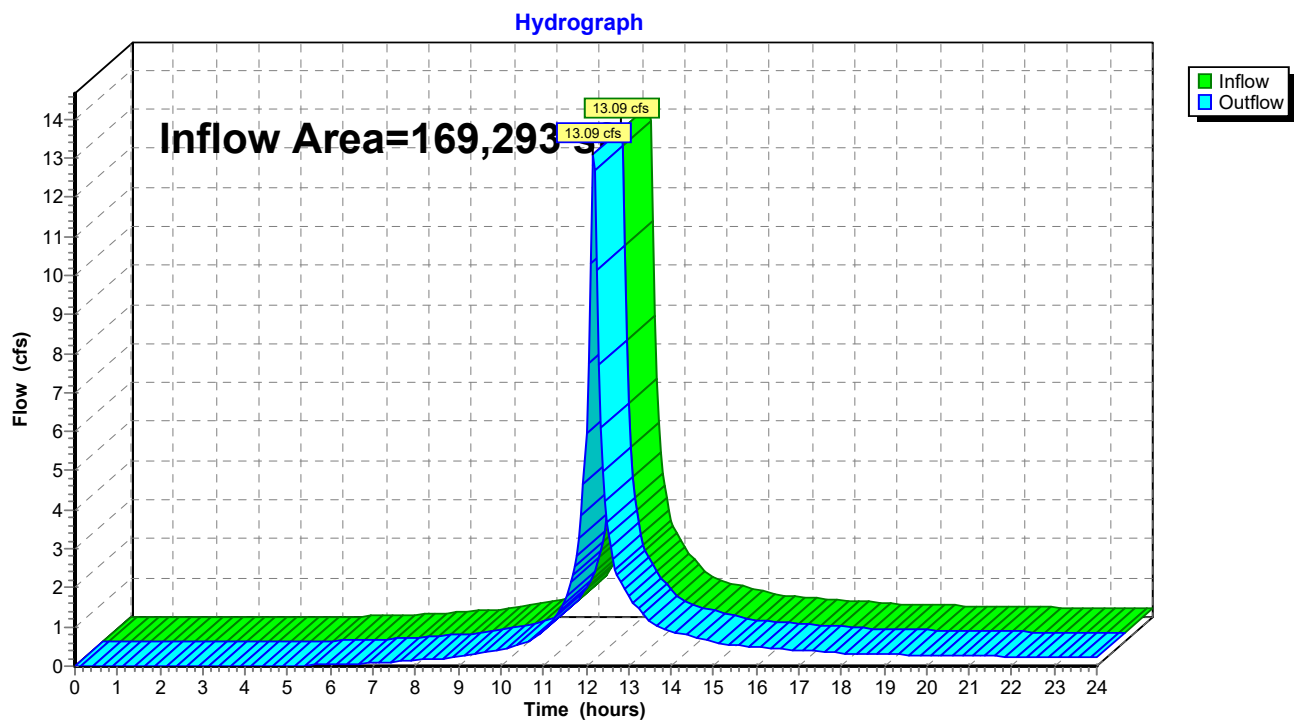
Summary for Reach DP-2: 18" NORTH DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 169,293 sf, 35.08% Impervious, Inflow Depth > 3.47" for 10year 24-hr event
Inflow = 13.09 cfs @ 12.17 hrs, Volume= 48,949 cf
Outflow = 13.09 cfs @ 12.17 hrs, Volume= 48,949 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: 18" NORTH DRAIN



13858 - EX Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 26

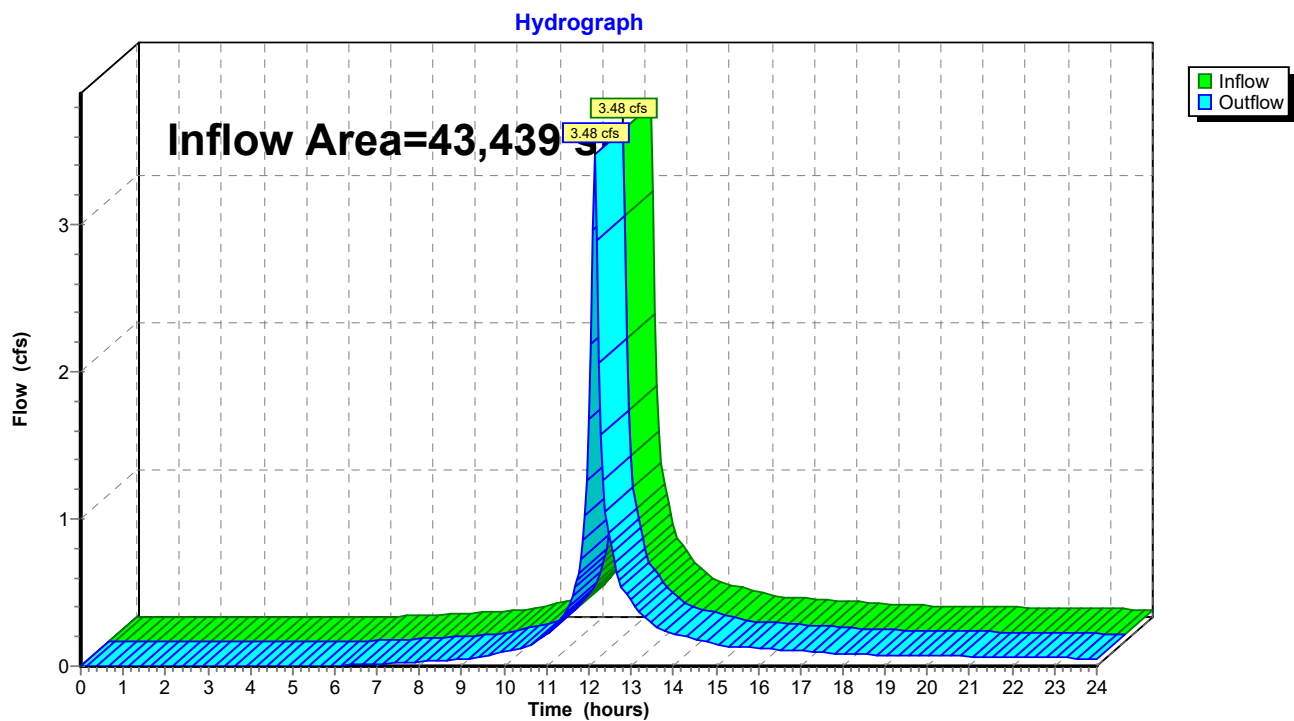
Summary for Reach DP-3: 6" DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 43,439 sf, 41.34% Impervious, Inflow Depth > 3.27" for 10year 24-hr event
Inflow = 3.48 cfs @ 12.15 hrs, Volume= 11,854 cf
Outflow = 3.48 cfs @ 12.15 hrs, Volume= 11,854 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-3: 6" DRAIN



13858 - EX Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 27

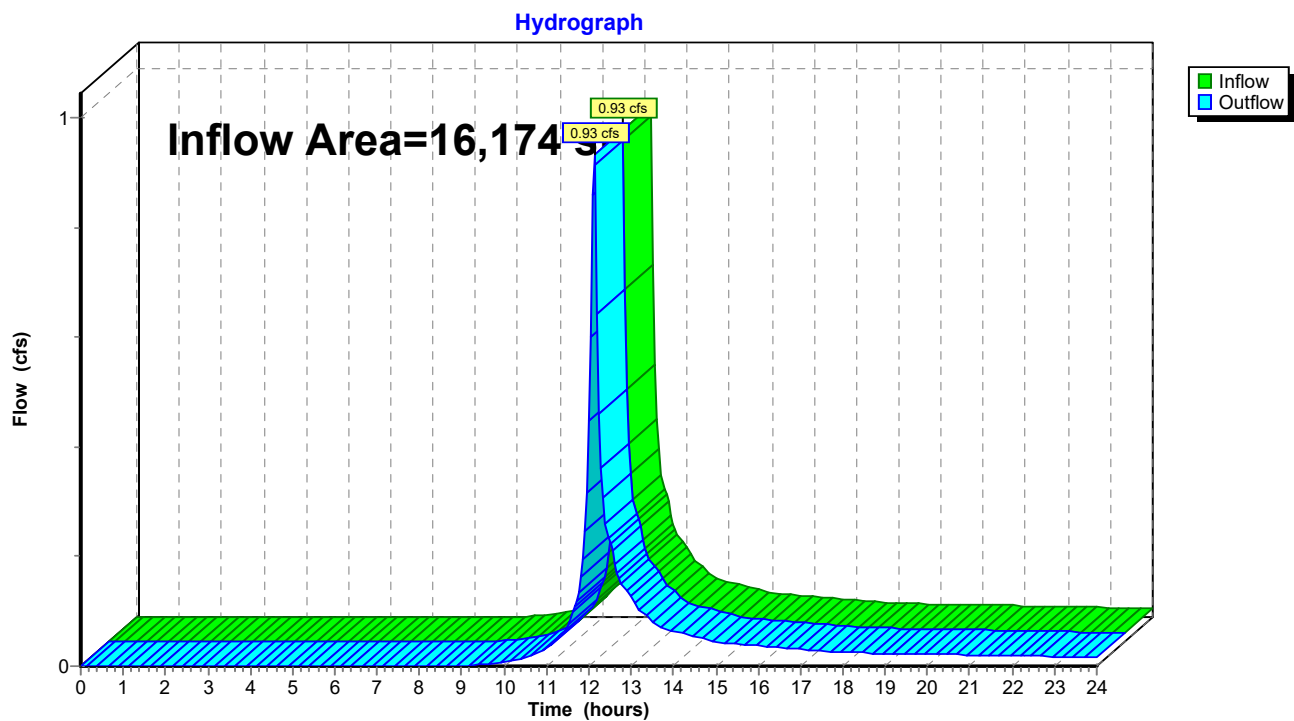
Summary for Reach DP-4: SOUTH BVW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16,174 sf, 25.68% Impervious, Inflow Depth > 2.20" for 10year 24-hr event
Inflow = 0.93 cfs @ 12.13 hrs, Volume= 2,969 cf
Outflow = 0.93 cfs @ 12.13 hrs, Volume= 2,969 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-4: SOUTH BVW



13858 - EX Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 28

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEX-1: Subcat EX-1

Runoff Area=36,178 sf 4.63% Impervious Runoff Depth>2.65"
Flow Length=202' Tc=6.0 min CN=67 Runoff=2.50 cfs 7,983 cf

SubcatchmentEX-2: Subcat EX-2

Runoff Area=169,293 sf 35.08% Impervious Runoff Depth>4.55"
Flow Length=385' Tc=10.0 min CN=86 Runoff=16.95 cfs 64,236 cf

SubcatchmentEX-3: Subcat EX-3

Runoff Area=43,439 sf 41.34% Impervious Runoff Depth>4.34"
Flow Length=246' Tc=7.8 min CN=84 Runoff=4.56 cfs 15,712 cf

SubcatchmentEX-4: Subcat EX-4

Runoff Area=16,174 sf 25.68% Impervious Runoff Depth>3.12"
Tc=6.0 min CN=72 Runoff=1.32 cfs 4,206 cf

SubcatchmentEX-5: EX UU SITE

Runoff Area=62,185 sf 49.82% Impervious Runoff Depth>4.34"
Tc=6.0 min CN=84 Runoff=6.84 cfs 22,501 cf

Reach DP-1: NW BVW

Inflow=9.34 cfs 30,484 cf
Outflow=9.34 cfs 30,484 cf

Reach DP-2: 18" NORTH DRAIN

Inflow=16.95 cfs 64,236 cf
Outflow=16.95 cfs 64,236 cf

Reach DP-3: 6" DRAIN

Inflow=4.56 cfs 15,712 cf
Outflow=4.56 cfs 15,712 cf

Reach DP-4: SOUTH BVW

Inflow=1.32 cfs 4,206 cf
Outflow=1.32 cfs 4,206 cf

Total Runoff Area = 327,269 sf Runoff Volume = 114,639 cf Average Runoff Depth = 4.20"
65.12% Pervious = 213,112 sf 34.88% Impervious = 114,157 sf

13858 - EX Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 29

Summary for Subcatchment EX-1: Subcat EX-1

Runoff = 2.50 cfs @ 12.13 hrs, Volume= 7,983 cf, Depth> 2.65"
 Routed to Reach DP-1 : NW BVW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Area (sf)	CN	Description
1,840	61	>75% Grass cover, Good, HSG B
7,992	80	>75% Grass cover, Good, HSG D
* 1,515	98	Impervious, HSG B
159	98	Paved parking, HSG D
17,152	55	Woods, Good, HSG B
7,520	77	Woods, Good, HSG D
36,178	67	Weighted Average
34,504		95.37% Pervious Area
1,674		4.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0480	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.17"
1.5	152	0.0579	1.68		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5					Direct Entry,
6.0	202	Total			

13858 - EX Conditions

Prepared by {enter your company name here}

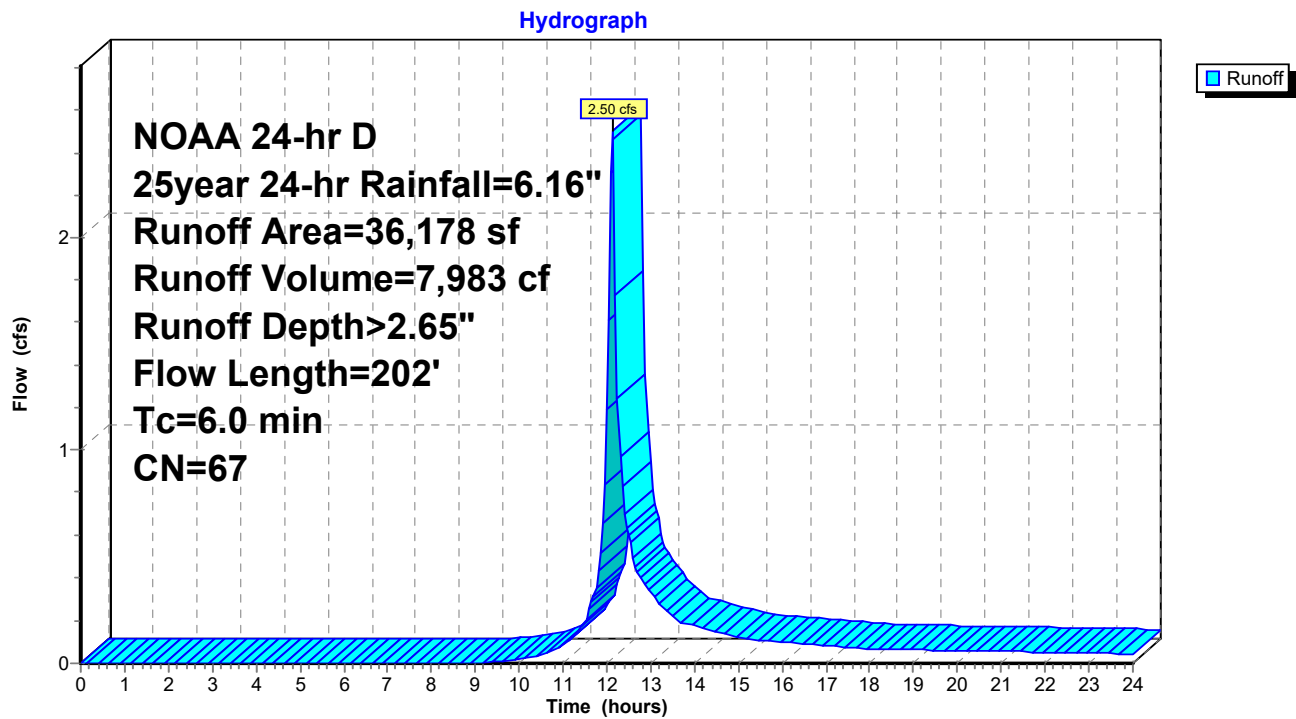
HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Printed 2/17/2022

Page 30

Subcatchment EX-1: Subcat EX-1



13858 - EX Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 31

Summary for Subcatchment EX-2: Subcat EX-2

Runoff = 16.95 cfs @ 12.17 hrs, Volume= 64,236 cf, Depth> 4.55"
 Routed to Reach DP-2 : 18" NORTH DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Area (sf)	CN	Description
1,906	61	>75% Grass cover, Good, HSG B
91,166	80	>75% Grass cover, Good, HSG D
* 11,943	89	Dirt, HSG D
4,461	98	Impervious, HSG B
35,258	98	Impervious, HSG D
551	98	Roofs, HSG B
19,119	98	Roofs, HSG D
4,064	55	Woods, Good, HSG B
825	77	Woods, Good, HSG D
169,293	86	Weighted Average
109,904		64.92% Pervious Area
59,389		35.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.0180	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.17"
4.1	335	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.0	385	Total			

13858 - EX Conditions

Prepared by {enter your company name here}

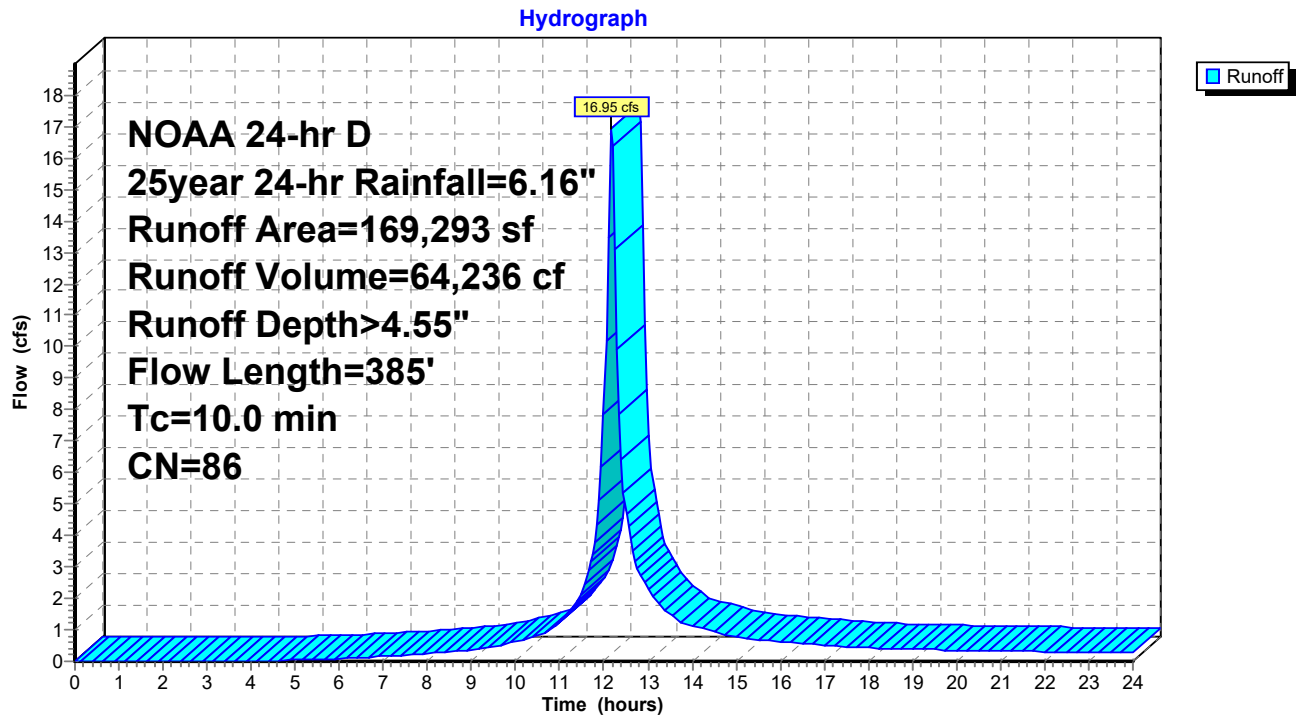
HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Printed 2/17/2022

Page 32

Subcatchment EX-2: Subcat EX-2



13858 - EX Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 33

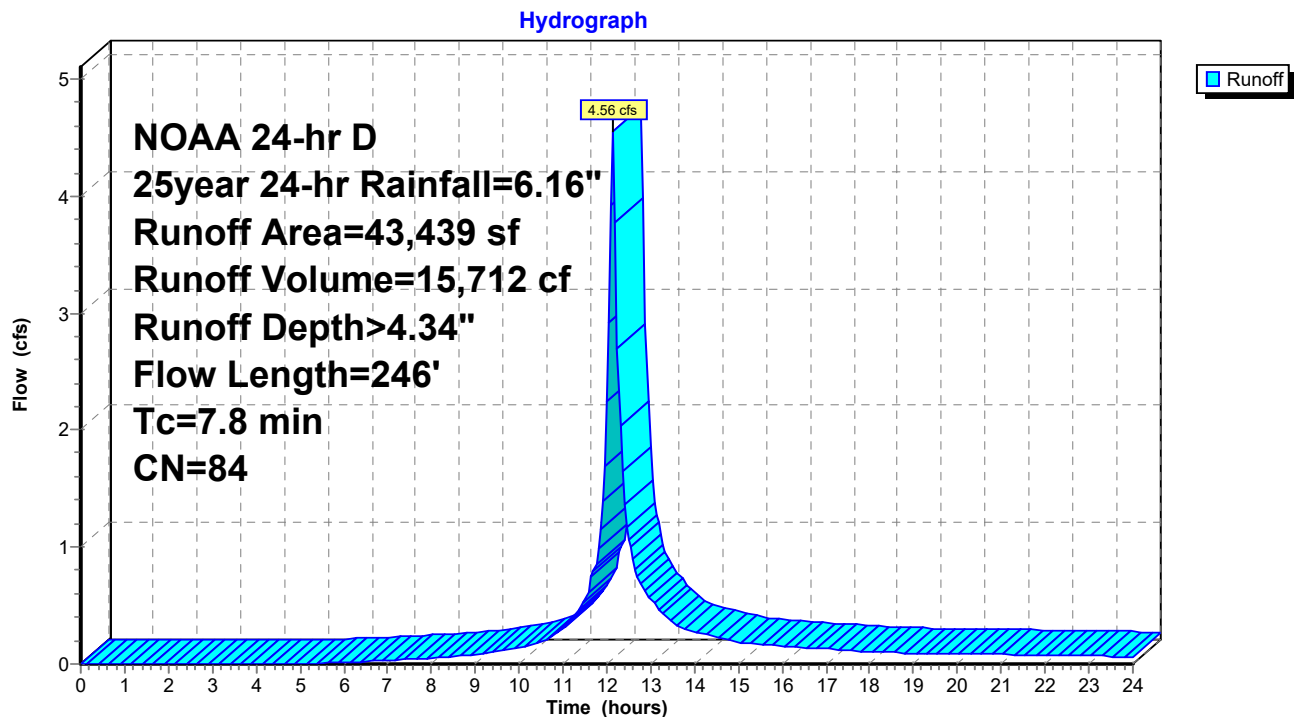
Summary for Subcatchment EX-3: Subcat EX-3

Runoff = 4.56 cfs @ 12.15 hrs, Volume= 15,712 cf, Depth> 4.34"
 Routed to Reach DP-3 : 6" DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Area (sf)	CN	Description
8,239	61	>75% Grass cover, Good, HSG B
16,195	80	>75% Grass cover, Good, HSG D
* 549	82	Dirt, HSG B
* 498	89	Dirt, HSG D
1,325	98	Impervious, HSG B
16,633	98	Impervious, HSG D
43,439	84	Weighted Average
25,481		58.66% Pervious Area
17,958		41.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0150	0.13		Sheet Flow,
					Grass: Short n= 0.150 P2= 3.17"
1.5	196	0.0200	2.12		Shallow Concentrated Flow,
					Grassed Waterway Kv= 15.0 fps
7.8	246	Total			

Subcatchment EX-3: Subcat EX-3

13858 - EX Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 34

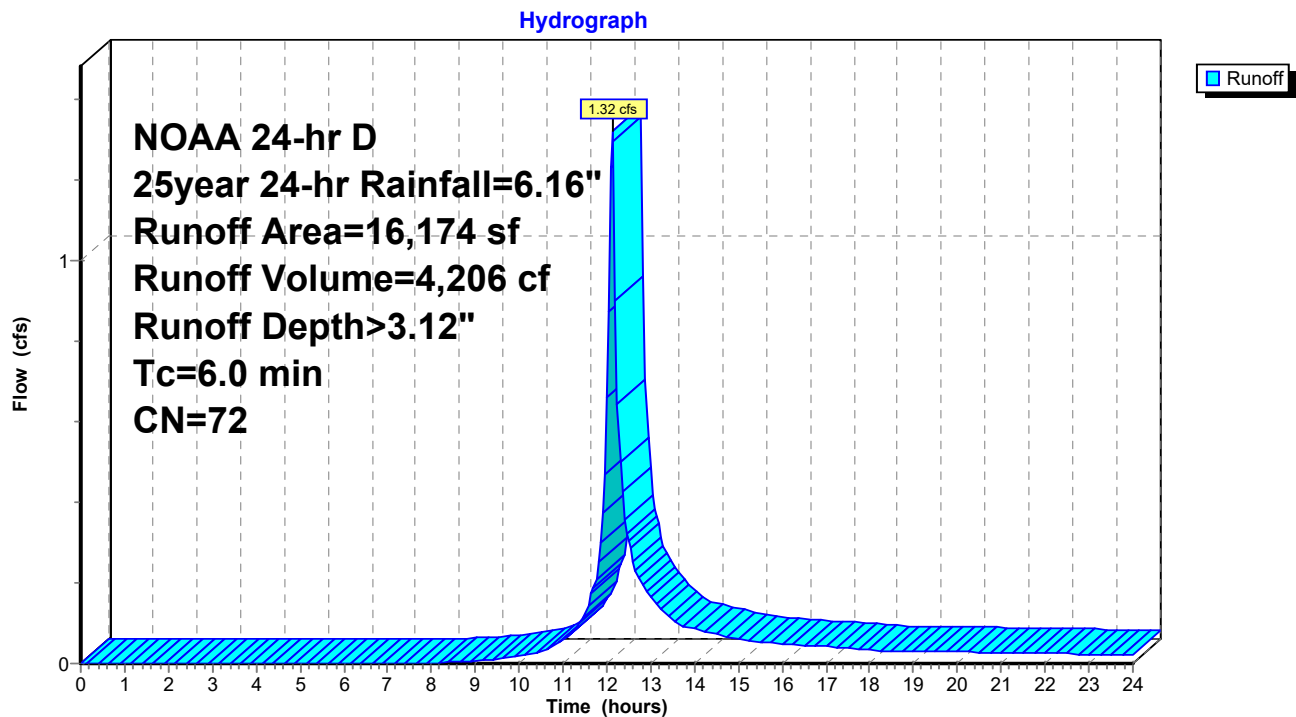
Summary for Subcatchment EX-4: Subcat EX-4

Runoff = 1.32 cfs @ 12.13 hrs, Volume= 4,206 cf, Depth> 3.12"
 Routed to Reach DP-4 : SOUTH BVW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Area (sf)	CN	Description
10,334	61	>75% Grass cover, Good, HSG B
* 1,081	82	Dirt, HSG B
3,380	98	Impervious, HSG B
774	98	Impervious, HSG D
605	55	Woods, Good, HSG B
16,174	72	Weighted Average
12,020		74.32% Pervious Area
4,154		25.68% Impervious Area

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

Subcatchment EX-4: Subcat EX-4

13858 - EX Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 35

Summary for Subcatchment EX-5: EX UU SITE

Runoff = 6.84 cfs @ 12.13 hrs, Volume= 22,501 cf, Depth> 4.34"
 Routed to Reach DP-1 : NW BVW

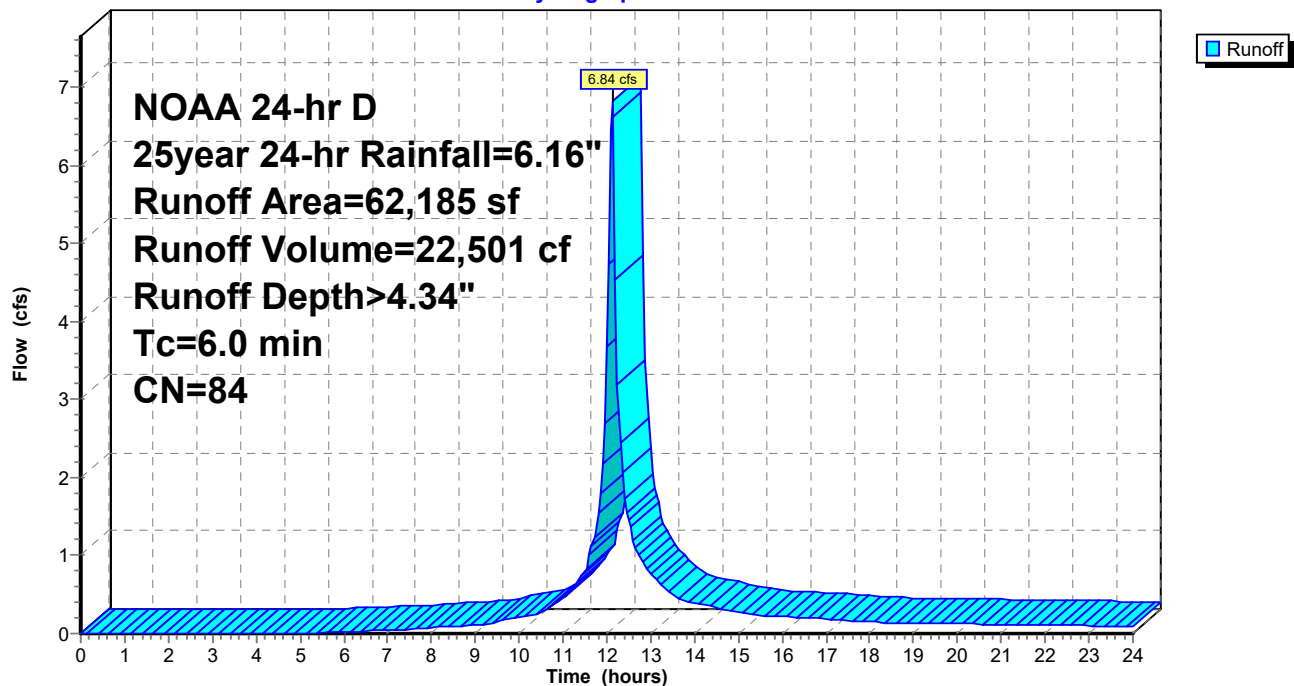
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Area (sf)	CN	Description
30,982	98	Paved parking, HSG B
29,665	70	Woods, Good, HSG C
1,538	74	>75% Grass cover, Good, HSG C
62,185	84	Weighted Average
31,203		50.18% Pervious Area
30,982		49.82% Impervious Area

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

Subcatchment EX-5: EX UU SITE

Hydrograph



13858 - EX Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 36

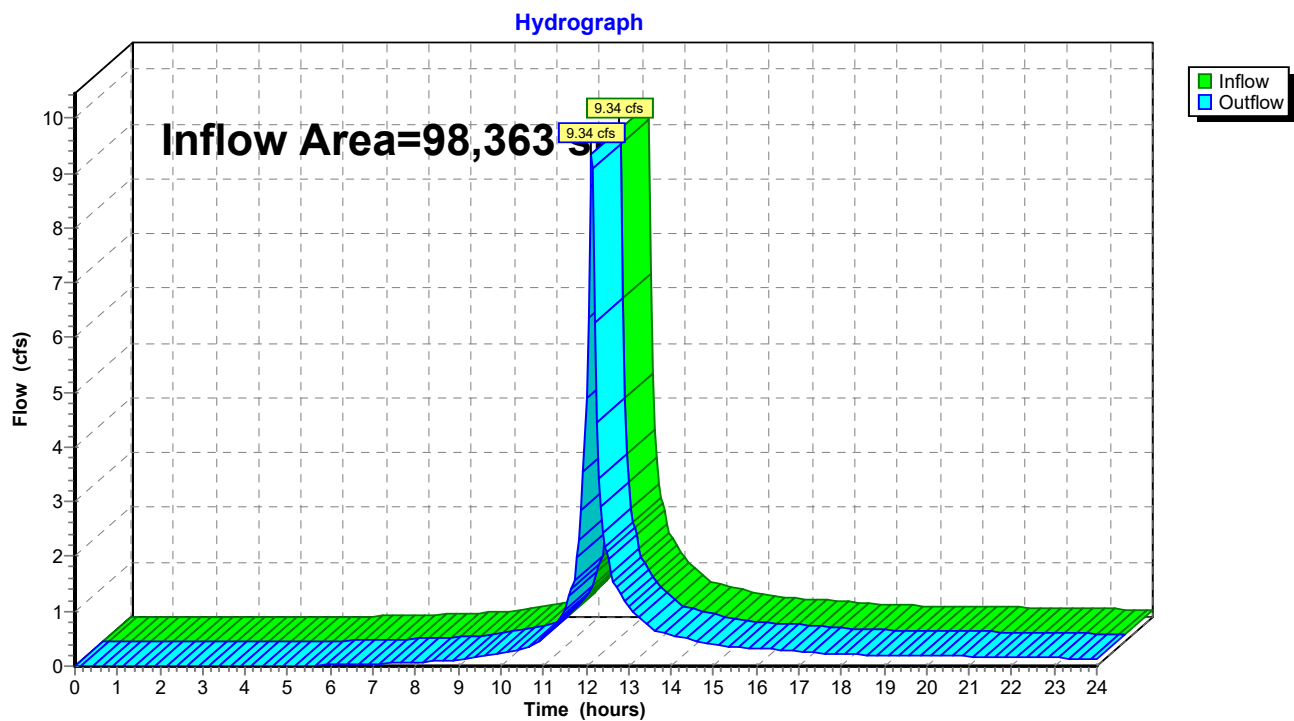
Summary for Reach DP-1: NW BVW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 98,363 sf, 33.20% Impervious, Inflow Depth > 3.72" for 25year 24-hr event
Inflow = 9.34 cfs @ 12.13 hrs, Volume= 30,484 cf
Outflow = 9.34 cfs @ 12.13 hrs, Volume= 30,484 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: NW BVW



13858 - EX Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 37

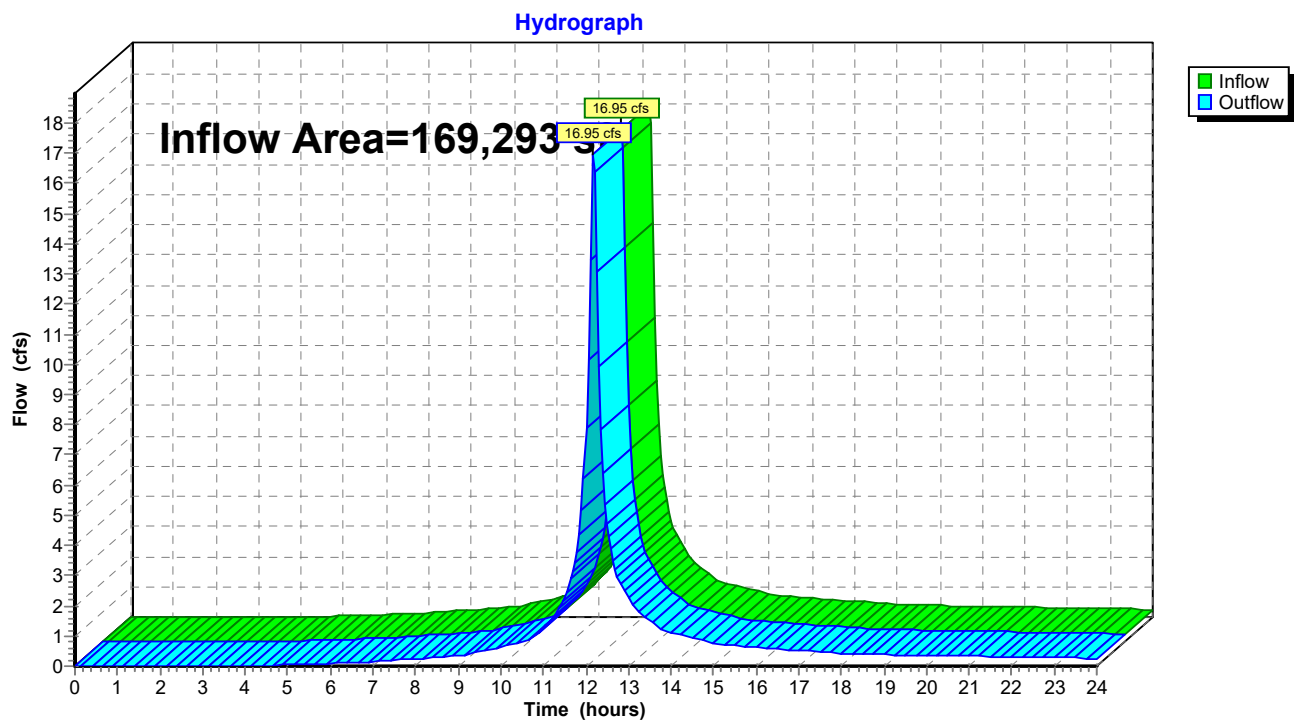
Summary for Reach DP-2: 18" NORTH DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 169,293 sf, 35.08% Impervious, Inflow Depth > 4.55" for 25year 24-hr event
Inflow = 16.95 cfs @ 12.17 hrs, Volume= 64,236 cf
Outflow = 16.95 cfs @ 12.17 hrs, Volume= 64,236 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: 18" NORTH DRAIN



13858 - EX Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 38

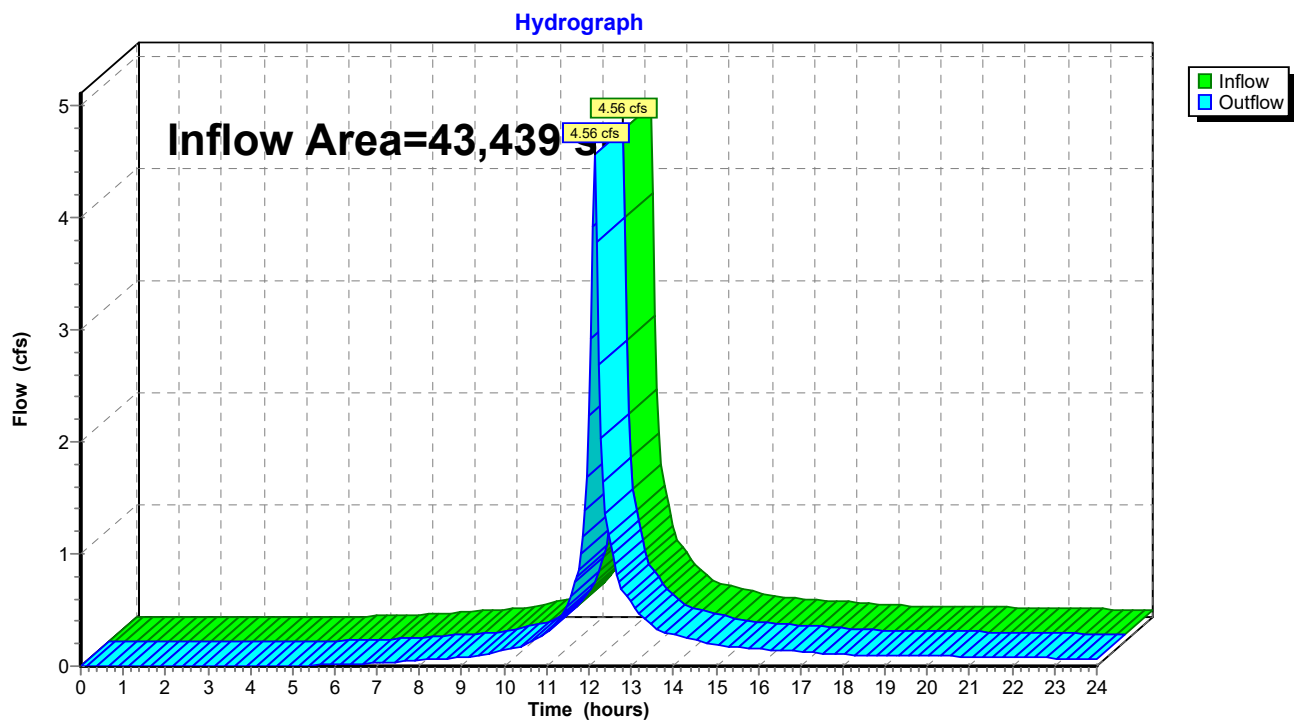
Summary for Reach DP-3: 6" DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 43,439 sf, 41.34% Impervious, Inflow Depth > 4.34" for 25year 24-hr event
Inflow = 4.56 cfs @ 12.15 hrs, Volume= 15,712 cf
Outflow = 4.56 cfs @ 12.15 hrs, Volume= 15,712 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-3: 6" DRAIN



13858 - EX Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 39

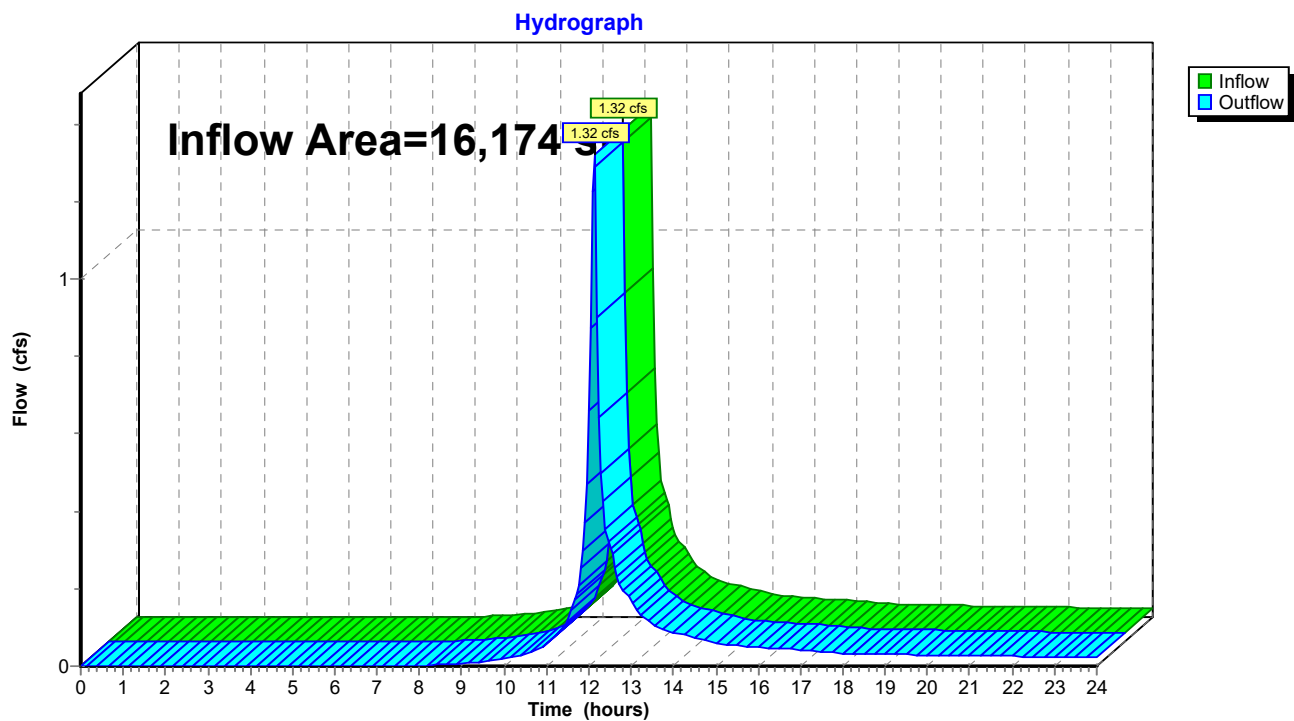
Summary for Reach DP-4: SOUTH BVW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16,174 sf, 25.68% Impervious, Inflow Depth > 3.12" for 25year 24-hr event
Inflow = 1.32 cfs @ 12.13 hrs, Volume= 4,206 cf
Outflow = 1.32 cfs @ 12.13 hrs, Volume= 4,206 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-4: SOUTH BVW



13858 - EX Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 40

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEX-1: Subcat EX-1

Runoff Area=36,178 sf 4.63% Impervious Runoff Depth>4.06"
Flow Length=202' Tc=6.0 min CN=67 Runoff=3.84 cfs 12,235 cf

SubcatchmentEX-2: Subcat EX-2

Runoff Area=169,293 sf 35.08% Impervious Runoff Depth>6.25"
Flow Length=385' Tc=10.0 min CN=86 Runoff=22.88 cfs 88,210 cf

SubcatchmentEX-3: Subcat EX-3

Runoff Area=43,439 sf 41.34% Impervious Runoff Depth>6.02"
Flow Length=246' Tc=7.8 min CN=84 Runoff=6.21 cfs 21,792 cf

SubcatchmentEX-4: Subcat EX-4

Runoff Area=16,174 sf 25.68% Impervious Runoff Depth>4.63"
Tc=6.0 min CN=72 Runoff=1.95 cfs 6,238 cf

SubcatchmentEX-5: EX UU SITE

Runoff Area=62,185 sf 49.82% Impervious Runoff Depth>6.02"
Tc=6.0 min CN=84 Runoff=9.31 cfs 31,208 cf

Reach DP-1: NW BVW

Inflow=13.16 cfs 43,444 cf
Outflow=13.16 cfs 43,444 cf

Reach DP-2: 18" NORTH DRAIN

Inflow=22.88 cfs 88,210 cf
Outflow=22.88 cfs 88,210 cf

Reach DP-3: 6" DRAIN

Inflow=6.21 cfs 21,792 cf
Outflow=6.21 cfs 21,792 cf

Reach DP-4: SOUTH BVW

Inflow=1.95 cfs 6,238 cf
Outflow=1.95 cfs 6,238 cf

Total Runoff Area = 327,269 sf Runoff Volume = 159,683 cf Average Runoff Depth = 5.86"
65.12% Pervious = 213,112 sf 34.88% Impervious = 114,157 sf

13858 - EX Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 41

Summary for Subcatchment EX-1: Subcat EX-1

Runoff = 3.84 cfs @ 12.13 hrs, Volume= 12,235 cf, Depth> 4.06"
 Routed to Reach DP-1 : NW BVW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Area (sf)	CN	Description
1,840	61	>75% Grass cover, Good, HSG B
7,992	80	>75% Grass cover, Good, HSG D
* 1,515	98	Impervious, HSG B
159	98	Paved parking, HSG D
17,152	55	Woods, Good, HSG B
7,520	77	Woods, Good, HSG D
36,178	67	Weighted Average
34,504		95.37% Pervious Area
1,674		4.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0480	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.17"
1.5	152	0.0579	1.68		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5					Direct Entry,
6.0	202	Total			

13858 - EX Conditions

Prepared by {enter your company name here}

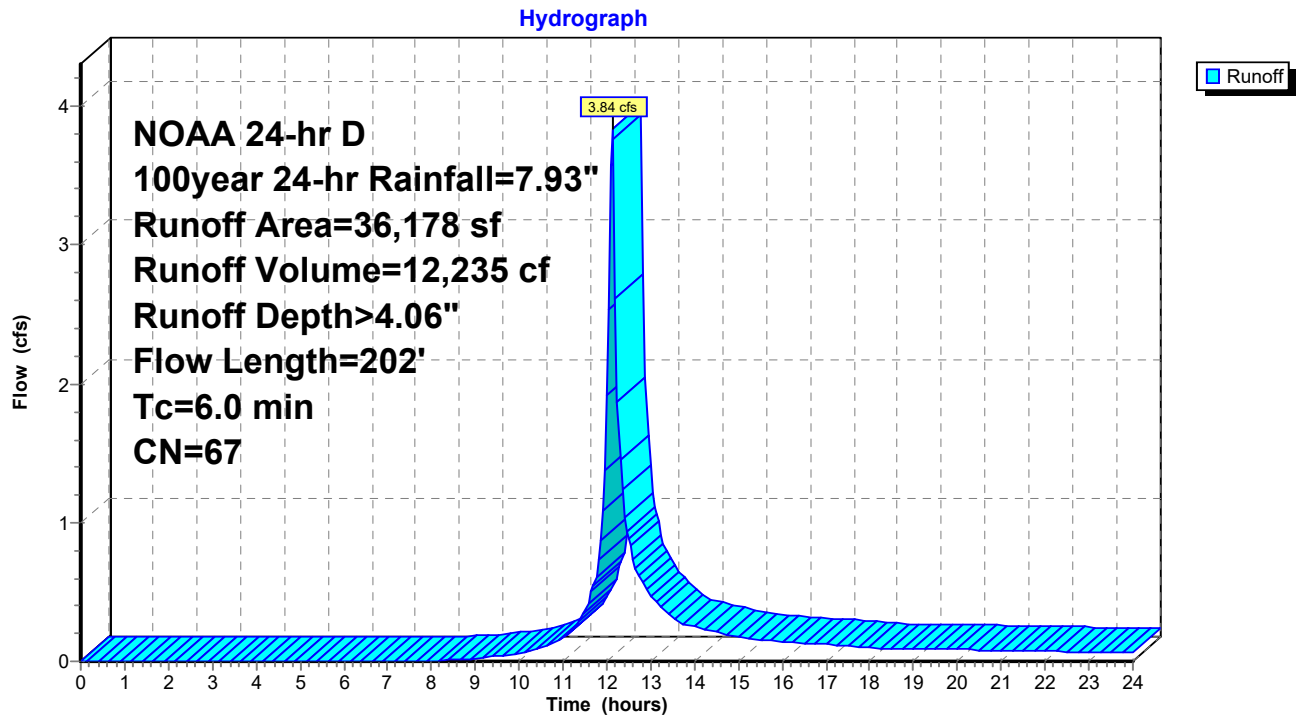
HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Printed 2/17/2022

Page 42

Subcatchment EX-1: Subcat EX-1



13858 - EX Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 43

Summary for Subcatchment EX-2: Subcat EX-2

Runoff = 22.88 cfs @ 12.17 hrs, Volume= 88,210 cf, Depth> 6.25"
 Routed to Reach DP-2 : 18" NORTH DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Area (sf)	CN	Description
1,906	61	>75% Grass cover, Good, HSG B
91,166	80	>75% Grass cover, Good, HSG D
* 11,943	89	Dirt, HSG D
4,461	98	Impervious, HSG B
35,258	98	Impervious, HSG D
551	98	Roofs, HSG B
19,119	98	Roofs, HSG D
4,064	55	Woods, Good, HSG B
825	77	Woods, Good, HSG D
169,293	86	Weighted Average
109,904		64.92% Pervious Area
59,389		35.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.0180	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.17"
4.1	335	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.0	385	Total			

13858 - EX Conditions

Prepared by {enter your company name here}

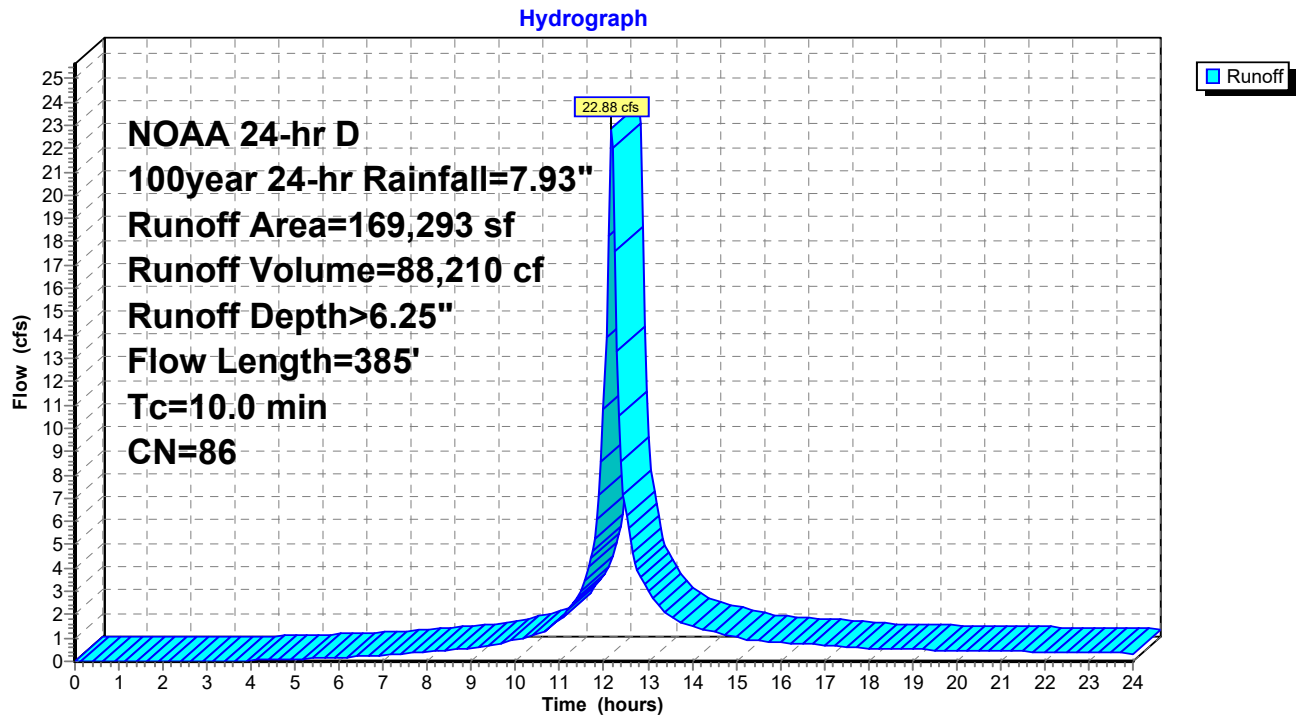
HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Printed 2/17/2022

Page 44

Subcatchment EX-2: Subcat EX-2



13858 - EX Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 45

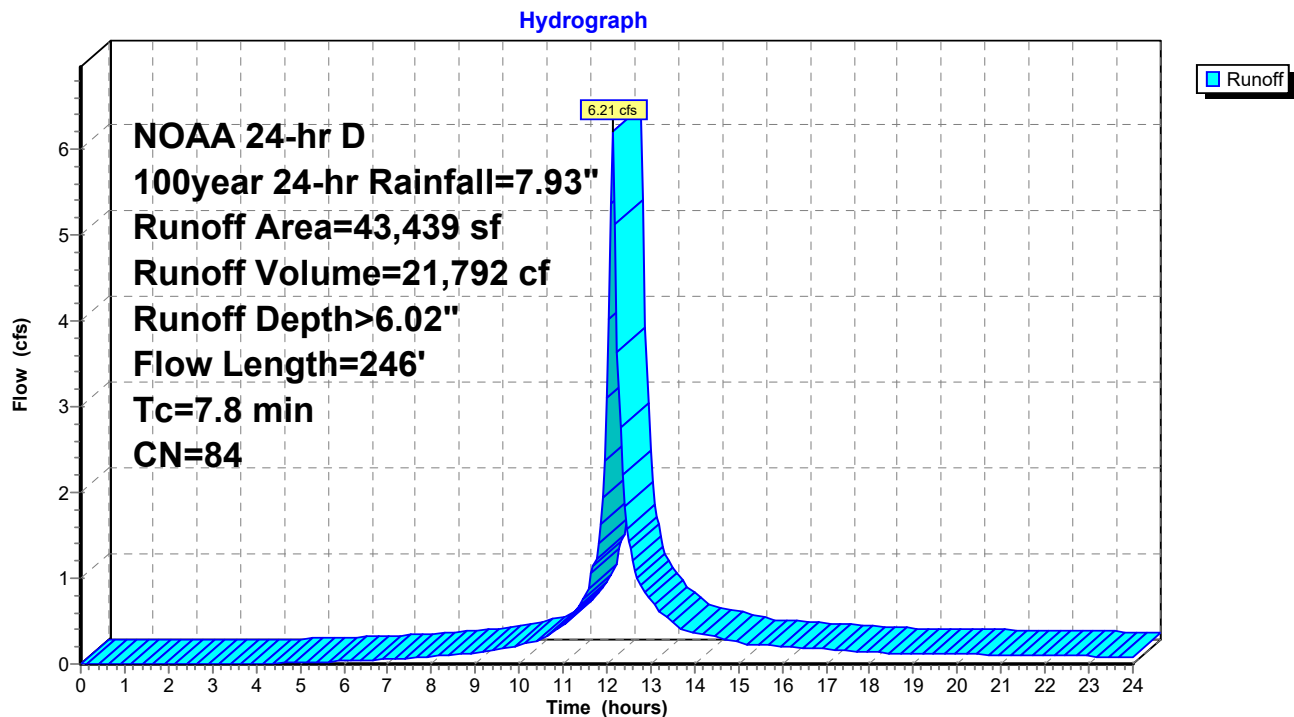
Summary for Subcatchment EX-3: Subcat EX-3

Runoff = 6.21 cfs @ 12.15 hrs, Volume= 21,792 cf, Depth> 6.02"
 Routed to Reach DP-3 : 6" DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Area (sf)	CN	Description
8,239	61	>75% Grass cover, Good, HSG B
16,195	80	>75% Grass cover, Good, HSG D
* 549	82	Dirt, HSG B
* 498	89	Dirt, HSG D
1,325	98	Impervious, HSG B
16,633	98	Impervious, HSG D
43,439	84	Weighted Average
25,481		58.66% Pervious Area
17,958		41.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0150	0.13		Sheet Flow,
					Grass: Short n= 0.150 P2= 3.17"
1.5	196	0.0200	2.12		Shallow Concentrated Flow,
					Grassed Waterway Kv= 15.0 fps
7.8	246	Total			

Subcatchment EX-3: Subcat EX-3

13858 - EX Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 46

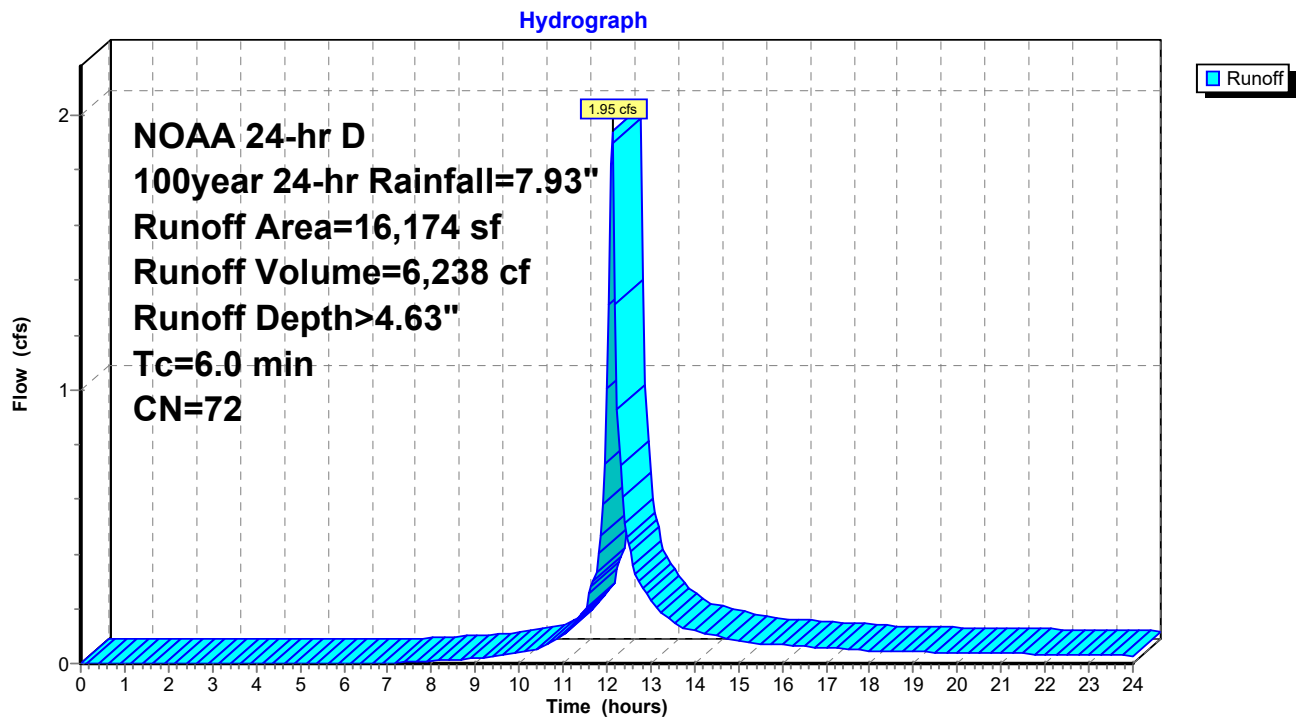
Summary for Subcatchment EX-4: Subcat EX-4

Runoff = 1.95 cfs @ 12.13 hrs, Volume= 6,238 cf, Depth> 4.63"
 Routed to Reach DP-4 : SOUTH BVW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Area (sf)	CN	Description
10,334	61	>75% Grass cover, Good, HSG B
* 1,081	82	Dirt, HSG B
3,380	98	Impervious, HSG B
774	98	Impervious, HSG D
605	55	Woods, Good, HSG B
16,174	72	Weighted Average
12,020		74.32% Pervious Area
4,154		25.68% Impervious Area

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

Subcatchment EX-4: Subcat EX-4

13858 - EX Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 47

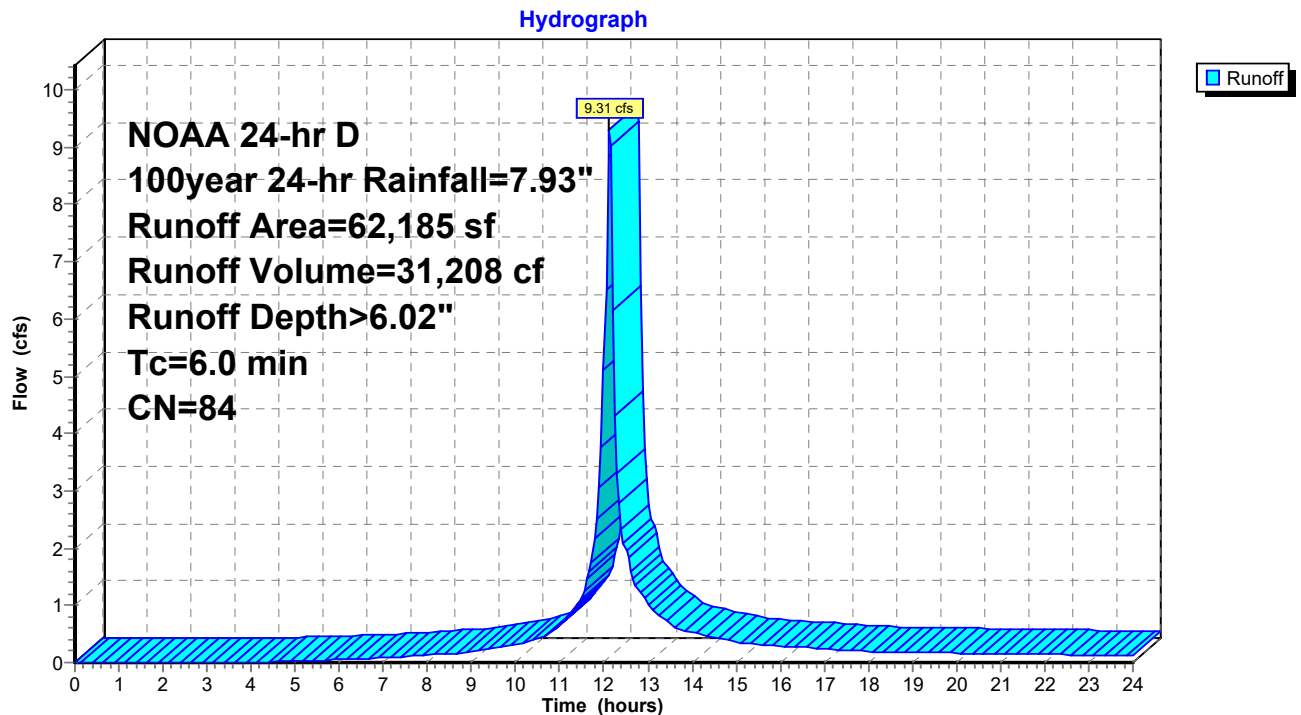
Summary for Subcatchment EX-5: EX UU SITE

Runoff = 9.31 cfs @ 12.13 hrs, Volume= 31,208 cf, Depth> 6.02"
Routed to Reach DP-1 : NW BVW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Area (sf)	CN	Description
30,982	98	Paved parking, HSG B
29,665	70	Woods, Good, HSG C
1,538	74	>75% Grass cover, Good, HSG C
62,185	84	Weighted Average
31,203		50.18% Pervious Area
30,982		49.82% Impervious Area

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

Subcatchment EX-5: EX UU SITE

13858 - EX Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 48

Summary for Reach DP-1: NW BVW

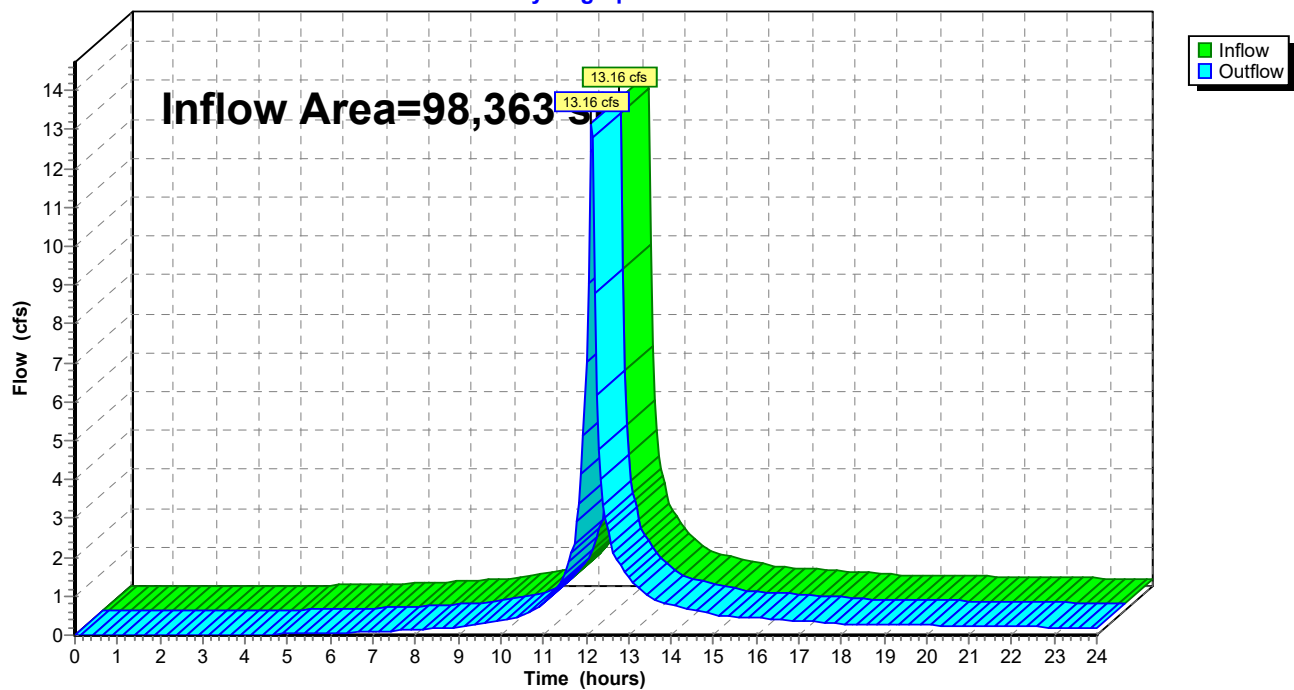
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 98,363 sf, 33.20% Impervious, Inflow Depth > 5.30" for 100year 24-hr event
Inflow = 13.16 cfs @ 12.13 hrs, Volume= 43,444 cf
Outflow = 13.16 cfs @ 12.13 hrs, Volume= 43,444 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: NW BVW

Hydrograph



13858 - EX Conditions

Prepared by {enter your company name here}

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Printed 2/17/2022

Page 49

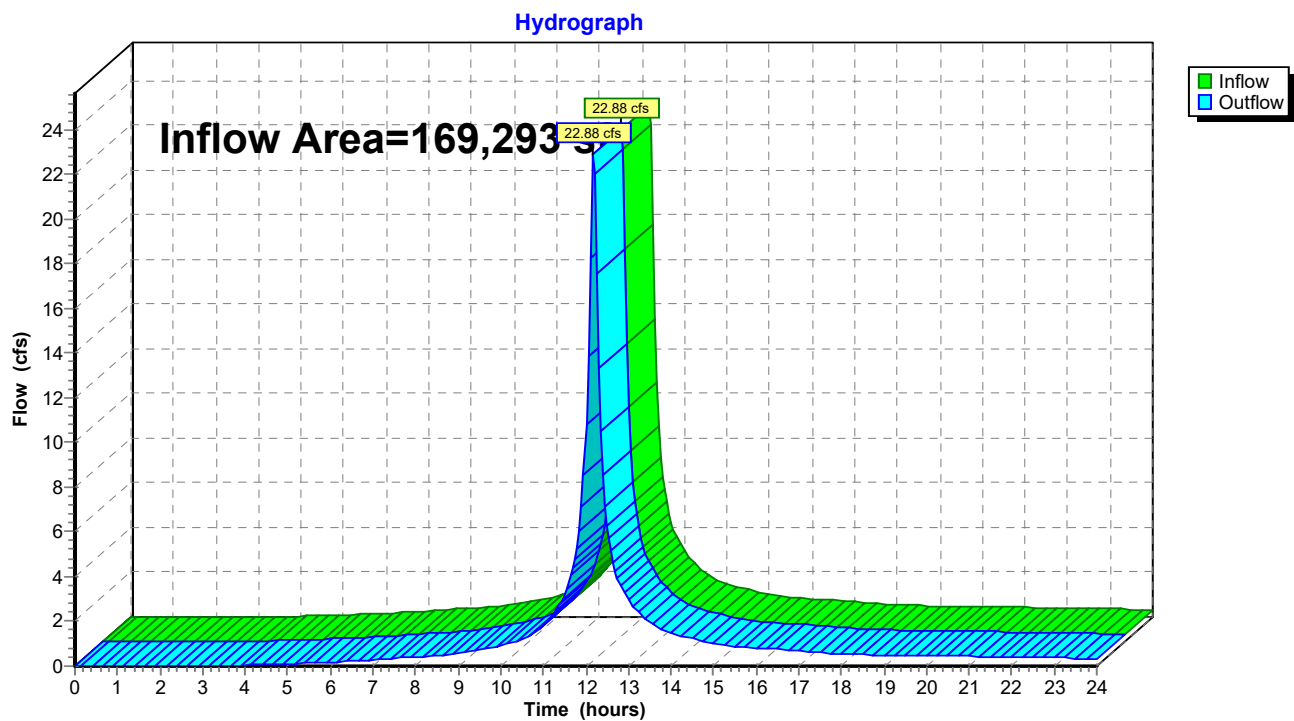
Summary for Reach DP-2: 18" NORTH DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 169,293 sf, 35.08% Impervious, Inflow Depth > 6.25" for 100year 24-hr event
Inflow = 22.88 cfs @ 12.17 hrs, Volume= 88,210 cf
Outflow = 22.88 cfs @ 12.17 hrs, Volume= 88,210 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: 18" NORTH DRAIN



13858 - EX Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 50

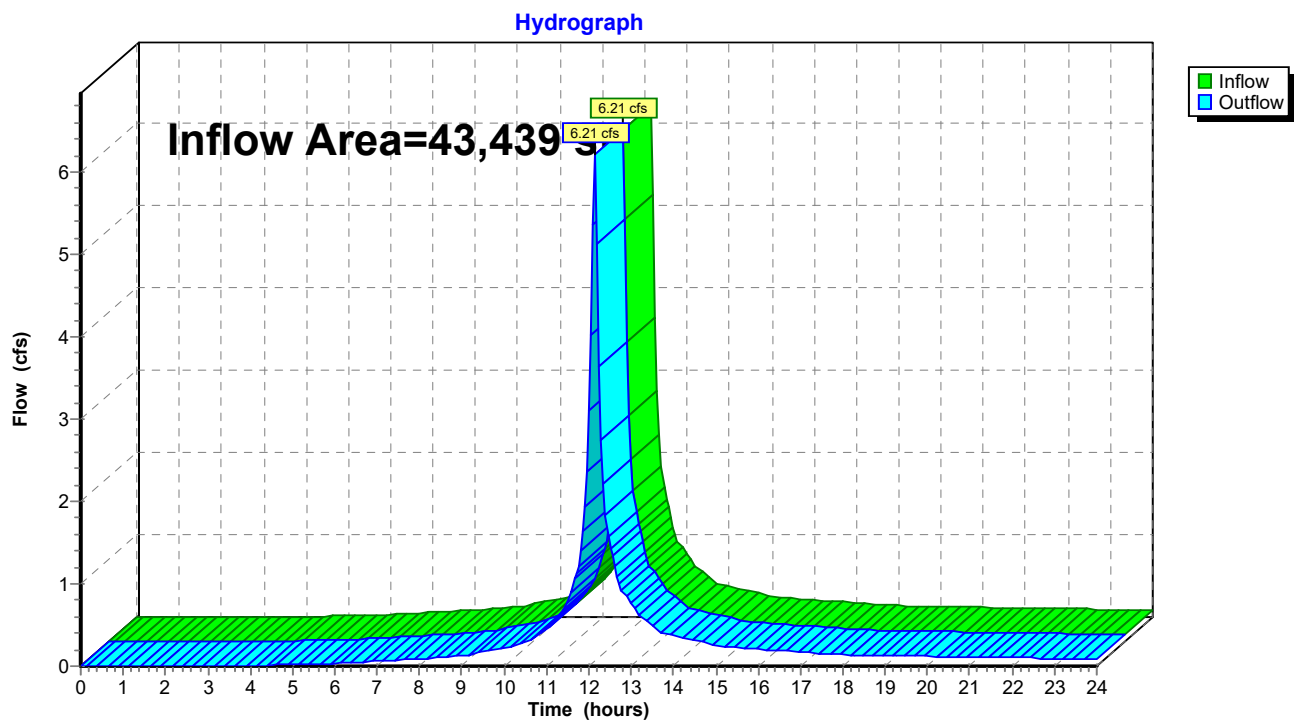
Summary for Reach DP-3: 6" DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 43,439 sf, 41.34% Impervious, Inflow Depth > 6.02" for 100year 24-hr event
Inflow = 6.21 cfs @ 12.15 hrs, Volume= 21,792 cf
Outflow = 6.21 cfs @ 12.15 hrs, Volume= 21,792 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-3: 6" DRAIN



13858 - EX Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/17/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 51

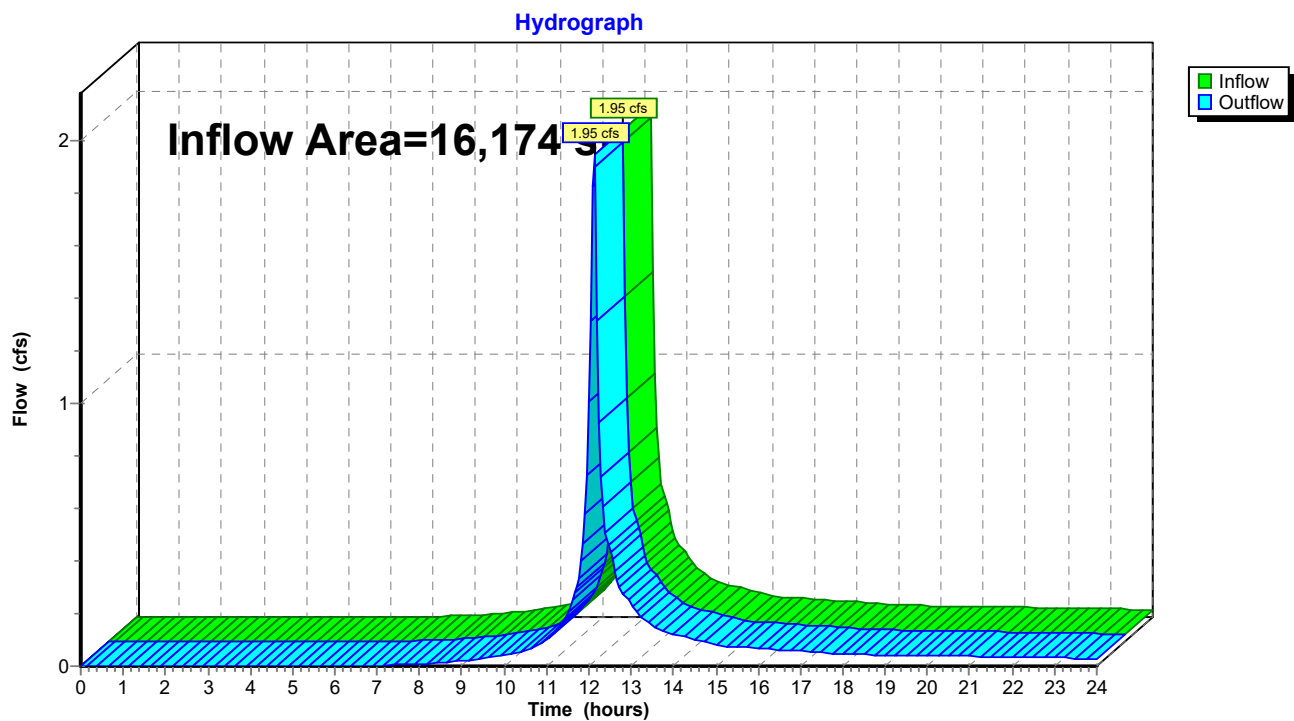
Summary for Reach DP-4: SOUTH BVW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16,174 sf, 25.68% Impervious, Inflow Depth > 4.63" for 100year 24-hr event
Inflow = 1.95 cfs @ 12.13 hrs, Volume= 6,238 cf
Outflow = 1.95 cfs @ 12.13 hrs, Volume= 6,238 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

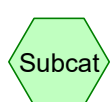
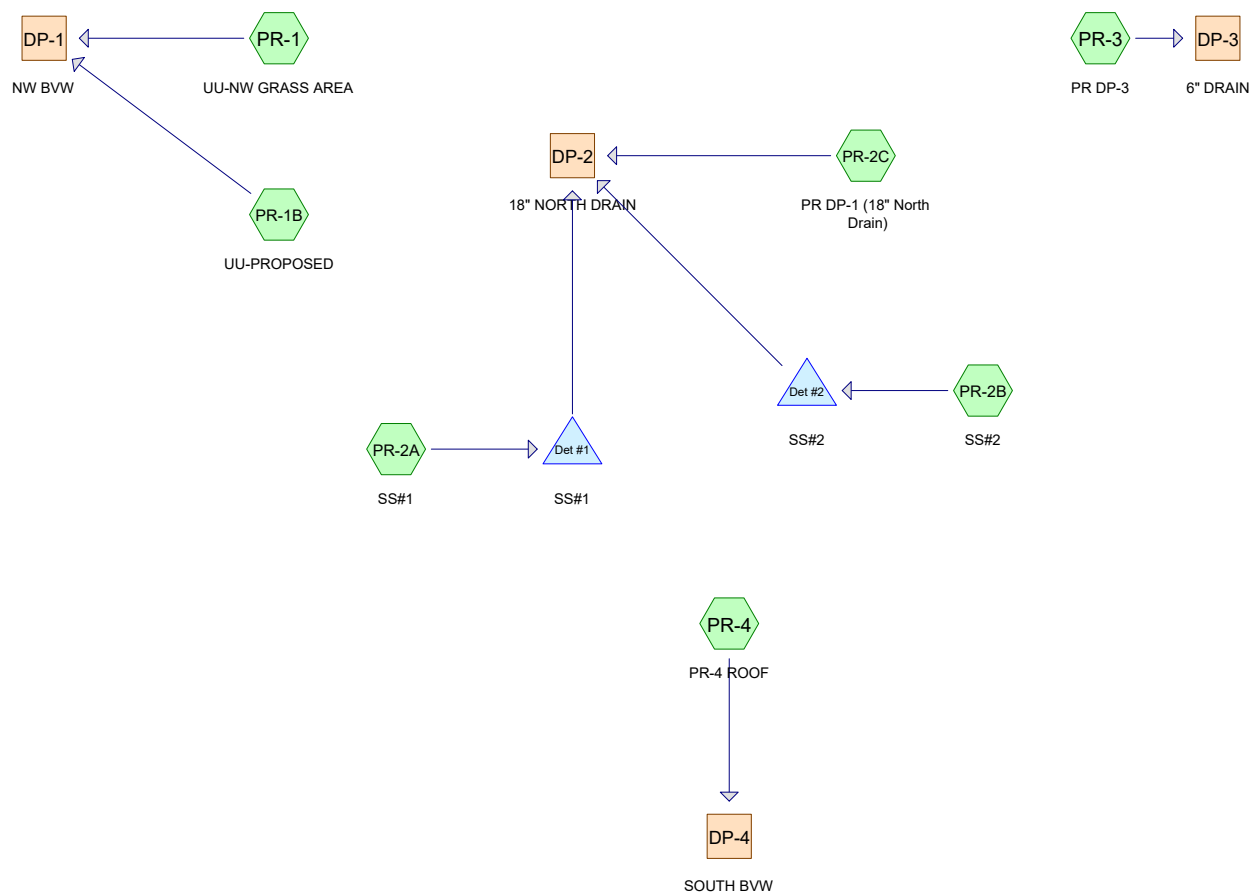
Reach DP-4: SOUTH BVW



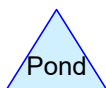
APPENDIX C

Post-Development Conditions – HydroCAD Calculations

PROPOSED HYDROCAD ANALYSIS NEW ELEMENTARY SCHOOL SWAMPSCOTT, MA



Reach



Routing Diagram for 13858 - PR Conditions

Prepared by {enter your company name here}, Printed 2/18/2022
HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

13858 - PR Conditions

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 2

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2year 24-hr	NOAA 24-hr	D	Default	24.00	1	3.17	2
2	10year 24-hr	NOAA 24-hr	D	Default	24.00	1	5.01	2
3	25year 24-hr	NOAA 24-hr	D	Default	24.00	1	6.16	2
4	100year 24-hr	NOAA 24-hr	D	Default	24.00	1	7.93	2

13858 - PR Conditions

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 3

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
5,726	74	>75% Grass cover, Good, HSG C (PR-1)
78,806	80	>75% Grass cover, Good, HSG D (PR-1B, PR-2A, PR-2B, PR-2C, PR-3)
29,683	98	Paved parking, HSG C (PR-1B)
133,532	98	Paved parking, HSG D (PR-2A, PR-2B, PR-2C, PR-3)
5,200	98	Roofs, HSG C (PR-4)
54,322	98	Roofs, HSG D (PR-2A, PR-2B)
20,000	70	Woods, Good, HSG C (PR-1B)
327,269	92	TOTAL AREA

13858 - PR Conditions

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 4

Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
60,609	HSG C	PR-1, PR-1B, PR-4
266,660	HSG D	PR-1B, PR-2A, PR-2B, PR-2C, PR-3
0	Other	
327,269		TOTAL AREA

13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPR-1: UU-NW GRASS AREA Runoff Area=5,726 sf 0.00% Impervious Runoff Depth>1.02"
Tc=6.0 min CN=74 Runoff=0.15 cfs 485 cf

SubcatchmentPR-1B: UU-PROPOSED Runoff Area=56,996 sf 52.08% Impervious Runoff Depth>1.81"
Tc=6.0 min CN=86 Runoff=2.68 cfs 8,583 cf

SubcatchmentPR-2A: SS#1 Runoff Area=133,345 sf 72.76% Impervious Runoff Depth>2.41"
Tc=6.0 min CN=93 Runoff=8.00 cfs 26,832 cf

SubcatchmentPR-2B: SS#2 Runoff Area=73,858 sf 92.54% Impervious Runoff Depth>2.82"
Tc=6.0 min CN=97 Runoff=4.86 cfs 17,384 cf

SubcatchmentPR-2C: PR DP-1 (18" North Runoff Area=40,442 sf 54.88% Impervious Runoff Depth>2.14"
Tc=6.0 min CN=90 Runoff=2.21 cfs 7,208 cf

SubcatchmentPR-3: PR DP-3 Runoff Area=11,702 sf 2.39% Impervious Runoff Depth>1.38"
Tc=6.0 min CN=80 Runoff=0.42 cfs 1,343 cf

SubcatchmentPR-4: PR-4 ROOF Runoff Area=5,200 sf 100.00% Impervious Runoff Depth>2.94"
Tc=6.0 min CN=98 Runoff=0.35 cfs 1,272 cf

Reach DP-1: NW BVW Inflow=2.83 cfs 9,068 cf
Outflow=2.83 cfs 9,068 cf

Reach DP-2: 18" NORTH DRAIN Inflow=4.90 cfs 50,840 cf
Outflow=4.90 cfs 50,840 cf

Reach DP-3: 6" DRAIN Inflow=0.42 cfs 1,343 cf
Outflow=0.42 cfs 1,343 cf

Reach DP-4: SOUTH BVW Inflow=0.35 cfs 1,272 cf
Outflow=0.35 cfs 1,272 cf

Pond Det #1: SS#1 Peak Elev=55.46' Storage=7,220 cf Inflow=8.00 cfs 26,832 cf
Outflow=2.22 cfs 26,457 cf

Pond Det #2: SS#2 Peak Elev=51.18' Storage=4,621 cf Inflow=4.86 cfs 17,384 cf
Outflow=1.33 cfs 17,176 cf

Total Runoff Area = 327,269 sf Runoff Volume = 63,107 cf Average Runoff Depth = 2.31"
31.94% Pervious = 104,532 sf 68.06% Impervious = 222,737 sf

13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 6

Summary for Subcatchment PR-1: UU-NW GRASS AREA

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 485 cf, Depth> 1.02"
Routed to Reach DP-1 : NW BVW

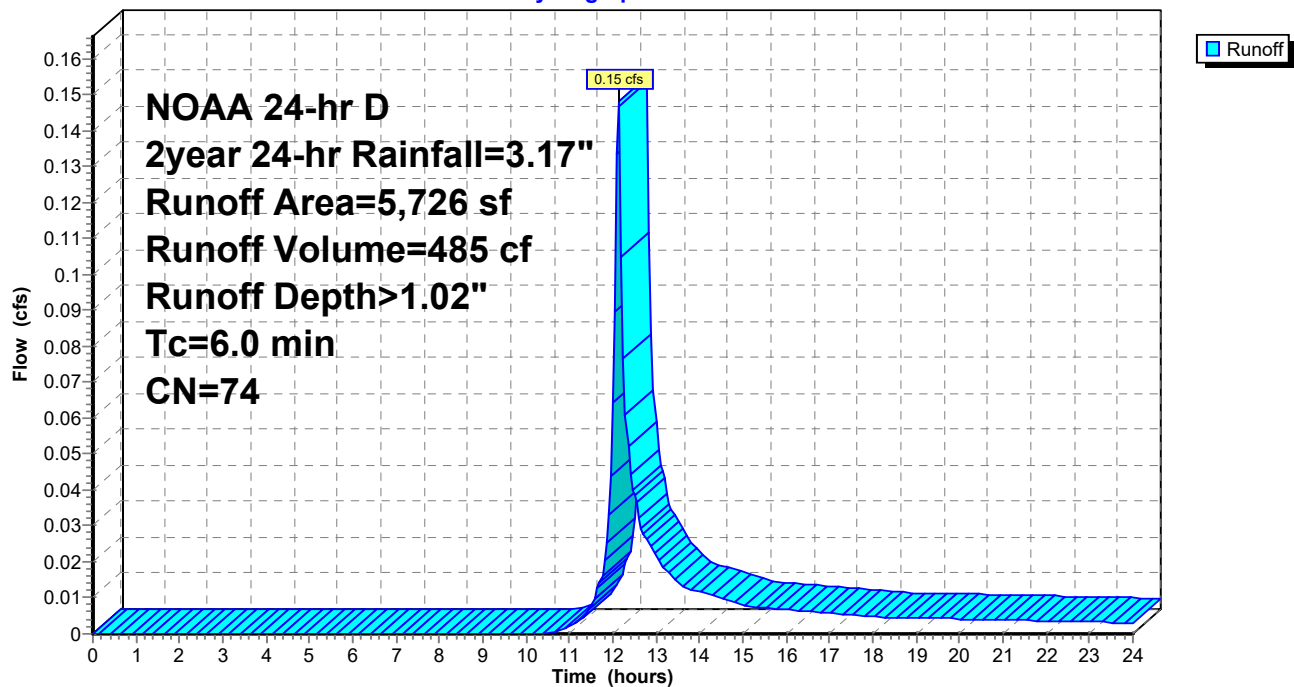
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Area (sf)	CN	Description
5,726	74	>75% Grass cover, Good, HSG C
5,726		100.00% Pervious Area

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

Subcatchment PR-1: UU-NW GRASS AREA

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 7

Summary for Subcatchment PR-1B: UU-PROPOSED

Runoff = 2.68 cfs @ 12.13 hrs, Volume= 8,583 cf, Depth> 1.81"
Routed to Reach DP-1 : NW BVW

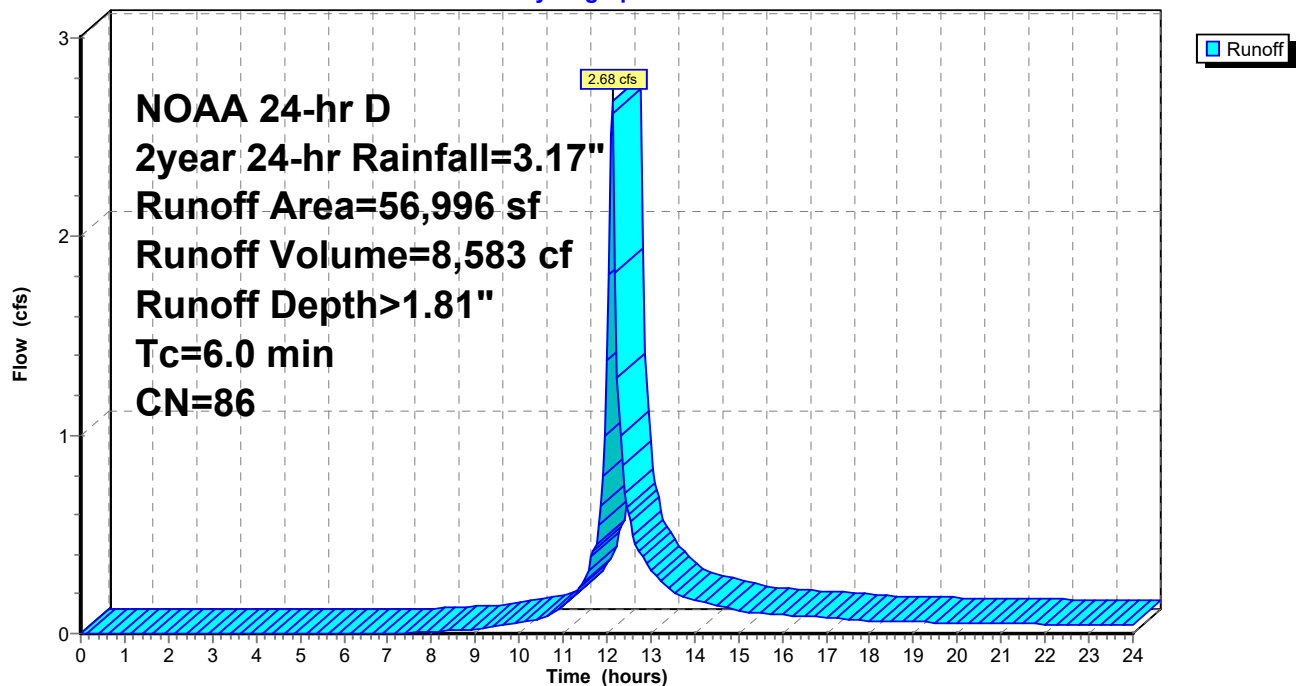
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Area (sf)	CN	Description
7,313	80	>75% Grass cover, Good, HSG D
20,000	70	Woods, Good, HSG C
29,683	98	Paved parking, HSG C
56,996	86	Weighted Average
27,313		47.92% Pervious Area
29,683		52.08% Impervious Area

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

Subcatchment PR-1B: UU-PROPOSED

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 8

Summary for Subcatchment PR-2A: SS#1

Runoff = 8.00 cfs @ 12.13 hrs, Volume= 26,832 cf, Depth> 2.41"
 Routed to Pond Det #1 : SS#1

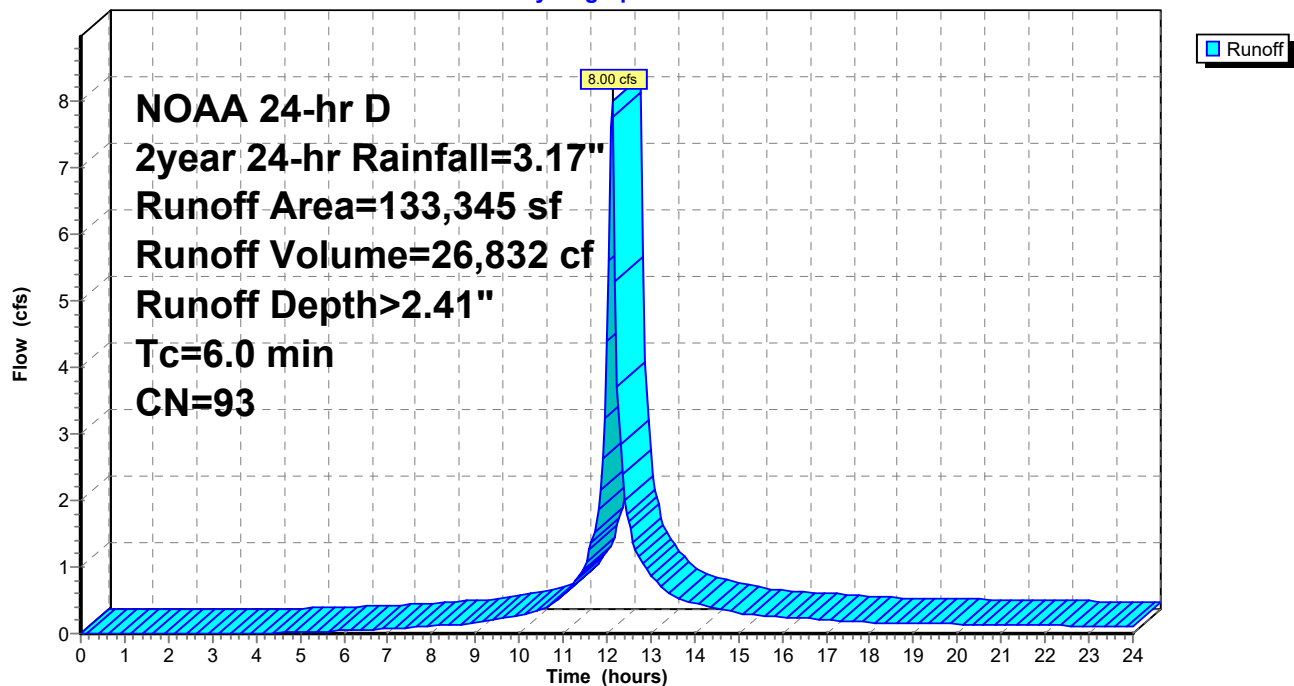
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Area (sf)	CN	Description
36,318	80	>75% Grass cover, Good, HSG D
66,336	98	Paved parking, HSG D
30,691	98	Roofs, HSG D
133,345	93	Weighted Average
36,318		27.24% Pervious Area
97,027		72.76% Impervious Area

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

Subcatchment PR-2A: SS#1

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 9

Summary for Subcatchment PR-2B: SS#2

Runoff = 4.86 cfs @ 12.13 hrs, Volume= 17,384 cf, Depth> 2.82"
Routed to Pond Det #2 : SS#2

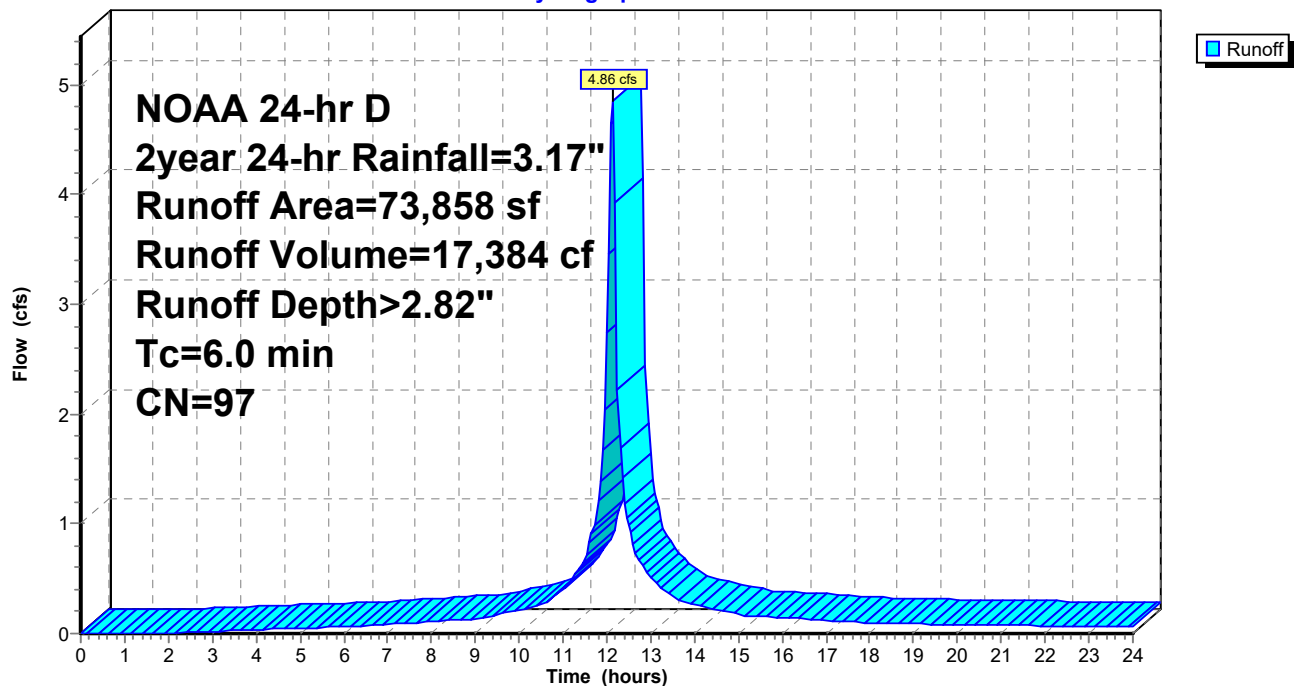
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Area (sf)	CN	Description
5,507	80	>75% Grass cover, Good, HSG D
44,720	98	Paved parking, HSG D
23,631	98	Roofs, HSG D
73,858	97	Weighted Average
5,507		7.46% Pervious Area
68,351		92.54% Impervious Area

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

Subcatchment PR-2B: SS#2

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 10

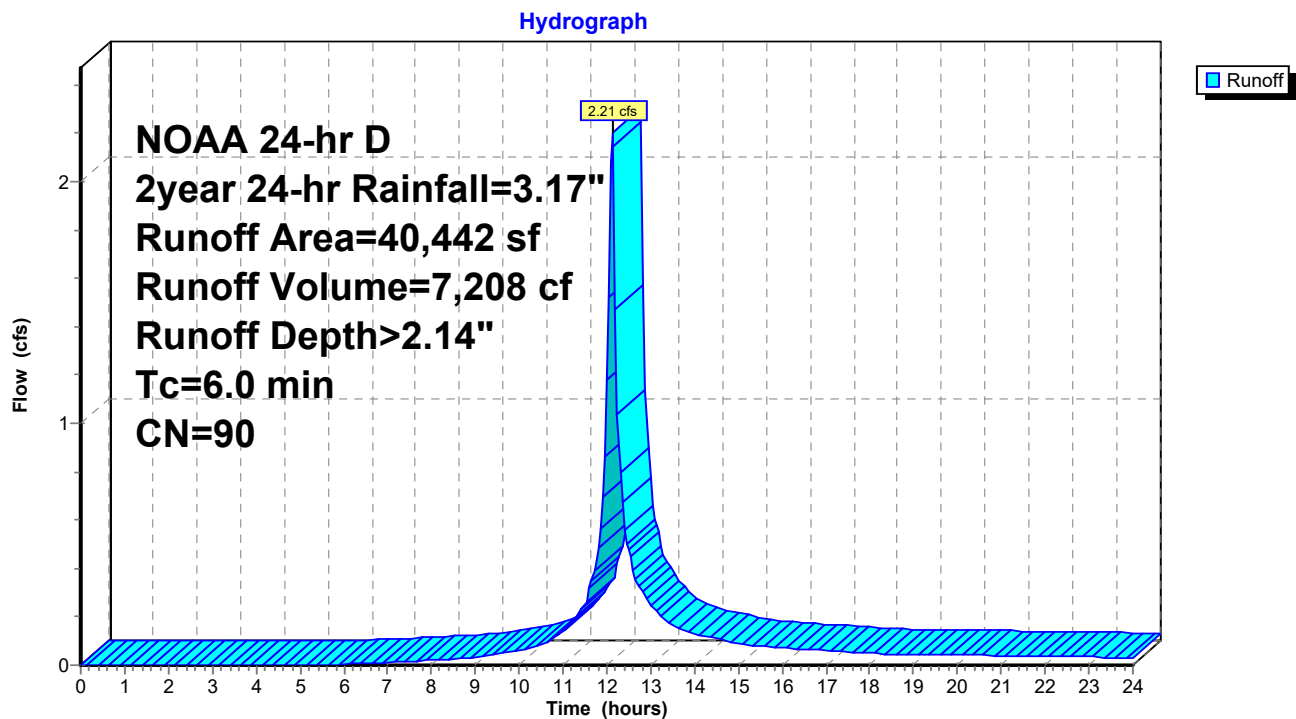
Summary for Subcatchment PR-2C: PR DP-1 (18" North Drain)

Runoff = 2.21 cfs @ 12.13 hrs, Volume= 7,208 cf, Depth> 2.14"
Routed to Reach DP-2 : 18" NORTH DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Area (sf)	CN	Description
18,246	80	>75% Grass cover, Good, HSG D
22,196	98	Paved parking, HSG D
40,442	90	Weighted Average
18,246		45.12% Pervious Area
22,196		54.88% Impervious Area

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

Subcatchment PR-2C: PR DP-1 (18" North Drain)

13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 11

Summary for Subcatchment PR-3: PR DP-3

Runoff = 0.42 cfs @ 12.13 hrs, Volume= 1,343 cf, Depth> 1.38"
Routed to Reach DP-3 : 6" DRAIN

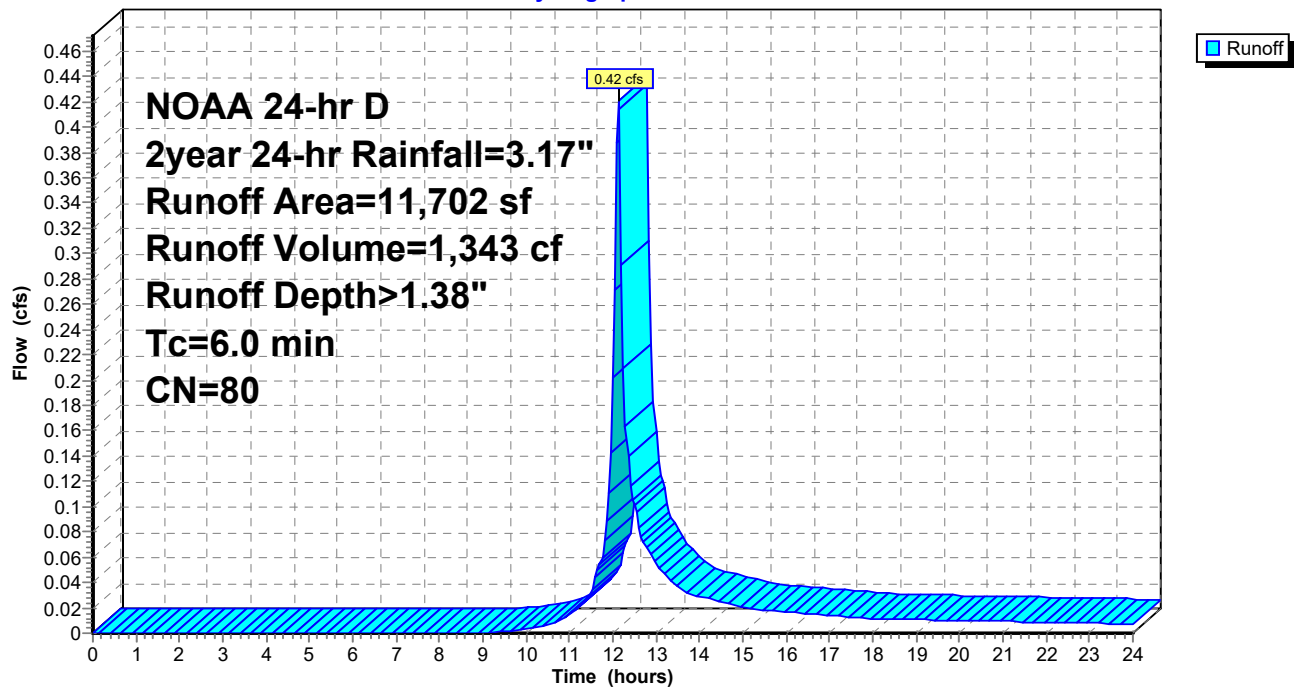
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Area (sf)	CN	Description
11,422	80	>75% Grass cover, Good, HSG D
280	98	Paved parking, HSG D
11,702	80	Weighted Average
11,422		97.61% Pervious Area
280		2.39% Impervious Area

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

Subcatchment PR-3: PR DP-3

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 12

Summary for Subcatchment PR-4: PR-4 ROOF

Runoff = 0.35 cfs @ 12.13 hrs, Volume= 1,272 cf, Depth> 2.94"
Routed to Reach DP-4 : SOUTH BVW

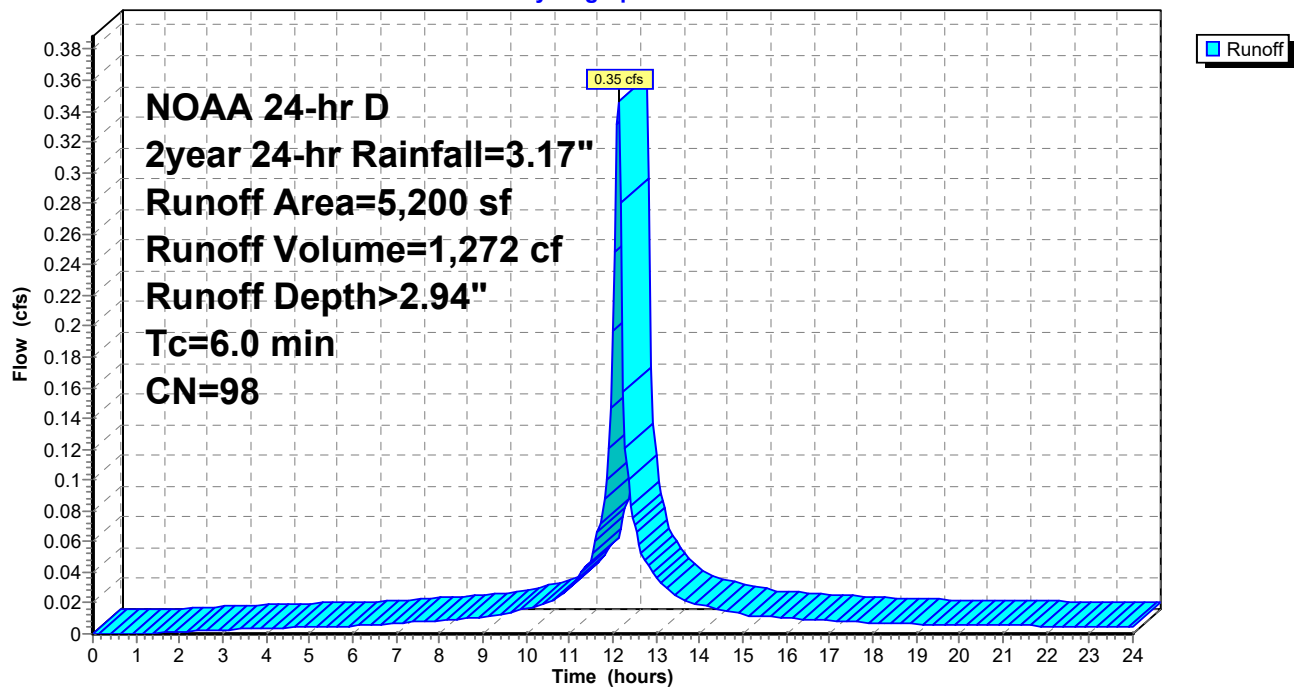
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Area (sf)	CN	Description
5,200	98	Roofs, HSG C
5,200		100.00% Impervious Area

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

Subcatchment PR-4: PR-4 ROOF

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 13

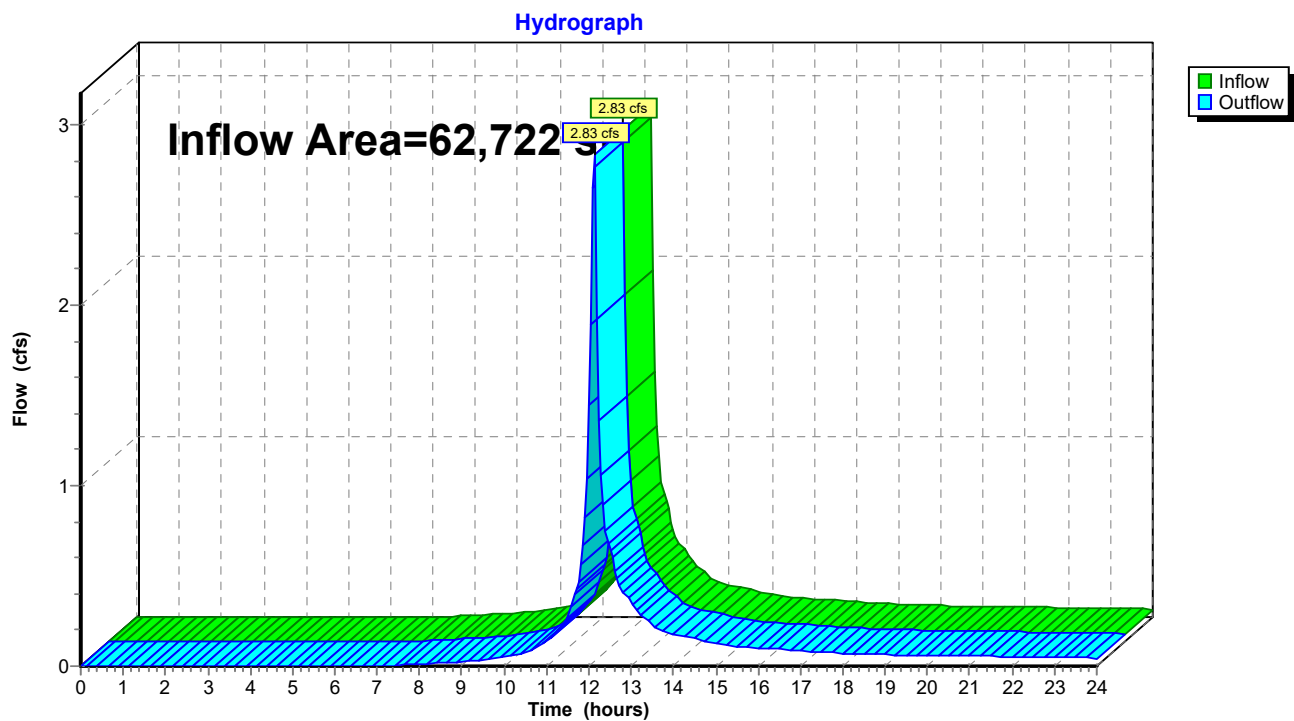
Summary for Reach DP-1: NW BVW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 62,722 sf, 47.32% Impervious, Inflow Depth > 1.73" for 2year 24-hr event
Inflow = 2.83 cfs @ 12.13 hrs, Volume= 9,068 cf
Outflow = 2.83 cfs @ 12.13 hrs, Volume= 9,068 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: NW BVW



13858 - PR Conditions

Prepared by {enter your company name here}

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Printed 2/18/2022

Page 14

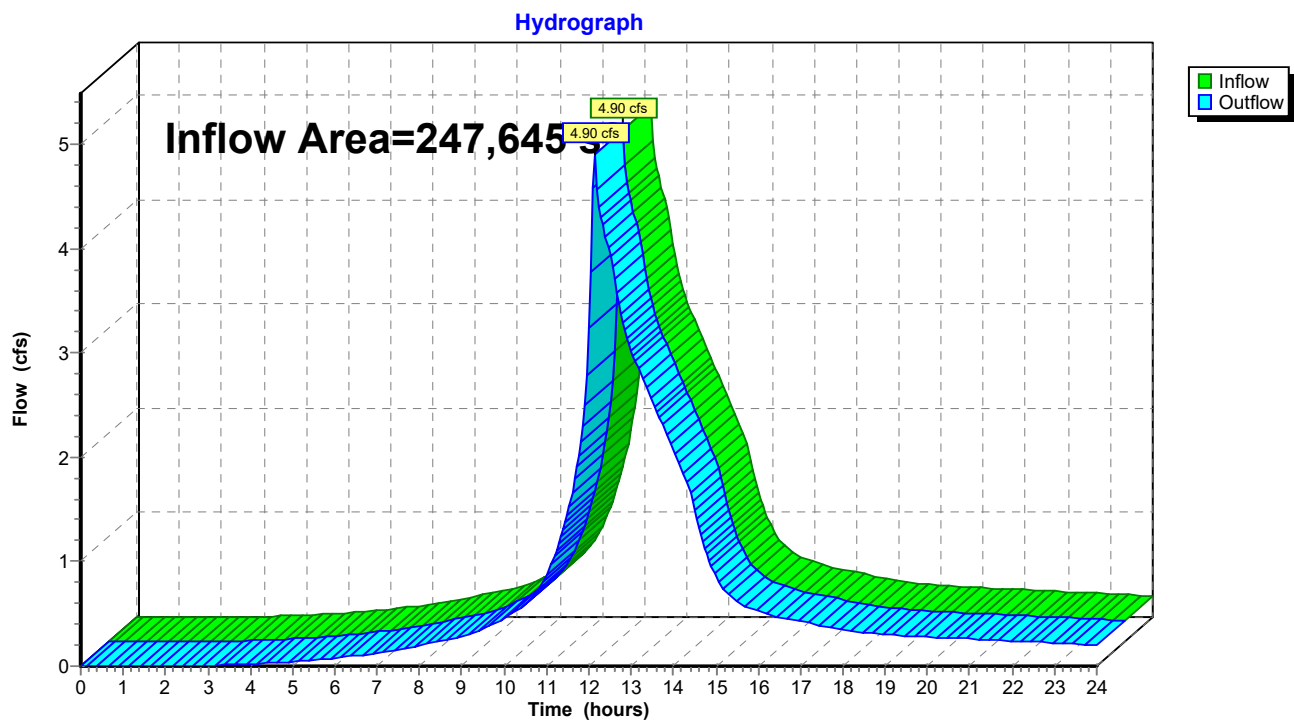
Summary for Reach DP-2: 18" NORTH DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 247,645 sf, 75.74% Impervious, Inflow Depth > 2.46" for 2year 24-hr event
Inflow = 4.90 cfs @ 12.15 hrs, Volume= 50,840 cf
Outflow = 4.90 cfs @ 12.15 hrs, Volume= 50,840 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: 18" NORTH DRAIN



Summary for Reach DP-3: 6" DRAIN

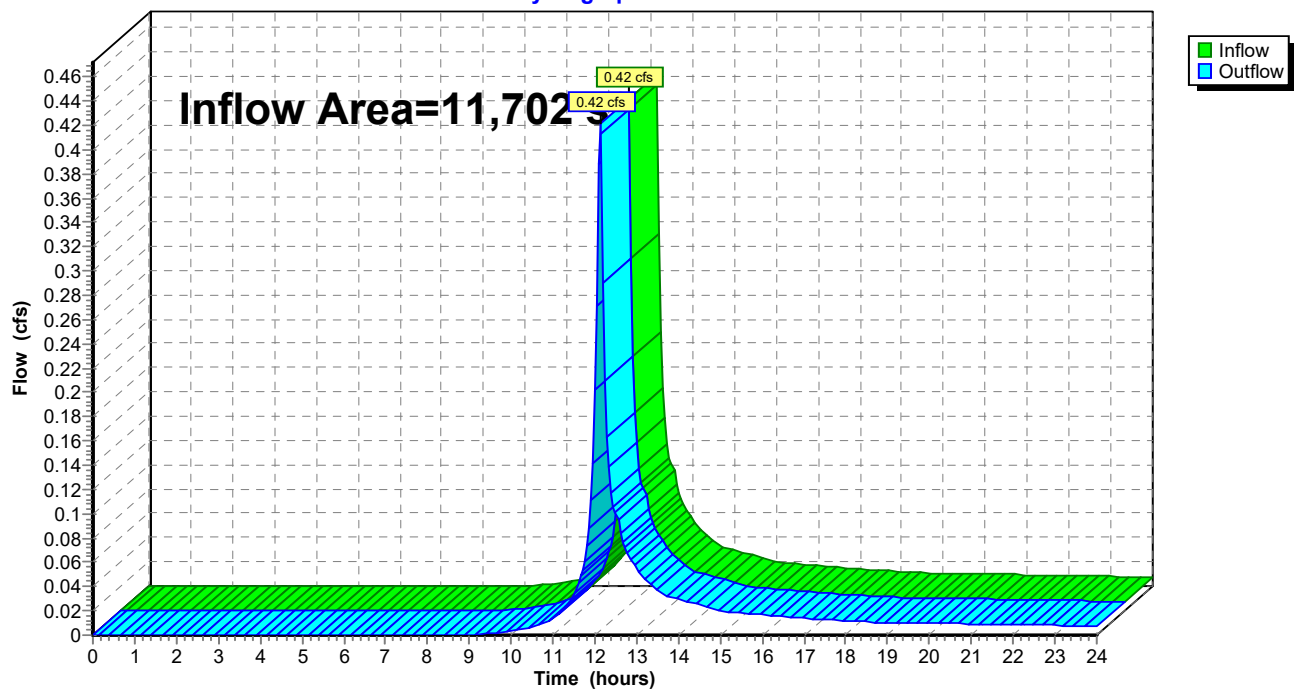
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 11,702 sf, 2.39% Impervious, Inflow Depth > 1.38" for 2year 24-hr event
Inflow = 0.42 cfs @ 12.13 hrs, Volume= 1,343 cf
Outflow = 0.42 cfs @ 12.13 hrs, Volume= 1,343 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-3: 6" DRAIN

Hydrograph



13858 - PR Conditions

Prepared by {enter your company name here}

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Printed 2/18/2022

Page 16

Summary for Reach DP-4: SOUTH BVW

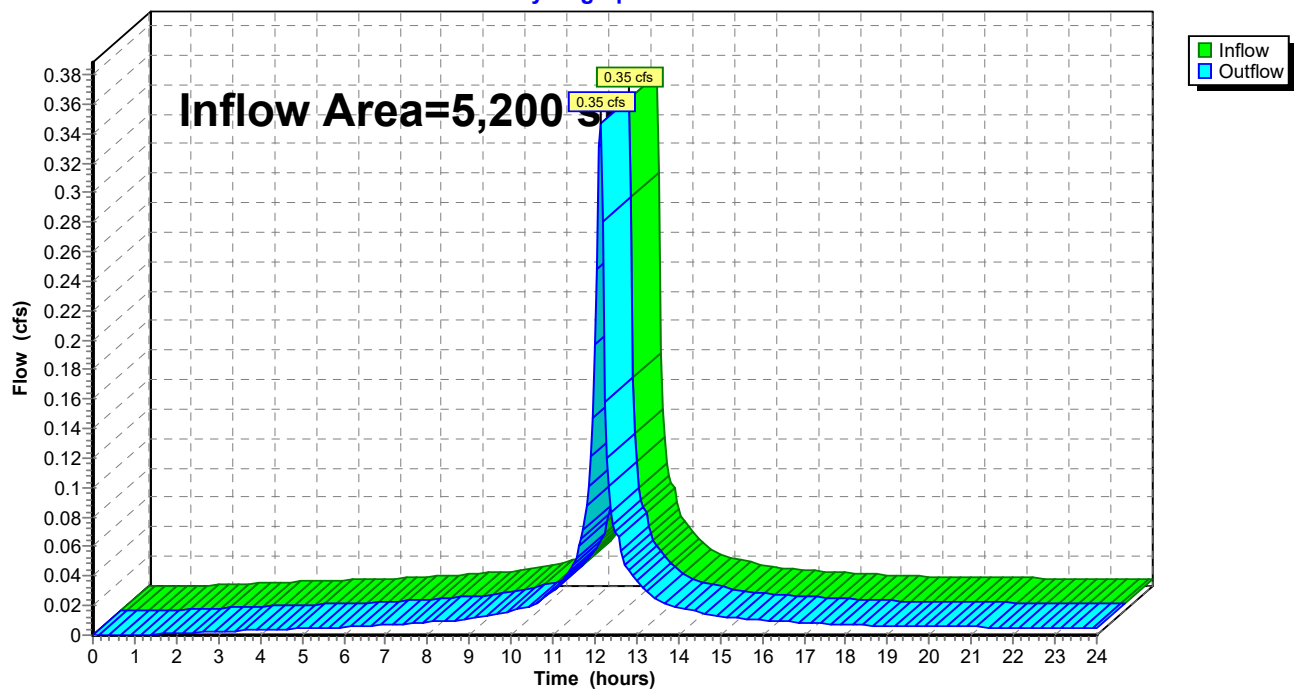
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5,200 sf, 100.00% Impervious, Inflow Depth > 2.94" for 2year 24-hr event
Inflow = 0.35 cfs @ 12.13 hrs, Volume= 1,272 cf
Outflow = 0.35 cfs @ 12.13 hrs, Volume= 1,272 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-4: SOUTH BVW

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 17

Summary for Pond Det #1: SS#1

Inflow Area = 133,345 sf, 72.76% Impervious, Inflow Depth > 2.41" for 2year 24-hr event
 Inflow = 8.00 cfs @ 12.13 hrs, Volume= 26,832 cf
 Outflow = 2.22 cfs @ 12.37 hrs, Volume= 26,457 cf, Atten= 72%, Lag= 14.6 min
 Primary = 2.22 cfs @ 12.37 hrs, Volume= 26,457 cf
 Routed to Reach DP-2 : 18" NORTH DRAIN

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 55.46' @ 12.37 hrs Surf.Area= 9,069 sf Storage= 7,220 cf

Plug-Flow detention time= 45.1 min calculated for 26,402 cf (98% of inflow)
 Center-of-Mass det. time= 36.5 min (834.7 - 798.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	54.20'	7,009 cf	72.75'W x 124.66'L x 3.50'H Field A 31,741 cf Overall - 11,715 cf Embedded = 20,026 cf x 35.0% Voids
#2A	54.70'	11,715 cf	ADS_StormTech SC-740 +Cap x 255 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 255 Chambers in 15 Rows
		18,724 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	54.20'	10.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	55.30'	12.0" W x 8.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	57.20'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=2.22 cfs @ 12.37 hrs HW=55.46' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 2.01 cfs @ 4.83 fps)
- 2=Orifice/Grate (Orifice Controls 0.21 cfs @ 1.29 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 18

Pond Det #1: SS#1 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

17 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 122.66' Row Length +12.0" End Stone x 2 = 124.66' Base Length

15 Rows x 51.0" Wide + 6.0" Spacing x 14 + 12.0" Side Stone x 2 = 72.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

255 Chambers x 45.9 cf = 11,714.7 cf Chamber Storage

31,740.7 cf Field - 11,714.7 cf Chambers = 20,026.0 cf Stone x 35.0% Voids = 7,009.1 cf Stone Storage

Chamber Storage + Stone Storage = 18,723.8 cf = 0.430 af

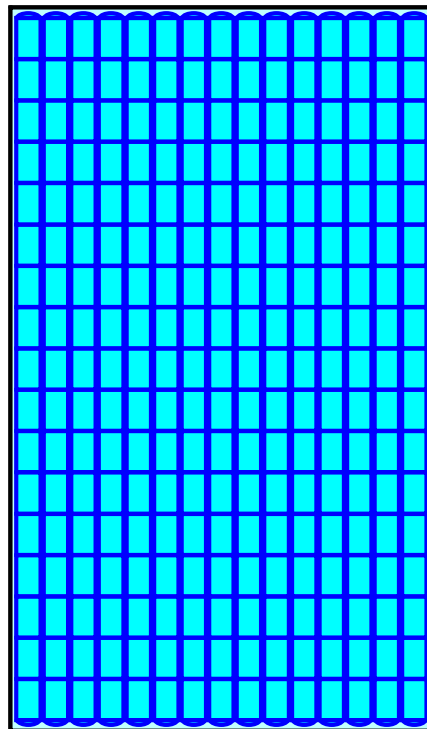
Overall Storage Efficiency = 59.0%

Overall System Size = 124.66' x 72.75' x 3.50'

255 Chambers

1,175.6 cy Field

741.7 cy Stone



13858 - PR Conditions

Prepared by {enter your company name here}

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

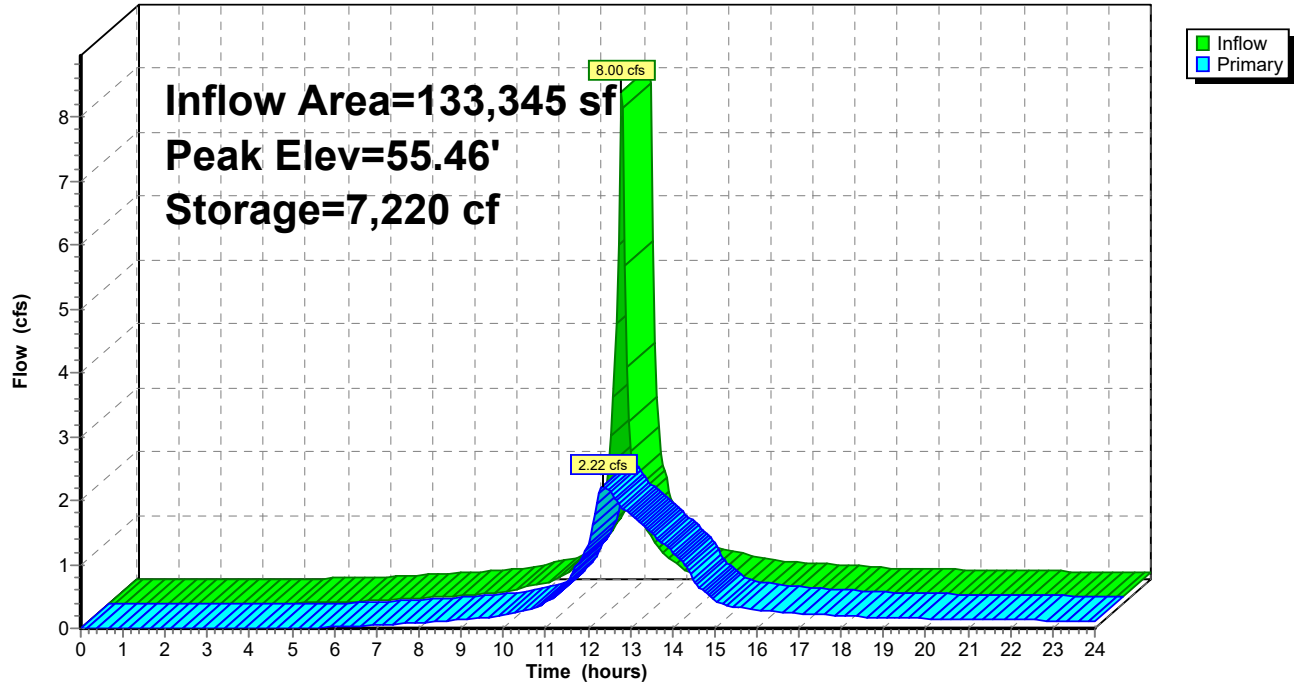
NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Printed 2/18/2022

Page 19

Pond Det #1: SS#1

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 20

Summary for Pond Det #2: SS#2

Inflow Area = 73,858 sf, 92.54% Impervious, Inflow Depth > 2.82" for 2year 24-hr event
 Inflow = 4.86 cfs @ 12.13 hrs, Volume= 17,384 cf
 Outflow = 1.33 cfs @ 12.37 hrs, Volume= 17,176 cf, Atten= 73%, Lag= 14.5 min
 Primary = 1.33 cfs @ 12.37 hrs, Volume= 17,176 cf
 Routed to Reach DP-2 : 18" NORTH DRAIN

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 51.18' @ 12.37 hrs Surf.Area= 6,318 sf Storage= 4,621 cf

Plug-Flow detention time= 47.4 min calculated for 17,176 cf (99% of inflow)
 Center-of-Mass det. time= 39.6 min (808.2 - 768.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	50.00'	4,909 cf	53.75'W x 117.54'L x 3.50'H Field A 22,112 cf Overall - 8,085 cf Embedded = 14,026 cf x 35.0% Voids
#2A	50.50'	8,085 cf	ADS_StormTech SC-740 +Cap x 176 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 176 Chambers in 11 Rows
		12,995 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	8.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	51.00'	12.0" W x 8.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	52.90'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=1.33 cfs @ 12.37 hrs HW=51.18' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 1.08 cfs @ 4.85 fps)
- 2=Orifice/Grate (Orifice Controls 0.25 cfs @ 1.37 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

13858 - PR Conditions

NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 21

Pond Det #2: SS#2 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

16 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 115.54' Row Length +12.0" End Stone x 2 = 117.54' Base Length

11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

176 Chambers x 45.9 cf = 8,085.4 cf Chamber Storage

22,111.6 cf Field - 8,085.4 cf Chambers = 14,026.1 cf Stone x 35.0% Voids = 4,909.1 cf Stone Storage

Chamber Storage + Stone Storage = 12,994.6 cf = 0.298 af

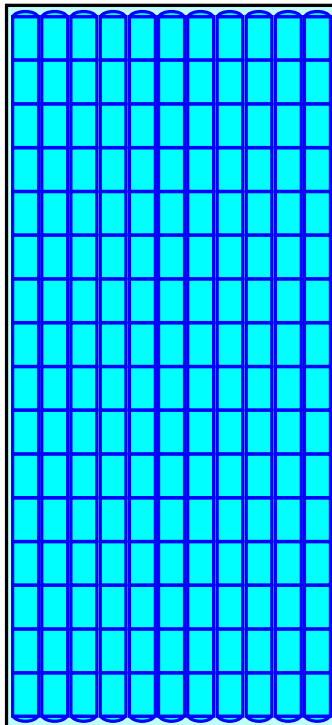
Overall Storage Efficiency = 58.8%

Overall System Size = 117.54' x 53.75' x 3.50'

176 Chambers

818.9 cy Field

519.5 cy Stone



13858 - PR Conditions

Prepared by {enter your company name here}

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

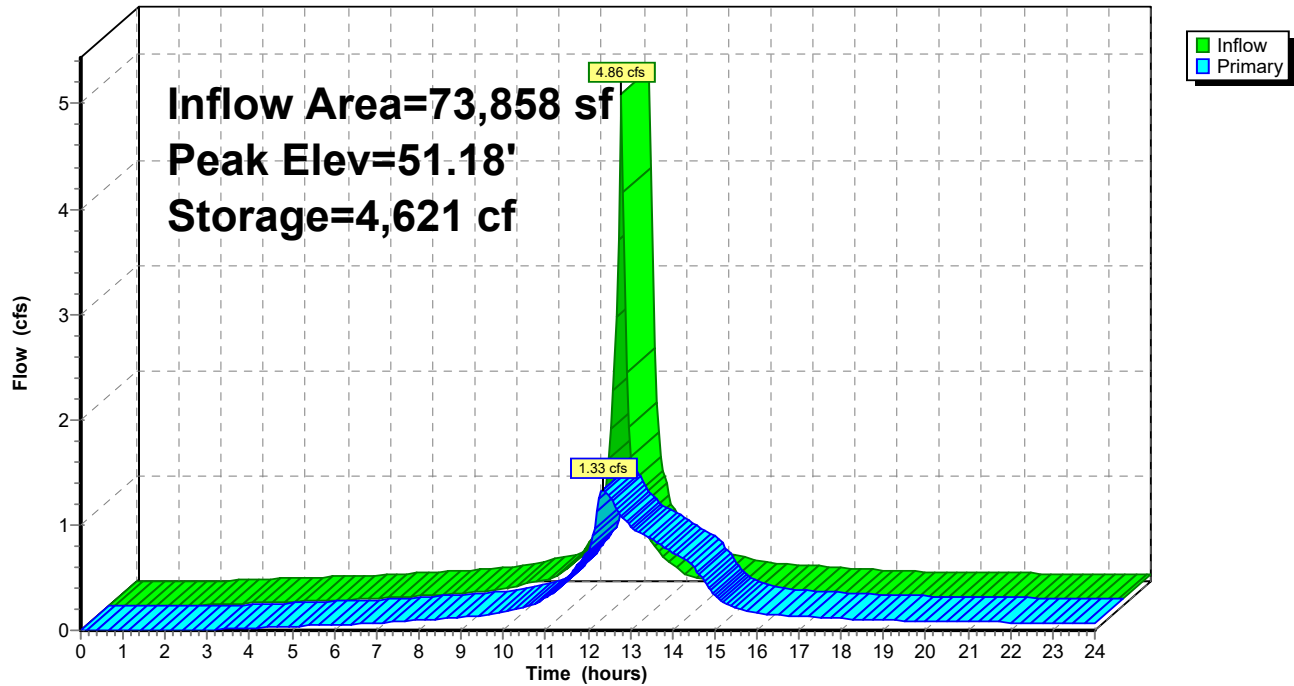
NOAA 24-hr D 2year 24-hr Rainfall=3.17"

Printed 2/18/2022

Page 22

Pond Det #2: SS#2

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 23

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPR-1: UU-NW GRASS AREA Runoff Area=5,726 sf 0.00% Impervious Runoff Depth>2.37"
Tc=6.0 min CN=74 Runoff=0.36 cfs 1,131 cf

SubcatchmentPR-1B: UU-PROPOSED Runoff Area=56,996 sf 52.08% Impervious Runoff Depth>3.47"
Tc=6.0 min CN=86 Runoff=5.03 cfs 16,495 cf

SubcatchmentPR-2A: SS#1 Runoff Area=133,345 sf 72.76% Impervious Runoff Depth>4.20"
Tc=6.0 min CN=93 Runoff=13.45 cfs 46,716 cf

SubcatchmentPR-2B: SS#2 Runoff Area=73,858 sf 92.54% Impervious Runoff Depth>4.65"
Tc=6.0 min CN=97 Runoff=7.79 cfs 28,640 cf

SubcatchmentPR-2C: PR DP-1 (18" North Runoff Area=40,442 sf 54.88% Impervious Runoff Depth>3.88"
Tc=6.0 min CN=90 Runoff=3.88 cfs 13,084 cf

SubcatchmentPR-3: PR DP-3 Runoff Area=11,702 sf 2.39% Impervious Runoff Depth>2.90"
Tc=6.0 min CN=80 Runoff=0.88 cfs 2,826 cf

SubcatchmentPR-4: PR-4 ROOF Runoff Area=5,200 sf 100.00% Impervious Runoff Depth>4.77"
Tc=6.0 min CN=98 Runoff=0.55 cfs 2,067 cf

Reach DP-1: NW BVW Inflow=5.39 cfs 17,625 cf
Outflow=5.39 cfs 17,625 cf

Reach DP-2: 18" NORTH DRAIN Inflow=10.22 cfs 87,642 cf
Outflow=10.22 cfs 87,642 cf

Reach DP-3: 6" DRAIN Inflow=0.88 cfs 2,826 cf
Outflow=0.88 cfs 2,826 cf

Reach DP-4: SOUTH BVW Inflow=0.55 cfs 2,067 cf
Outflow=0.55 cfs 2,067 cf

Pond Det #1: SS#1 Peak Elev=56.17' Storage=12,024 cf Inflow=13.45 cfs 46,716 cf
Outflow=4.95 cfs 46,200 cf

Pond Det #2: SS#2 Peak Elev=51.70' Storage=7,124 cf Inflow=7.79 cfs 28,640 cf
Outflow=3.20 cfs 28,357 cf

Total Runoff Area = 327,269 sf Runoff Volume = 110,959 cf Average Runoff Depth = 4.07"
31.94% Pervious = 104,532 sf 68.06% Impervious = 222,737 sf

13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 24

Summary for Subcatchment PR-1: UU-NW GRASS AREA

Runoff = 0.36 cfs @ 12.13 hrs, Volume= 1,131 cf, Depth> 2.37"
Routed to Reach DP-1 : NW BVW

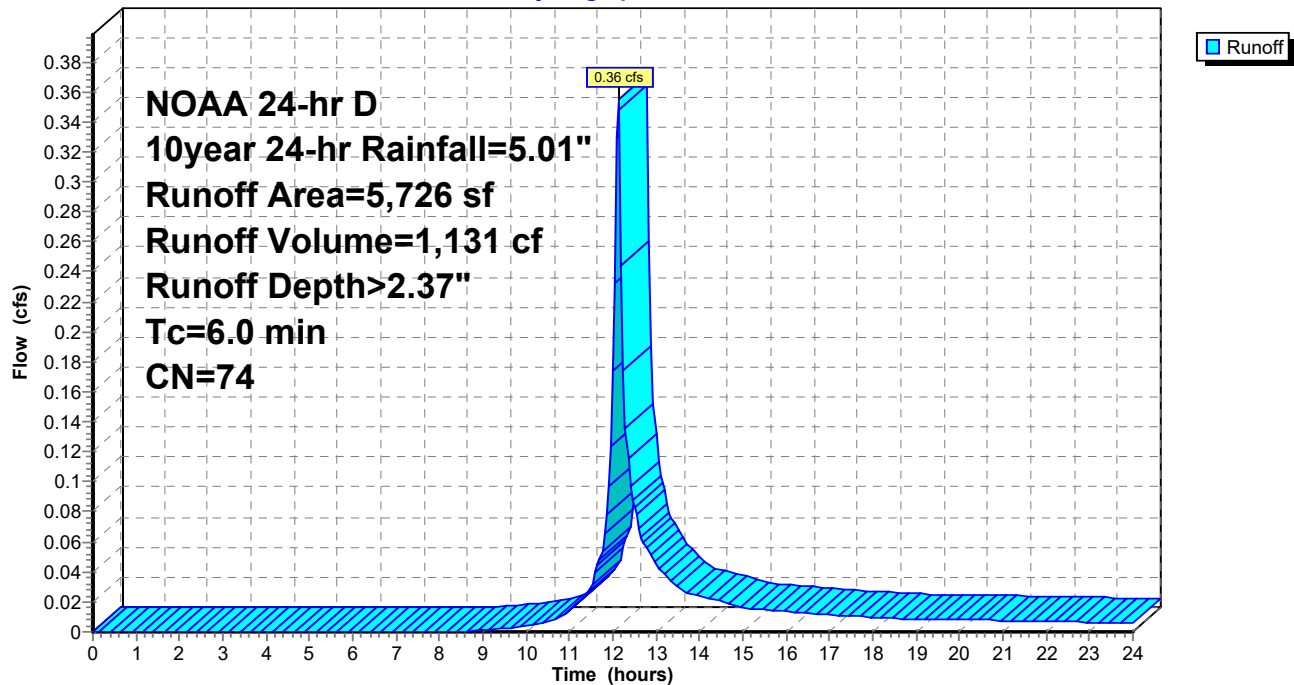
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Area (sf)	CN	Description
5,726	74	>75% Grass cover, Good, HSG C
5,726		100.00% Pervious Area

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

Subcatchment PR-1: UU-NW GRASS AREA

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 25

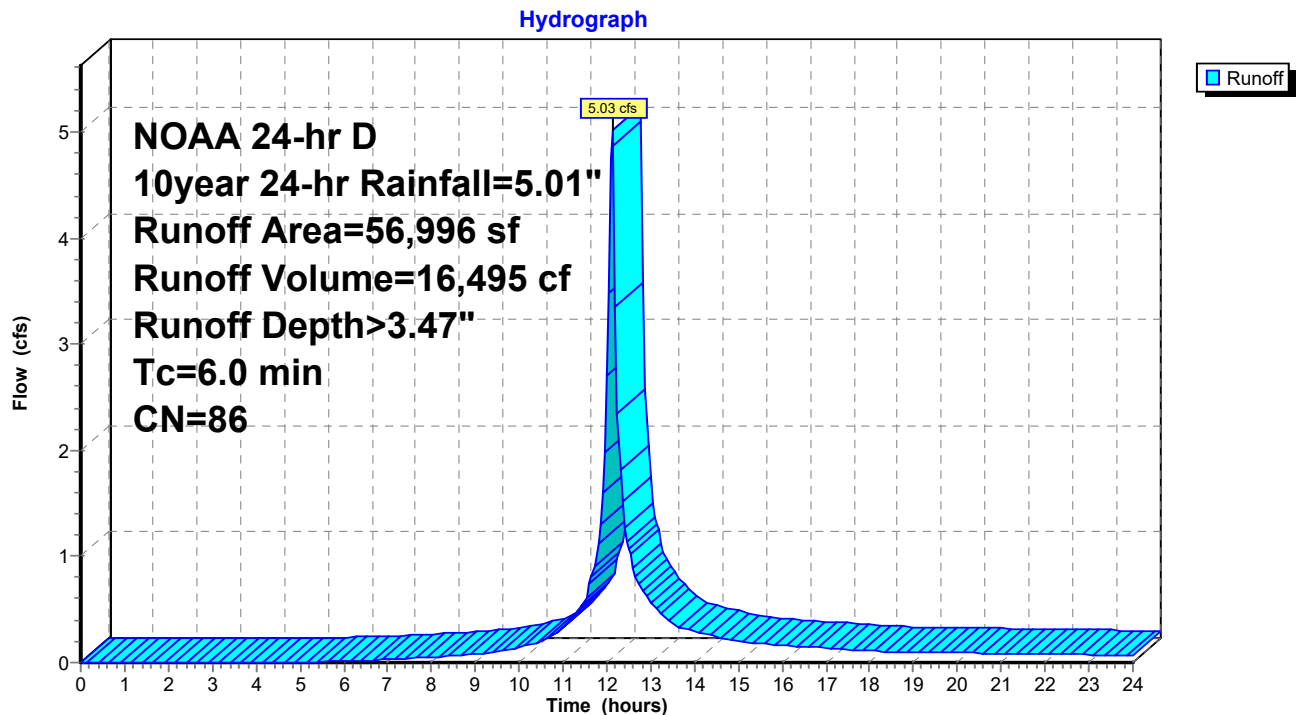
Summary for Subcatchment PR-1B: UU-PROPOSED

Runoff = 5.03 cfs @ 12.13 hrs, Volume= 16,495 cf, Depth> 3.47"
 Routed to Reach DP-1 : NW BVW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Area (sf)	CN	Description
7,313	80	>75% Grass cover, Good, HSG D
20,000	70	Woods, Good, HSG C
29,683	98	Paved parking, HSG C
56,996	86	Weighted Average
27,313		47.92% Pervious Area
29,683		52.08% Impervious Area

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

Subcatchment PR-1B: UU-PROPOSED

13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 26

Summary for Subcatchment PR-2A: SS#1

Runoff = 13.45 cfs @ 12.13 hrs, Volume= 46,716 cf, Depth> 4.20"
 Routed to Pond Det #1 : SS#1

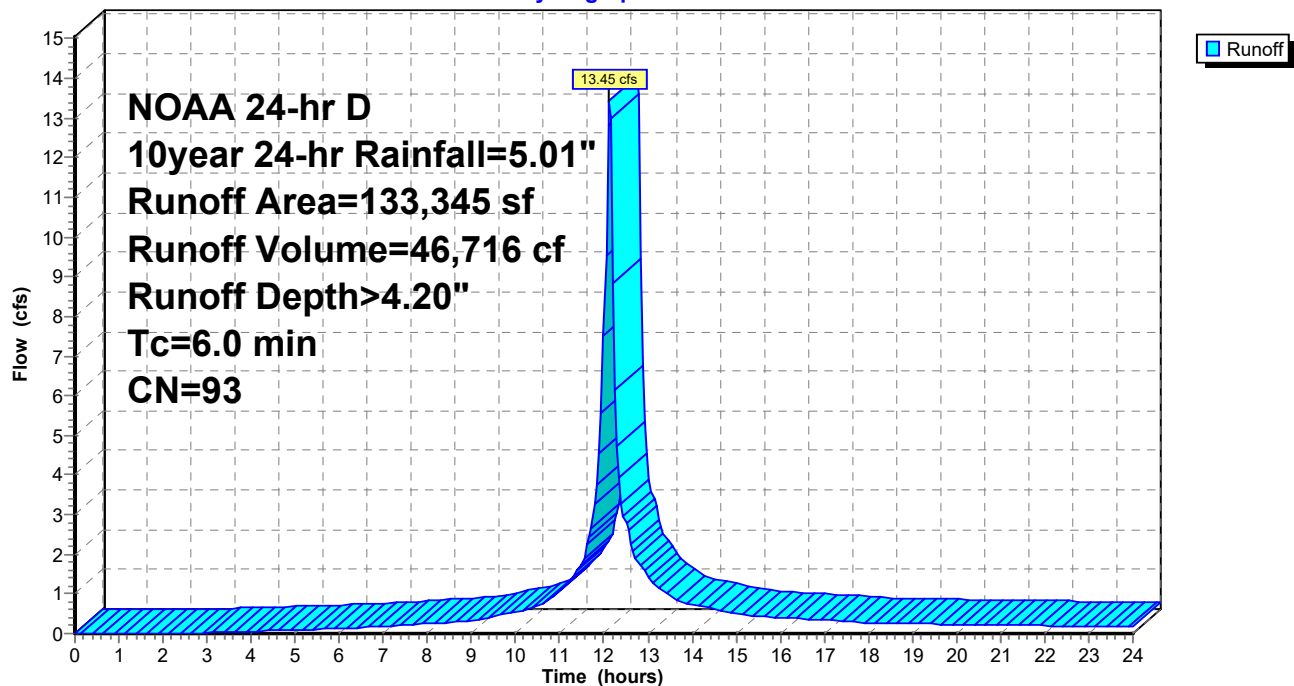
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Area (sf)	CN	Description
36,318	80	>75% Grass cover, Good, HSG D
66,336	98	Paved parking, HSG D
30,691	98	Roofs, HSG D
133,345	93	Weighted Average
36,318		27.24% Pervious Area
97,027		72.76% Impervious Area

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

Subcatchment PR-2A: SS#1

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 27

Summary for Subcatchment PR-2B: SS#2

Runoff = 7.79 cfs @ 12.13 hrs, Volume= 28,640 cf, Depth> 4.65"
Routed to Pond Det #2 : SS#2

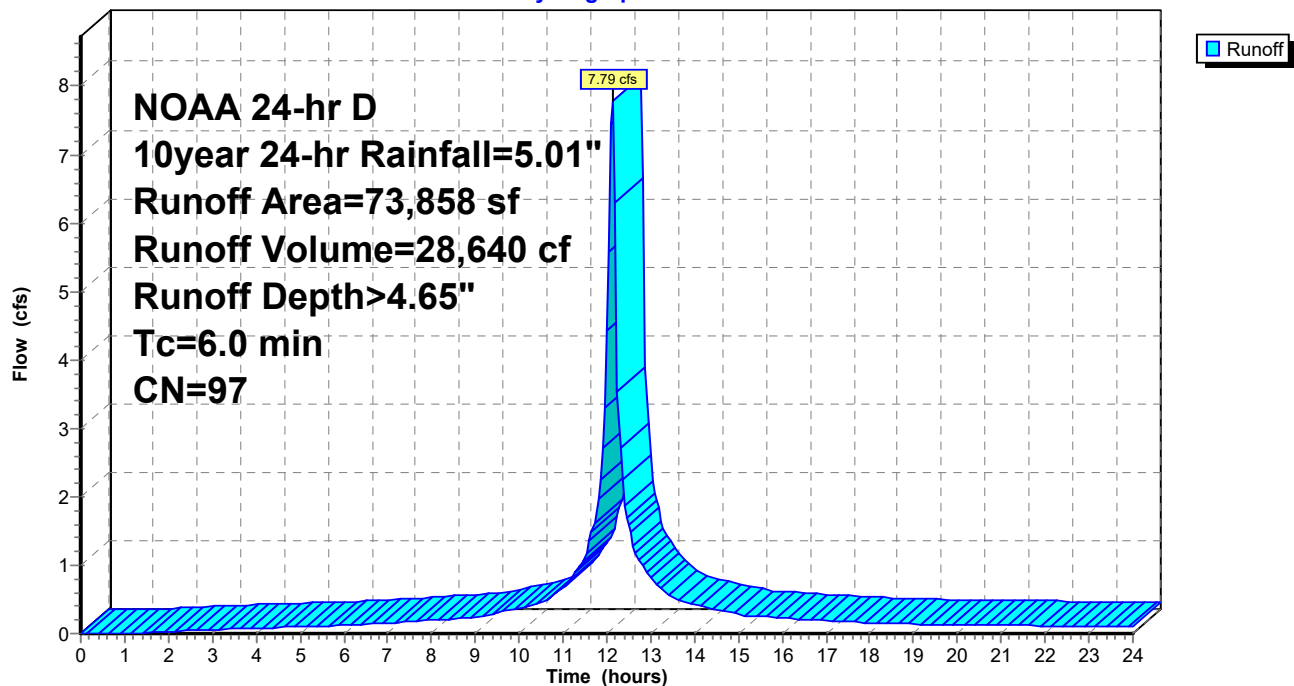
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Area (sf)	CN	Description
5,507	80	>75% Grass cover, Good, HSG D
44,720	98	Paved parking, HSG D
23,631	98	Roofs, HSG D
73,858	97	Weighted Average
5,507		7.46% Pervious Area
68,351		92.54% Impervious Area

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

Subcatchment PR-2B: SS#2

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 28

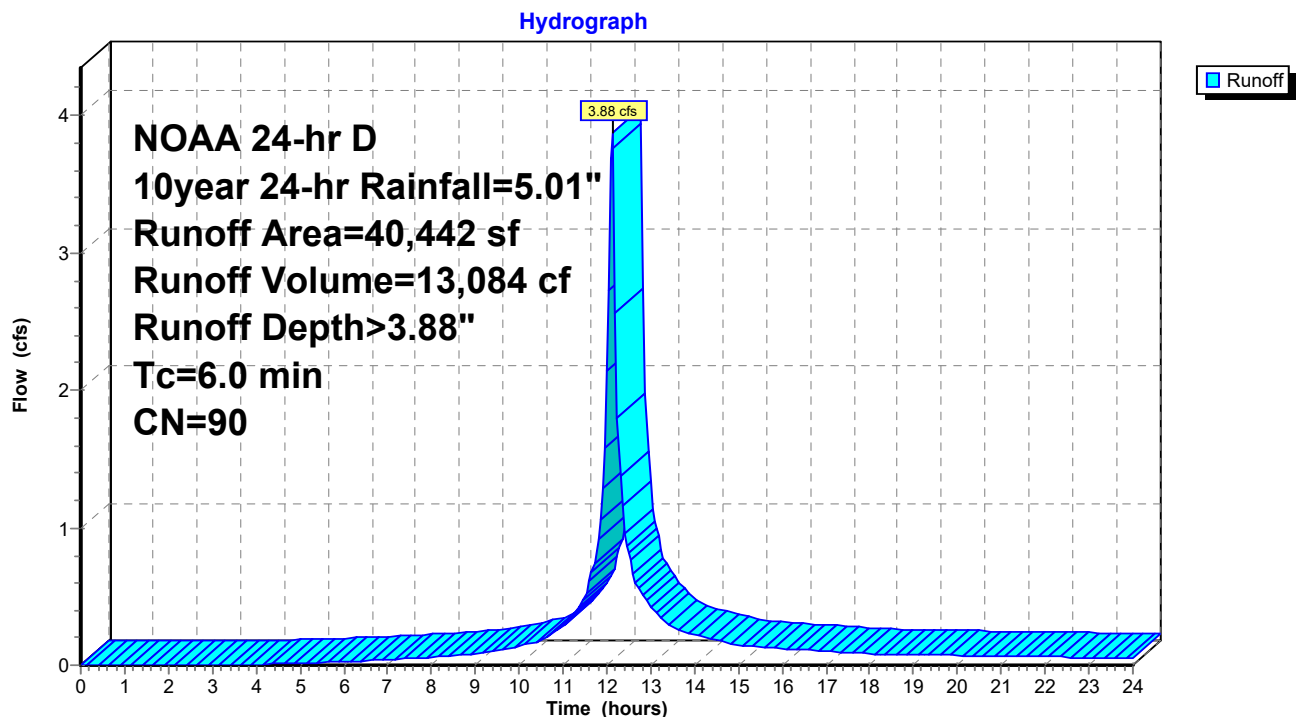
Summary for Subcatchment PR-2C: PR DP-1 (18" North Drain)

Runoff = 3.88 cfs @ 12.13 hrs, Volume= 13,084 cf, Depth> 3.88"
Routed to Reach DP-2 : 18" NORTH DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Area (sf)	CN	Description
18,246	80	>75% Grass cover, Good, HSG D
22,196	98	Paved parking, HSG D
40,442	90	Weighted Average
18,246		45.12% Pervious Area
22,196		54.88% Impervious Area

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

Subcatchment PR-2C: PR DP-1 (18" North Drain)

13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 29

Summary for Subcatchment PR-3: PR DP-3

Runoff = 0.88 cfs @ 12.13 hrs, Volume= 2,826 cf, Depth> 2.90"
Routed to Reach DP-3 : 6" DRAIN

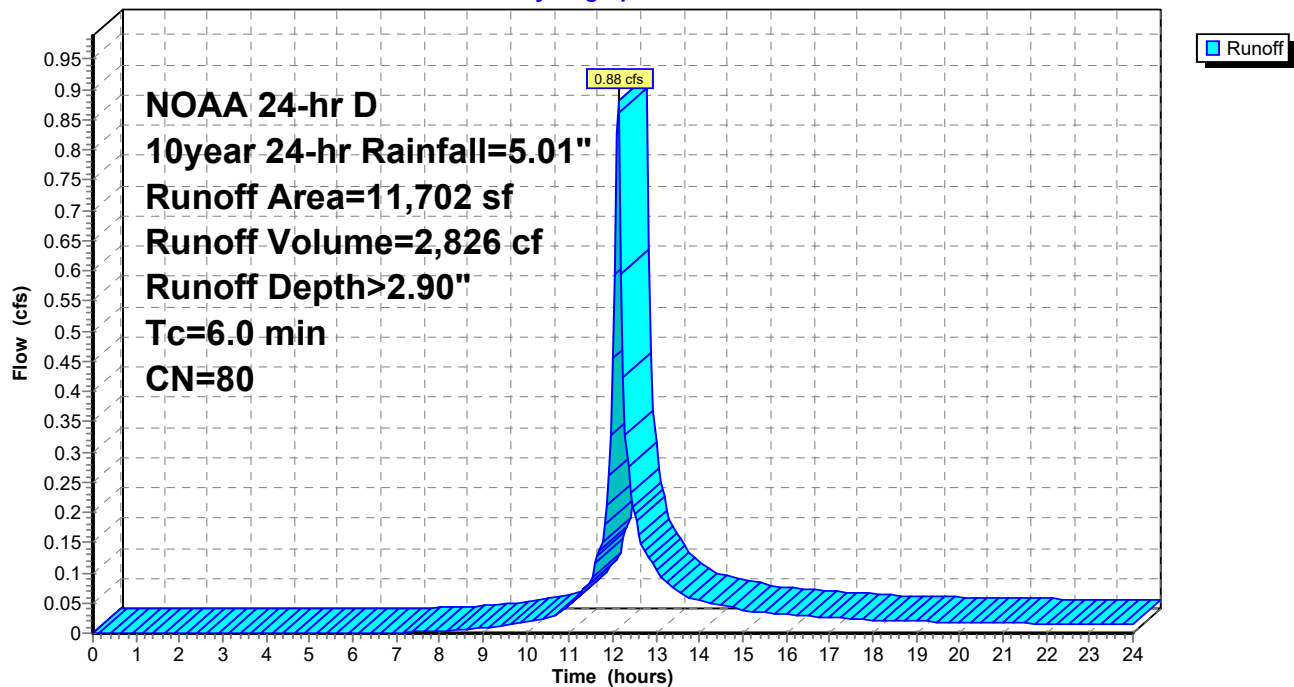
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Area (sf)	CN	Description
11,422	80	>75% Grass cover, Good, HSG D
280	98	Paved parking, HSG D
11,702	80	Weighted Average
11,422		97.61% Pervious Area
280		2.39% Impervious Area

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

Subcatchment PR-3: PR DP-3

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 30

Summary for Subcatchment PR-4: PR-4 ROOF

Runoff = 0.55 cfs @ 12.13 hrs, Volume= 2,067 cf, Depth> 4.77"
Routed to Reach DP-4 : SOUTH BVW

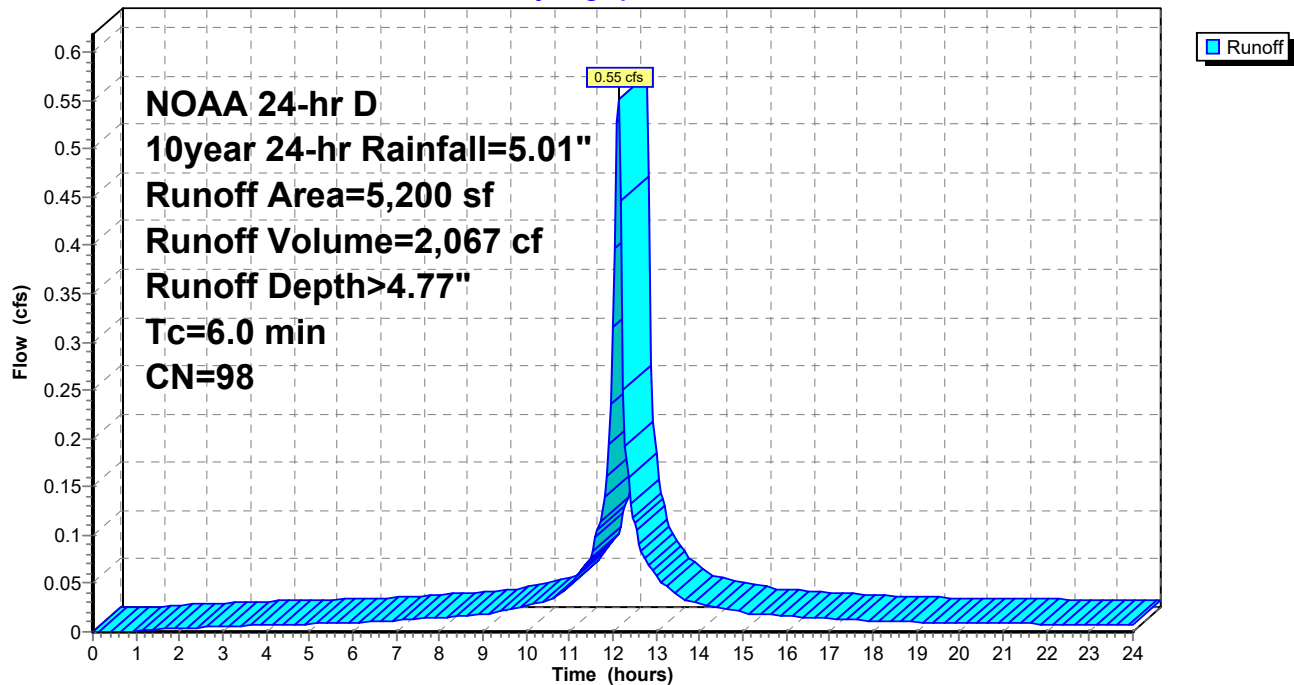
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Area (sf)	CN	Description
5,200	98	Roofs, HSG C
5,200		100.00% Impervious Area

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

Subcatchment PR-4: PR-4 ROOF

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 31

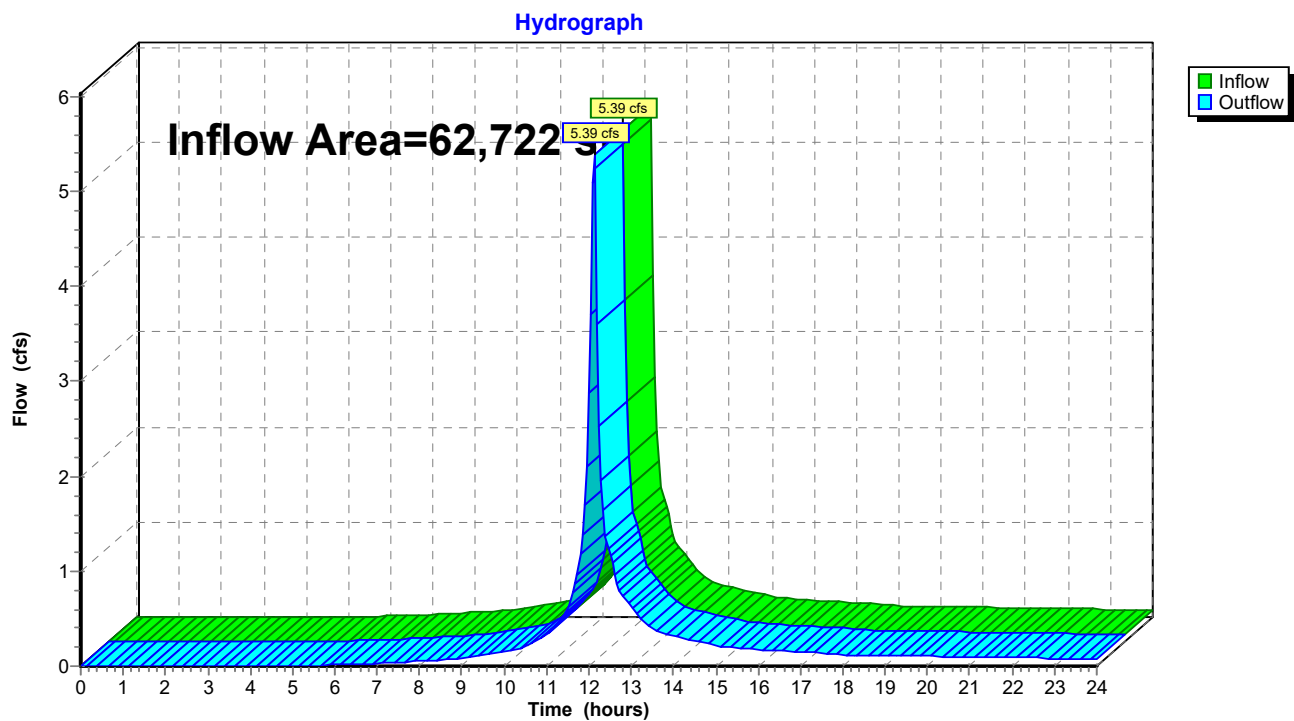
Summary for Reach DP-1: NW BVW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 62,722 sf, 47.32% Impervious, Inflow Depth > 3.37" for 10year 24-hr event
Inflow = 5.39 cfs @ 12.13 hrs, Volume= 17,625 cf
Outflow = 5.39 cfs @ 12.13 hrs, Volume= 17,625 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: NW BVW



13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 32

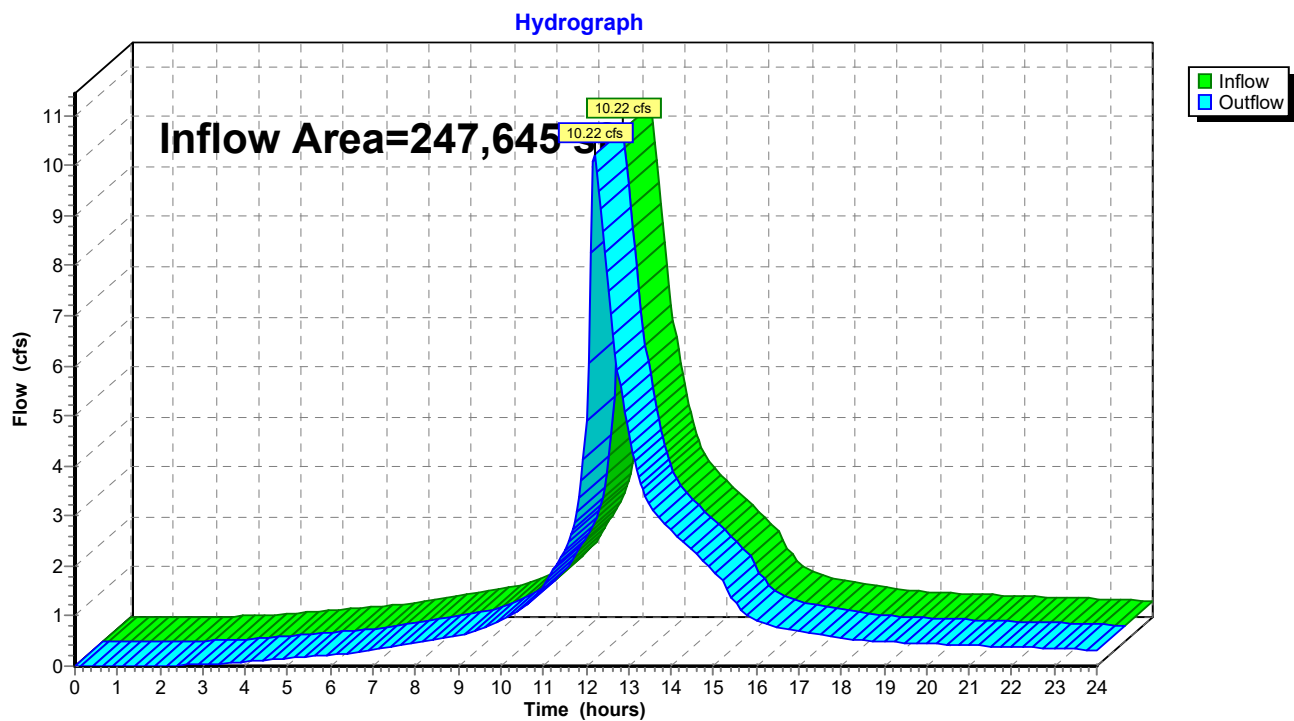
Summary for Reach DP-2: 18" NORTH DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 247,645 sf, 75.74% Impervious, Inflow Depth > 4.25" for 10year 24-hr event
Inflow = 10.22 cfs @ 12.19 hrs, Volume= 87,642 cf
Outflow = 10.22 cfs @ 12.19 hrs, Volume= 87,642 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: 18" NORTH DRAIN



13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 33

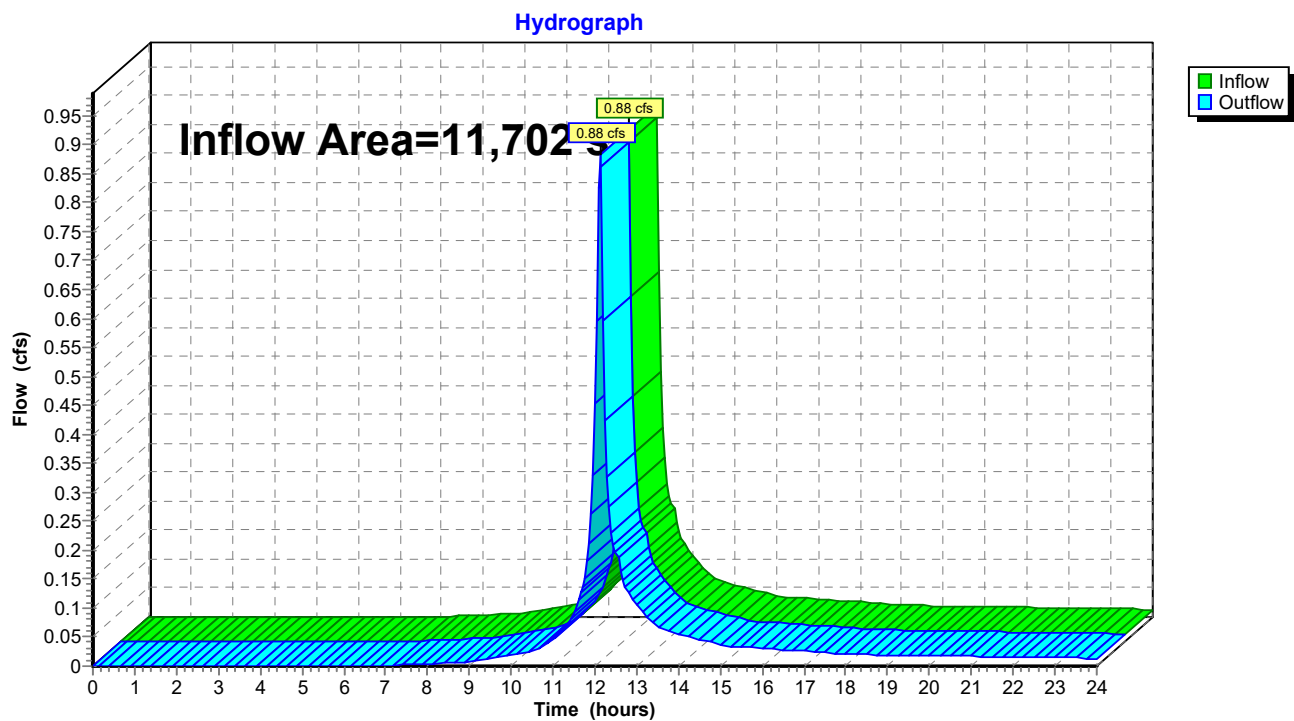
Summary for Reach DP-3: 6" DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 11,702 sf, 2.39% Impervious, Inflow Depth > 2.90" for 10year 24-hr event
Inflow = 0.88 cfs @ 12.13 hrs, Volume= 2,826 cf
Outflow = 0.88 cfs @ 12.13 hrs, Volume= 2,826 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-3: 6" DRAIN



13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 34

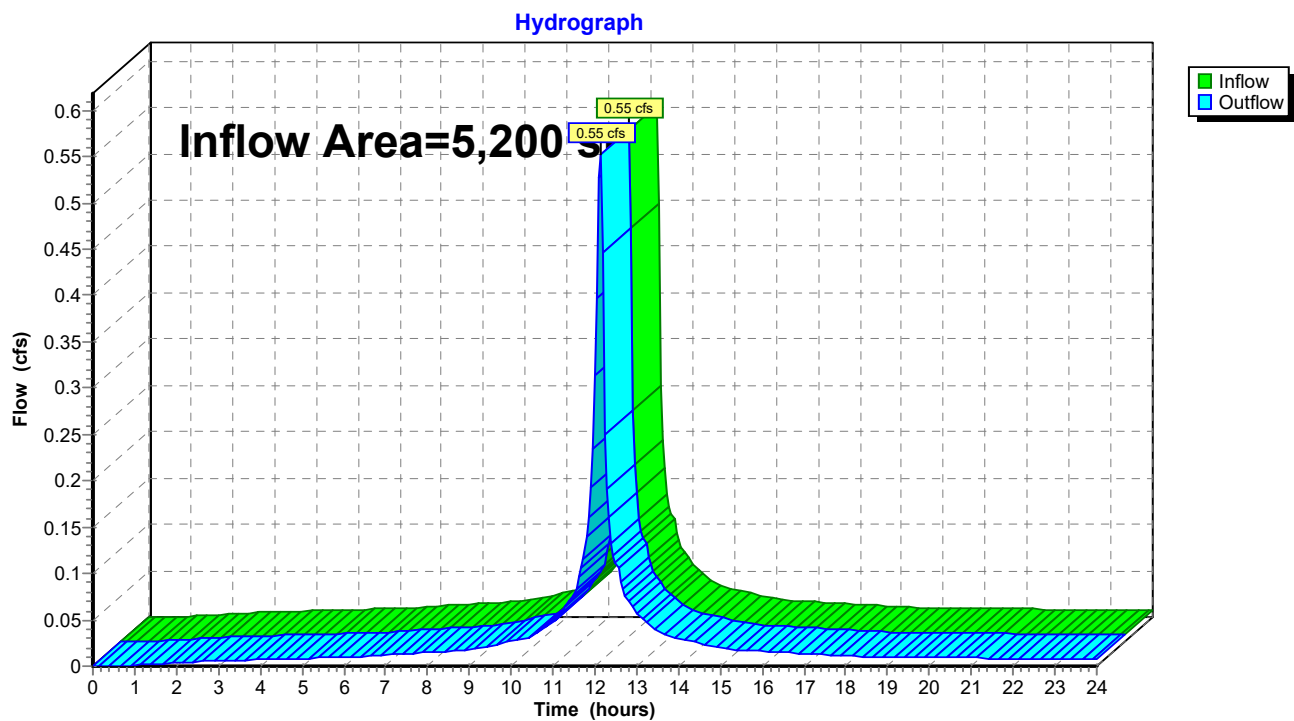
Summary for Reach DP-4: SOUTH BVW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5,200 sf, 100.00% Impervious, Inflow Depth > 4.77" for 10year 24-hr event
Inflow = 0.55 cfs @ 12.13 hrs, Volume= 2,067 cf
Outflow = 0.55 cfs @ 12.13 hrs, Volume= 2,067 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-4: SOUTH BVW



13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 35

Summary for Pond Det #1: SS#1

Inflow Area = 133,345 sf, 72.76% Impervious, Inflow Depth > 4.20" for 10year 24-hr event
 Inflow = 13.45 cfs @ 12.13 hrs, Volume= 46,716 cf
 Outflow = 4.95 cfs @ 12.30 hrs, Volume= 46,200 cf, Atten= 63%, Lag= 10.3 min
 Primary = 4.95 cfs @ 12.30 hrs, Volume= 46,200 cf
 Routed to Reach DP-2 : 18" NORTH DRAIN

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 56.17' @ 12.30 hrs Surf.Area= 9,069 sf Storage= 12,024 cf

Plug-Flow detention time= 42.7 min calculated for 46,200 cf (99% of inflow)
 Center-of-Mass det. time= 35.6 min (817.4 - 781.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	54.20'	7,009 cf	72.75'W x 124.66'L x 3.50'H Field A 31,741 cf Overall - 11,715 cf Embedded = 20,026 cf x 35.0% Voids
#2A	54.70'	11,715 cf	ADS_StormTech SC-740 +Cap x 255 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 255 Chambers in 15 Rows
		18,724 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	54.20'	10.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	55.30'	12.0" W x 8.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	57.20'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=4.95 cfs @ 12.30 hrs HW=56.17' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 2.63 cfs @ 6.32 fps)
- 2=Orifice/Grate (Orifice Controls 2.32 cfs @ 3.48 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 36

Pond Det #1: SS#1 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

17 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 122.66' Row Length +12.0" End Stone x 2 = 124.66' Base Length

15 Rows x 51.0" Wide + 6.0" Spacing x 14 + 12.0" Side Stone x 2 = 72.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

255 Chambers x 45.9 cf = 11,714.7 cf Chamber Storage

31,740.7 cf Field - 11,714.7 cf Chambers = 20,026.0 cf Stone x 35.0% Voids = 7,009.1 cf Stone Storage

Chamber Storage + Stone Storage = 18,723.8 cf = 0.430 af

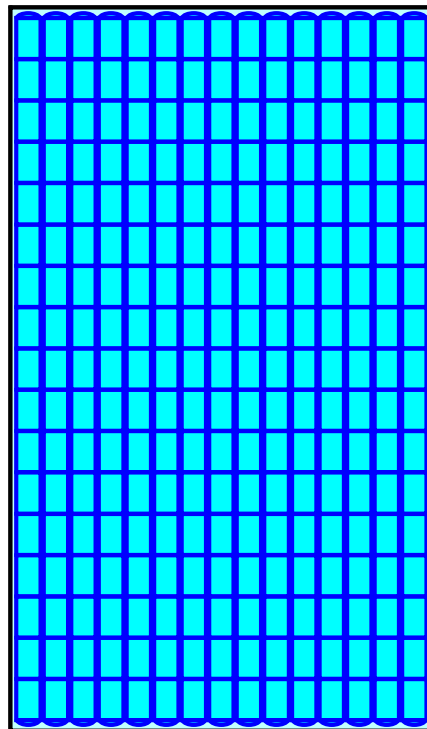
Overall Storage Efficiency = 59.0%

Overall System Size = 124.66' x 72.75' x 3.50'

255 Chambers

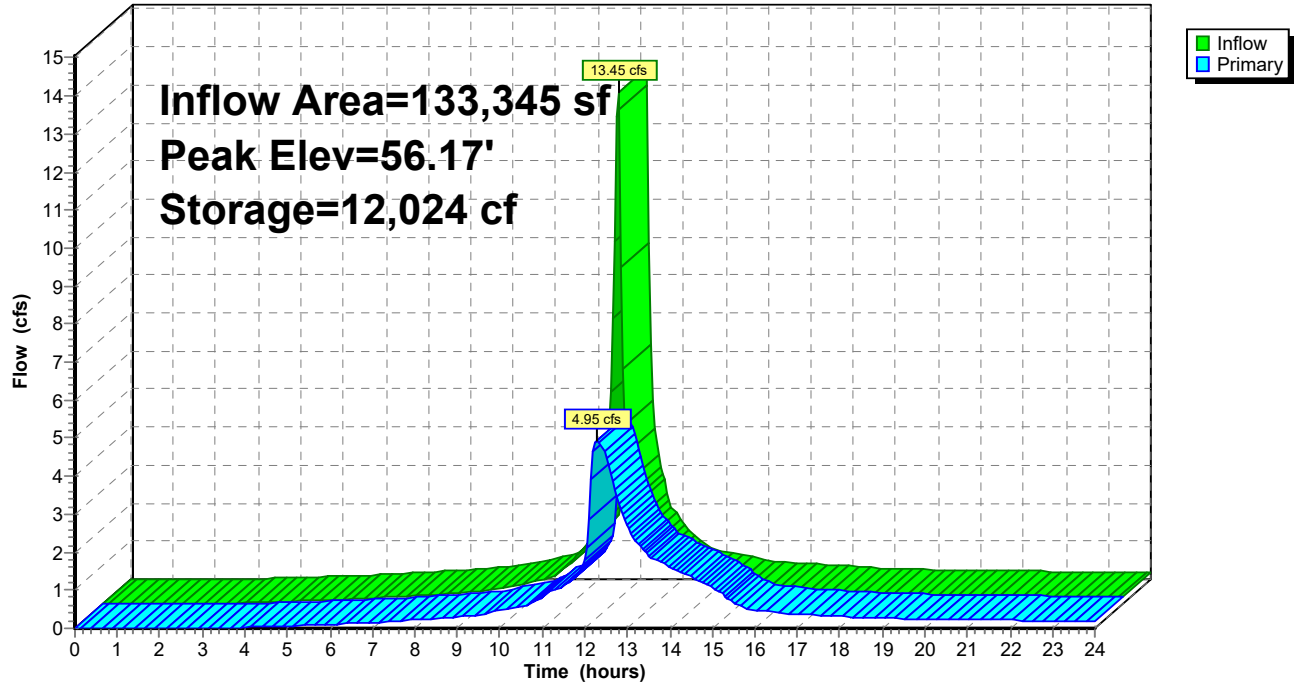
1,175.6 cy Field

741.7 cy Stone



Pond Det #1: SS#1

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 38

Summary for Pond Det #2: SS#2

Inflow Area = 73,858 sf, 92.54% Impervious, Inflow Depth > 4.65" for 10year 24-hr event
 Inflow = 7.79 cfs @ 12.13 hrs, Volume= 28,640 cf
 Outflow = 3.20 cfs @ 12.27 hrs, Volume= 28,357 cf, Atten= 59%, Lag= 8.8 min
 Primary = 3.20 cfs @ 12.27 hrs, Volume= 28,357 cf
 Routed to Reach DP-2 : 18" NORTH DRAIN

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 51.70' @ 12.27 hrs Surf.Area= 6,318 sf Storage= 7,124 cf

Plug-Flow detention time= 43.8 min calculated for 28,298 cf (99% of inflow)
 Center-of-Mass det. time= 37.2 min (794.3 - 757.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	50.00'	4,909 cf	53.75'W x 117.54'L x 3.50'H Field A 22,112 cf Overall - 8,085 cf Embedded = 14,026 cf x 35.0% Voids
#2A	50.50'	8,085 cf	ADS_StormTech SC-740 +Cap x 176 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 176 Chambers in 11 Rows
		12,995 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	8.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	51.00'	12.0" W x 8.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	52.90'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=3.18 cfs @ 12.27 hrs HW=51.70' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 1.32 cfs @ 5.95 fps)
- 2=Orifice/Grate (Orifice Controls 1.85 cfs @ 2.78 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 39

Pond Det #2: SS#2 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

16 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 115.54' Row Length +12.0" End Stone x 2 = 117.54' Base Length

11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

176 Chambers x 45.9 cf = 8,085.4 cf Chamber Storage

22,111.6 cf Field - 8,085.4 cf Chambers = 14,026.1 cf Stone x 35.0% Voids = 4,909.1 cf Stone Storage

Chamber Storage + Stone Storage = 12,994.6 cf = 0.298 af

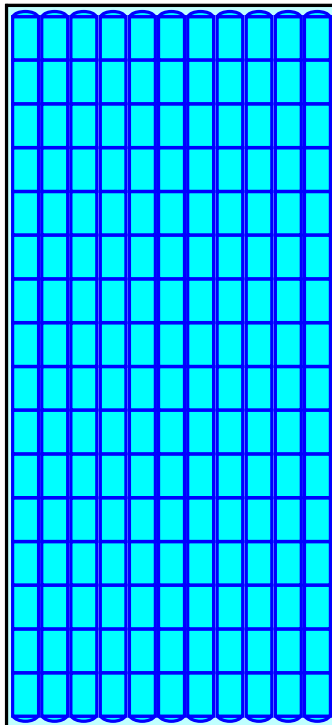
Overall Storage Efficiency = 58.8%

Overall System Size = 117.54' x 53.75' x 3.50'

176 Chambers

818.9 cy Field

519.5 cy Stone



13858 - PR Conditions

NOAA 24-hr D 10year 24-hr Rainfall=5.01"

Prepared by {enter your company name here}

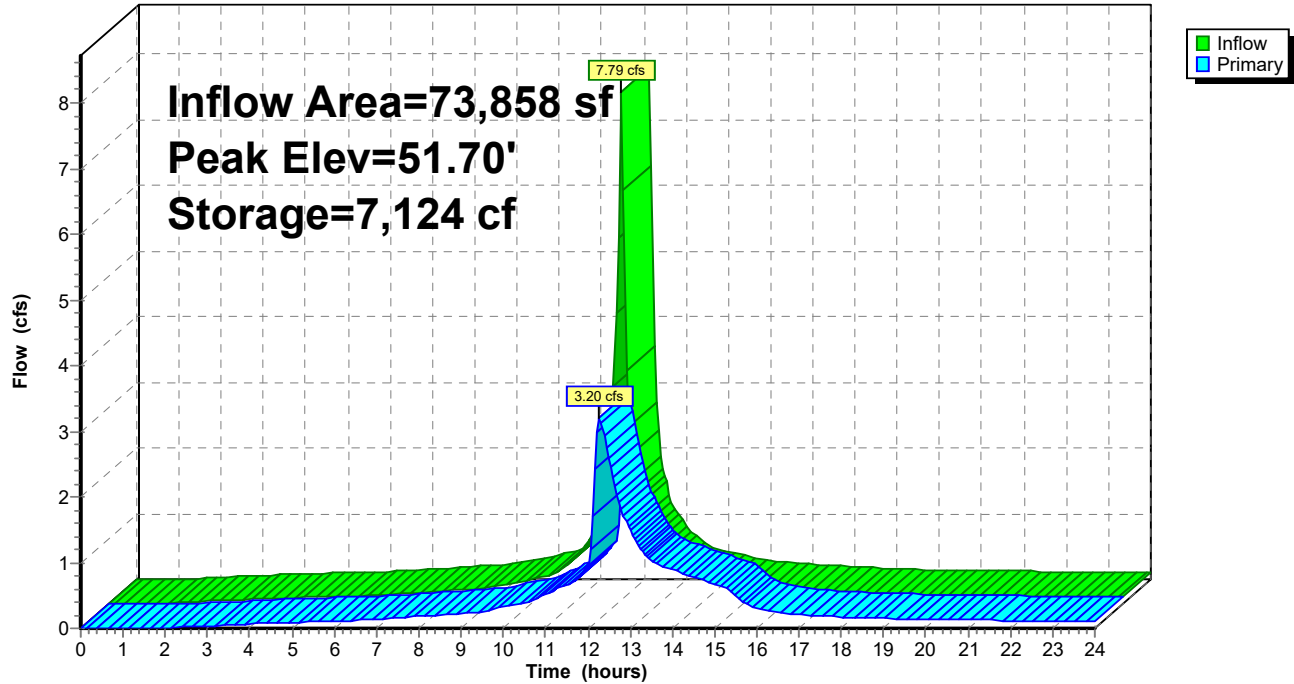
Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 40

Pond Det #2: SS#2

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 41

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPR-1: UU-NW GRASS AREA Runoff Area=5,726 sf 0.00% Impervious Runoff Depth>3.32"
Tc=6.0 min CN=74 Runoff=0.50 cfs 1,582 cf

SubcatchmentPR-1B: UU-PROPOSED Runoff Area=56,996 sf 52.08% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=86 Runoff=6.51 cfs 21,645 cf

SubcatchmentPR-2A: SS#1 Runoff Area=133,345 sf 72.76% Impervious Runoff Depth>5.34"
Tc=6.0 min CN=93 Runoff=16.82 cfs 59,294 cf

SubcatchmentPR-2B: SS#2 Runoff Area=73,858 sf 92.54% Impervious Runoff Depth>5.80"
Tc=6.0 min CN=97 Runoff=9.62 cfs 35,693 cf

SubcatchmentPR-2C: PR DP-1 (18" North Runoff Area=40,442 sf 54.88% Impervious Runoff Depth>5.00"
Tc=6.0 min CN=90 Runoff=4.92 cfs 16,842 cf

SubcatchmentPR-3: PR DP-3 Runoff Area=11,702 sf 2.39% Impervious Runoff Depth>3.92"
Tc=6.0 min CN=80 Runoff=1.18 cfs 3,824 cf

SubcatchmentPR-4: PR-4 ROOF Runoff Area=5,200 sf 100.00% Impervious Runoff Depth>5.92"
Tc=6.0 min CN=98 Runoff=0.68 cfs 2,564 cf

Reach DP-1: NW BVW Inflow=7.00 cfs 23,228 cf
Outflow=7.00 cfs 23,228 cf

Reach DP-2: 18" NORTH DRAIN Inflow=13.86 cfs 110,912 cf
Outflow=13.86 cfs 110,912 cf

Reach DP-3: 6" DRAIN Inflow=1.18 cfs 3,824 cf
Outflow=1.18 cfs 3,824 cf

Reach DP-4: SOUTH BVW Inflow=0.68 cfs 2,564 cf
Outflow=0.68 cfs 2,564 cf

Pond Det #1: SS#1 Peak Elev=56.70' Storage=15,085 cf Inflow=16.82 cfs 59,294 cf
Outflow=6.31 cfs 58,702 cf

Pond Det #2: SS#2 Peak Elev=52.04' Storage=8,641 cf Inflow=9.62 cfs 35,693 cf
Outflow=4.15 cfs 35,368 cf

Total Runoff Area = 327,269 sf Runoff Volume = 141,445 cf Average Runoff Depth = 5.19"
31.94% Pervious = 104,532 sf 68.06% Impervious = 222,737 sf

13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 42

Summary for Subcatchment PR-1: UU-NW GRASS AREA

Runoff = 0.50 cfs @ 12.13 hrs, Volume= 1,582 cf, Depth> 3.32"
Routed to Reach DP-1 : NW BVW

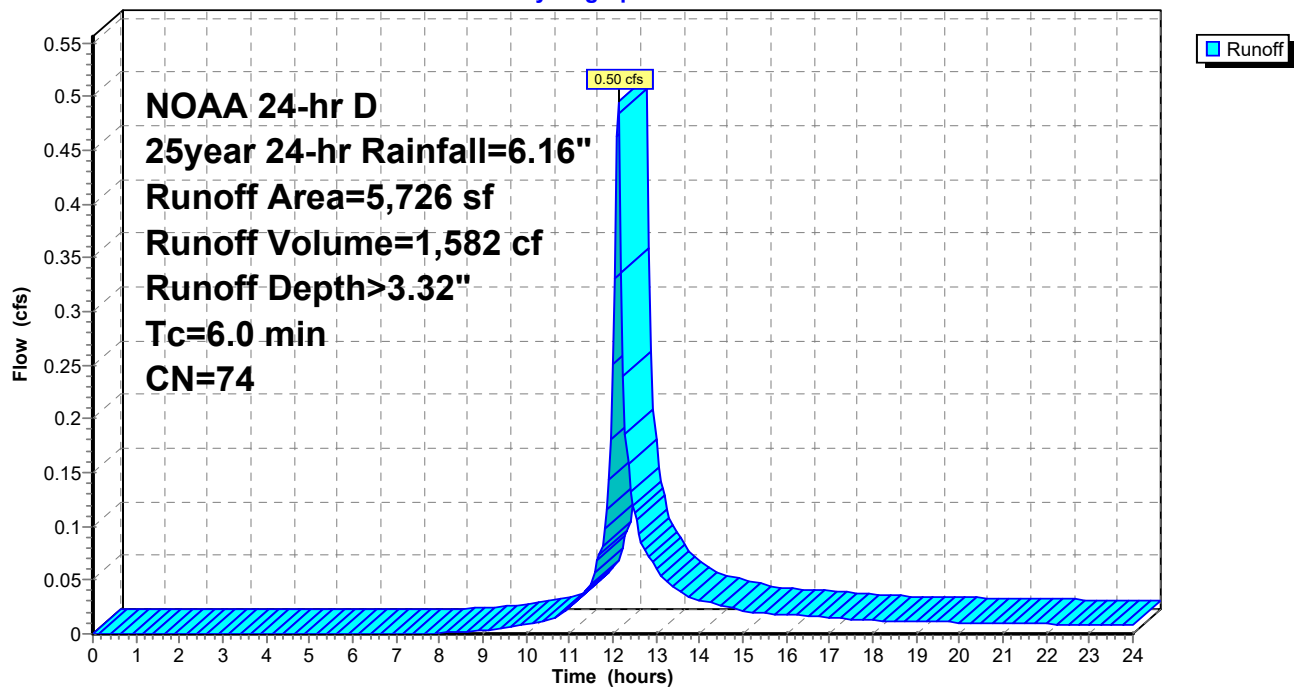
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Area (sf)	CN	Description
5,726	74	>75% Grass cover, Good, HSG C
5,726		100.00% Pervious Area

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

Subcatchment PR-1: UU-NW GRASS AREA

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 43

Summary for Subcatchment PR-1B: UU-PROPOSED

Runoff = 6.51 cfs @ 12.13 hrs, Volume= 21,645 cf, Depth> 4.56"
Routed to Reach DP-1 : NW BVW

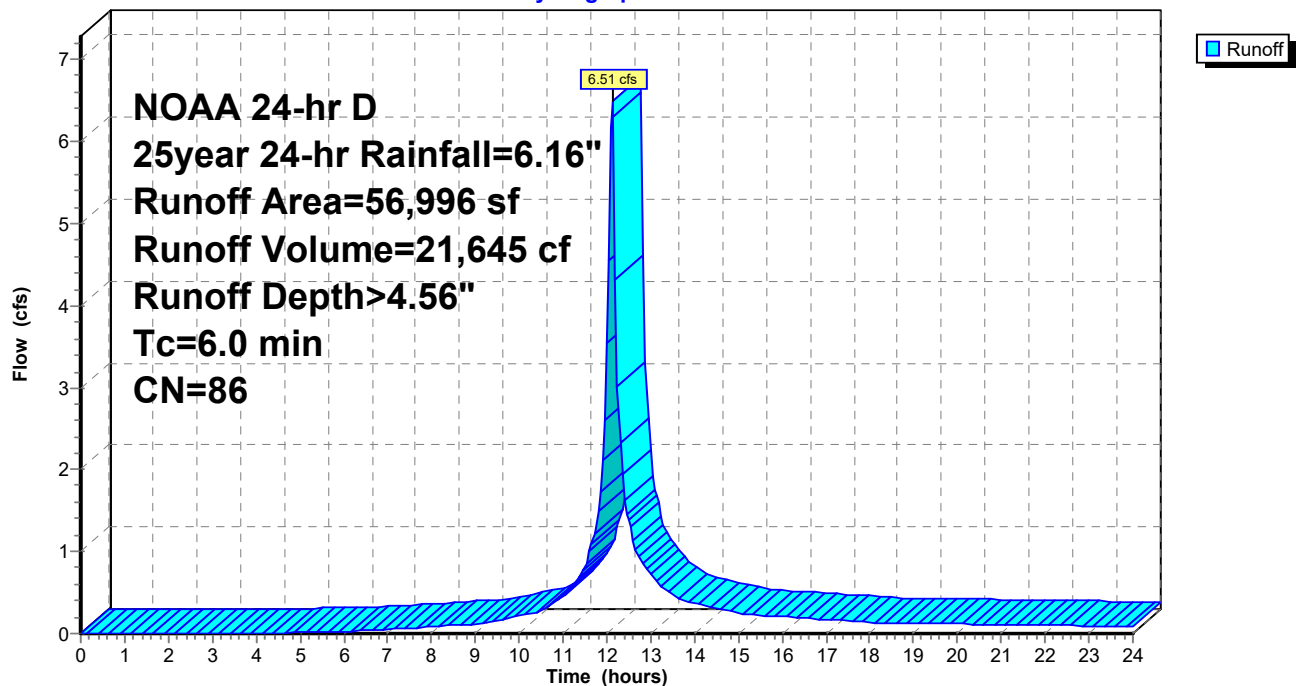
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Area (sf)	CN	Description
7,313	80	>75% Grass cover, Good, HSG D
20,000	70	Woods, Good, HSG C
29,683	98	Paved parking, HSG C
56,996	86	Weighted Average
27,313		47.92% Pervious Area
29,683		52.08% Impervious Area

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

Subcatchment PR-1B: UU-PROPOSED

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 44

Summary for Subcatchment PR-2A: SS#1

Runoff = 16.82 cfs @ 12.13 hrs, Volume= 59,294 cf, Depth> 5.34"
Routed to Pond Det #1 : SS#1

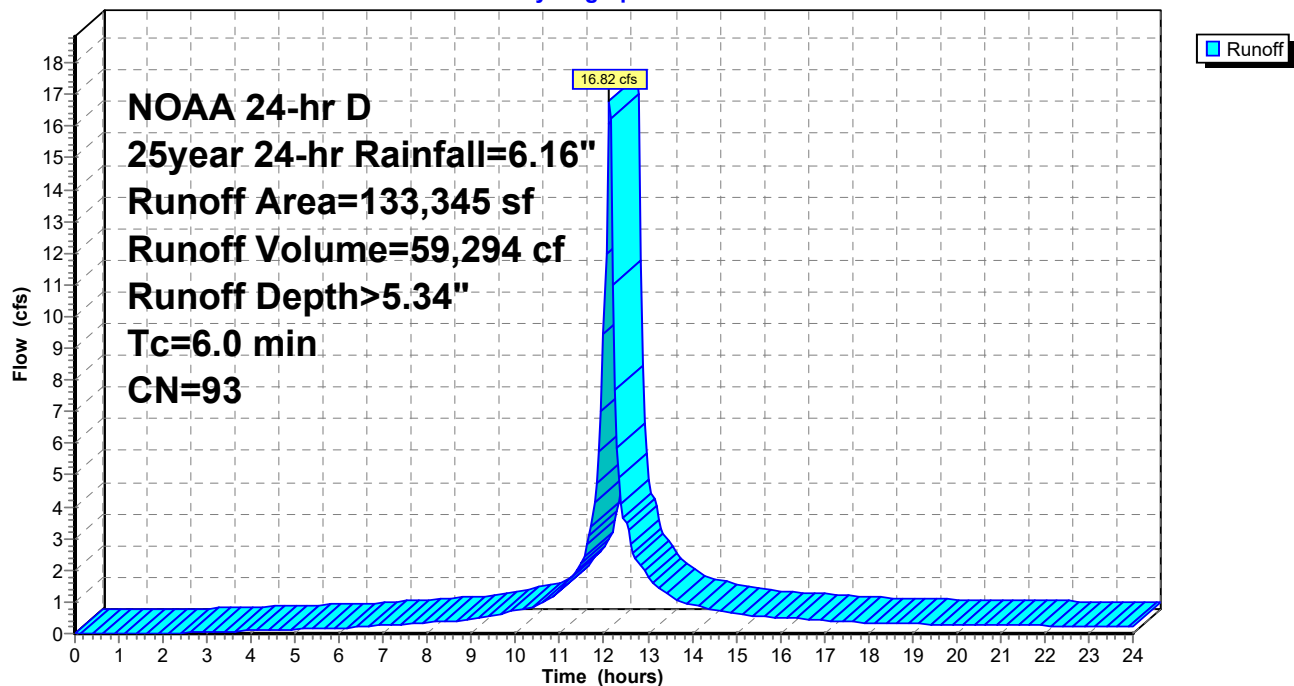
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Area (sf)	CN	Description
36,318	80	>75% Grass cover, Good, HSG D
66,336	98	Paved parking, HSG D
30,691	98	Roofs, HSG D
133,345	93	Weighted Average
36,318		27.24% Pervious Area
97,027		72.76% Impervious Area

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

Subcatchment PR-2A: SS#1

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 45

Summary for Subcatchment PR-2B: SS#2

Runoff = 9.62 cfs @ 12.13 hrs, Volume= 35,693 cf, Depth> 5.80"
Routed to Pond Det #2 : SS#2

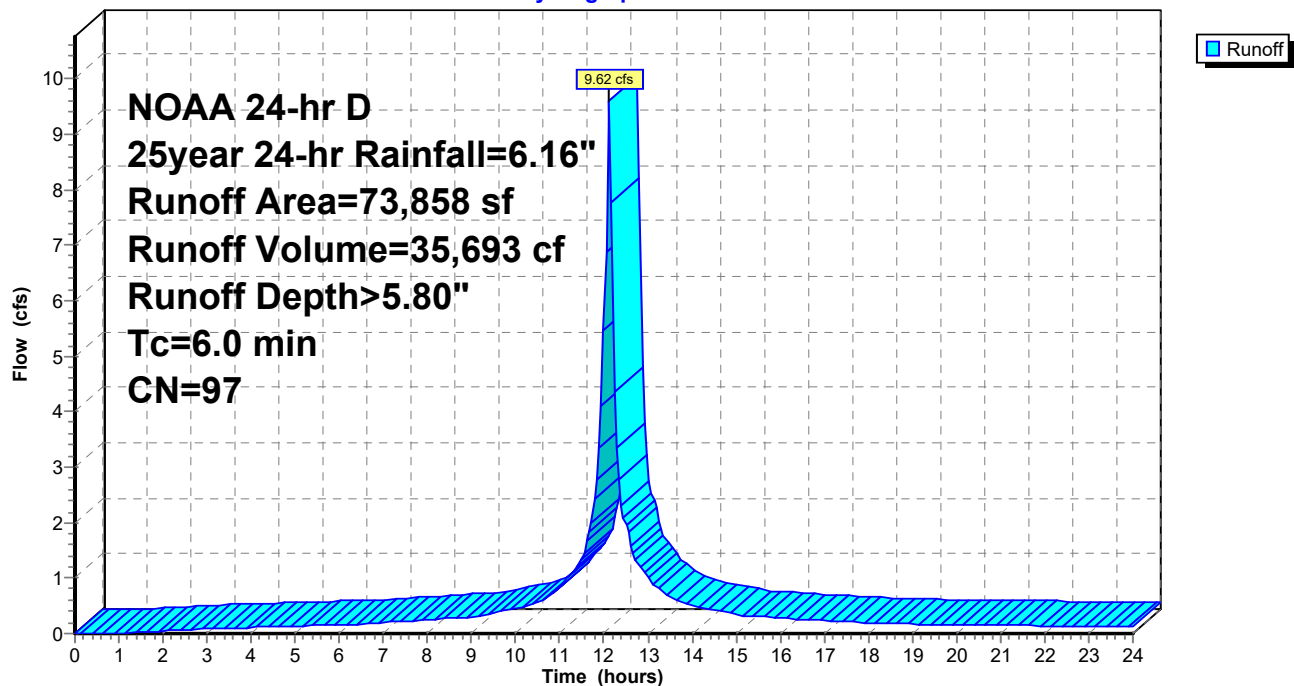
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Area (sf)	CN	Description
5,507	80	>75% Grass cover, Good, HSG D
44,720	98	Paved parking, HSG D
23,631	98	Roofs, HSG D
73,858	97	Weighted Average
5,507		7.46% Pervious Area
68,351		92.54% Impervious Area

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

Subcatchment PR-2B: SS#2

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 46

Summary for Subcatchment PR-2C: PR DP-1 (18" North Drain)

Runoff = 4.92 cfs @ 12.13 hrs, Volume= 16,842 cf, Depth> 5.00"
Routed to Reach DP-2 : 18" NORTH DRAIN

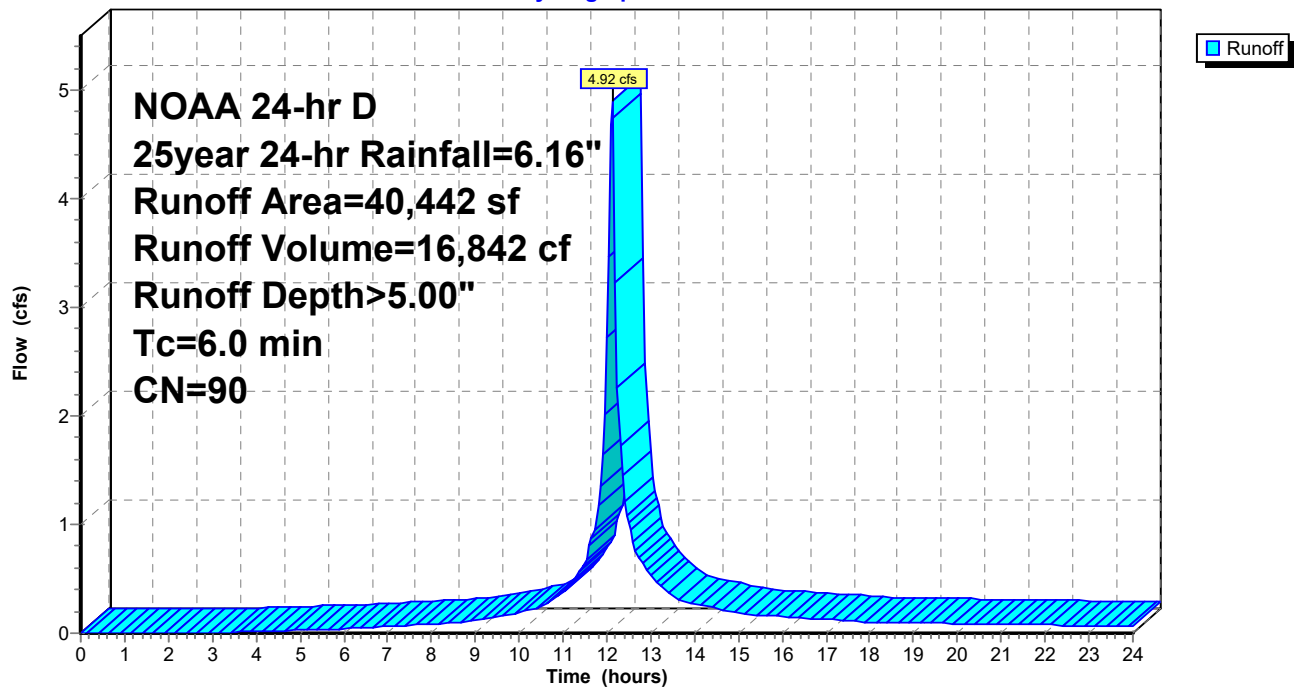
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Area (sf)	CN	Description
18,246	80	>75% Grass cover, Good, HSG D
22,196	98	Paved parking, HSG D
40,442	90	Weighted Average
18,246		45.12% Pervious Area
22,196		54.88% Impervious Area

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

Subcatchment PR-2C: PR DP-1 (18" North Drain)

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 47

Summary for Subcatchment PR-3: PR DP-3

Runoff = 1.18 cfs @ 12.13 hrs, Volume= 3,824 cf, Depth> 3.92"
Routed to Reach DP-3 : 6" DRAIN

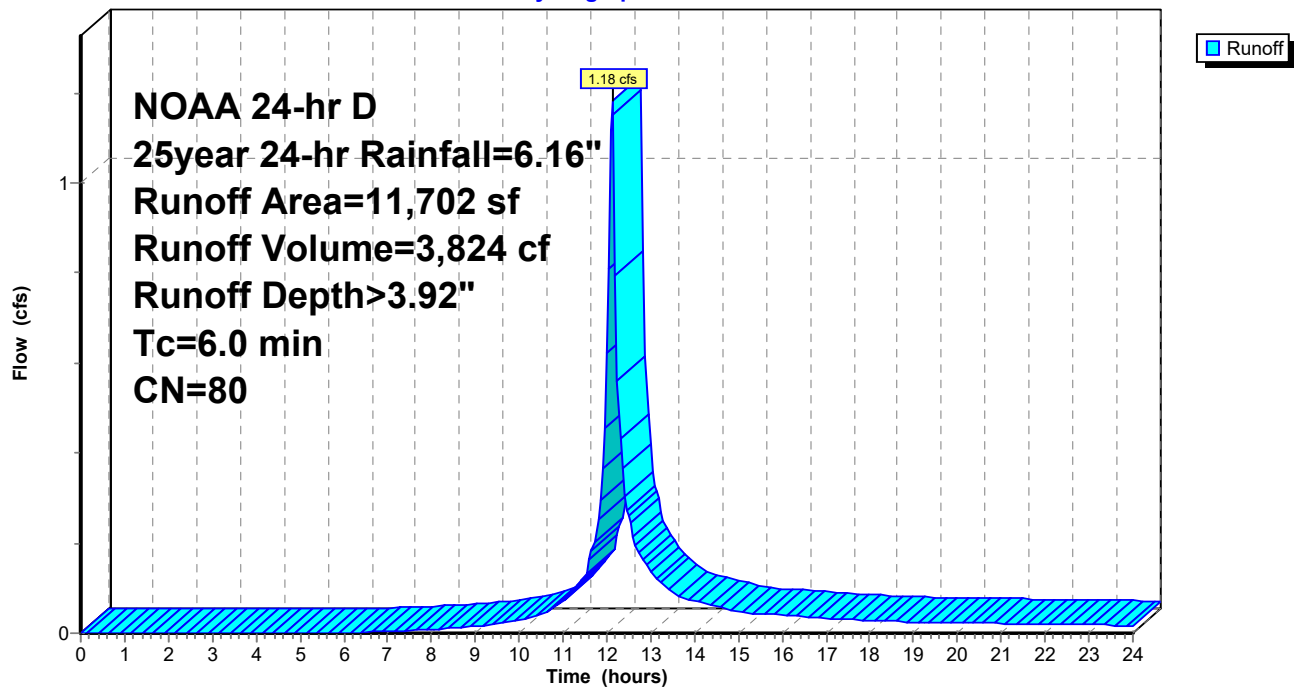
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Area (sf)	CN	Description
11,422	80	>75% Grass cover, Good, HSG D
280	98	Paved parking, HSG D
11,702	80	Weighted Average
11,422		97.61% Pervious Area
280		2.39% Impervious Area

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

Subcatchment PR-3: PR DP-3

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 48

Summary for Subcatchment PR-4: PR-4 ROOF

Runoff = 0.68 cfs @ 12.13 hrs, Volume= 2,564 cf, Depth> 5.92"
Routed to Reach DP-4 : SOUTH BVW

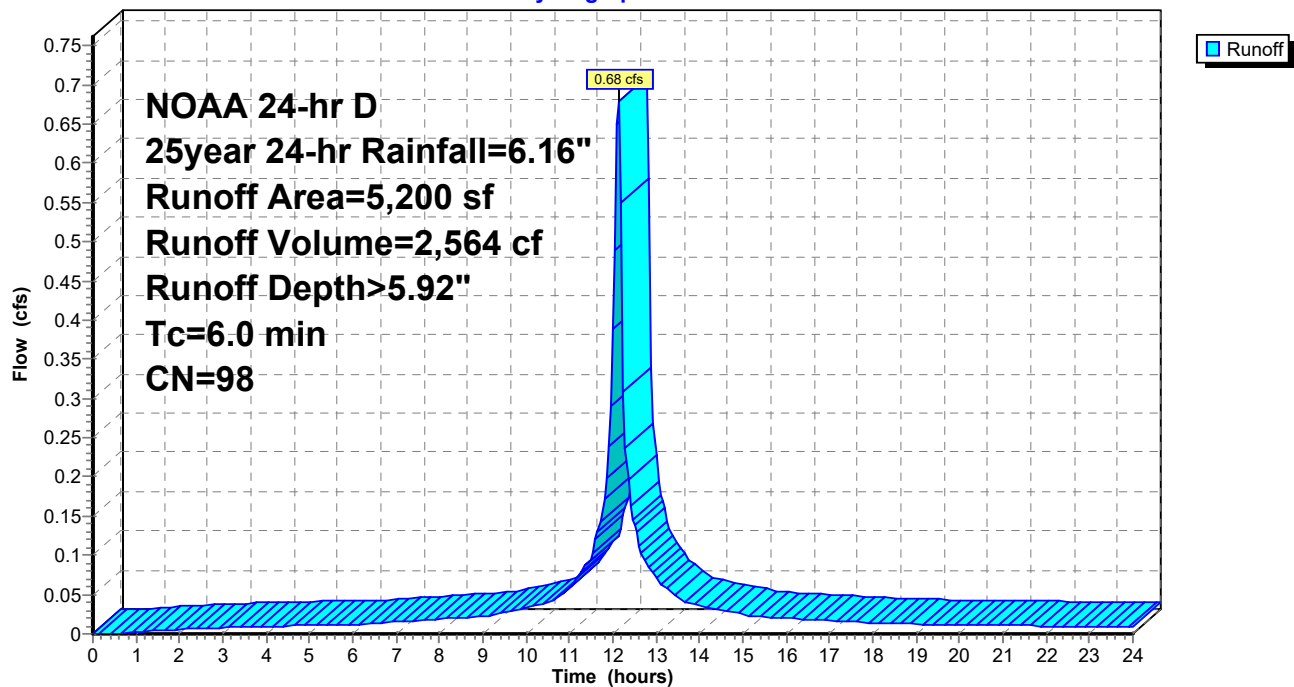
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Area (sf)	CN	Description
5,200	98	Roofs, HSG C
5,200		100.00% Impervious Area

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

Subcatchment PR-4: PR-4 ROOF

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 49

Summary for Reach DP-1: NW BVW

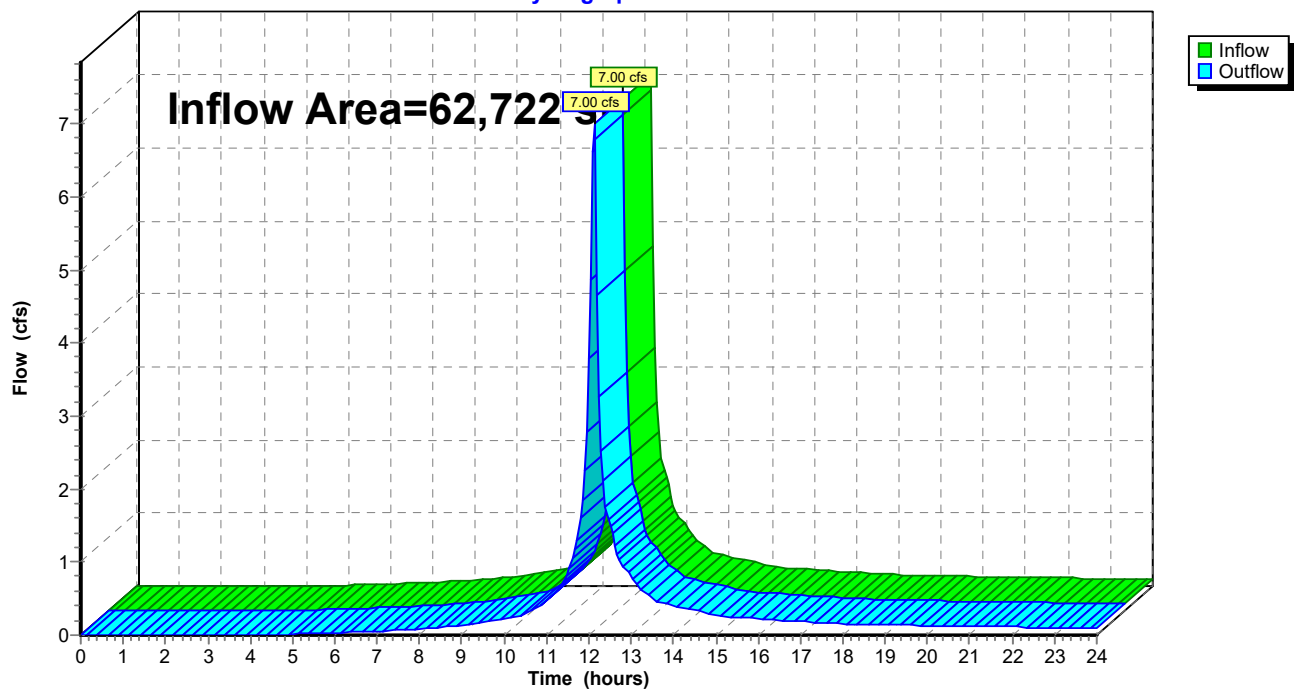
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 62,722 sf, 47.32% Impervious, Inflow Depth > 4.44" for 25year 24-hr event
Inflow = 7.00 cfs @ 12.13 hrs, Volume= 23,228 cf
Outflow = 7.00 cfs @ 12.13 hrs, Volume= 23,228 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: NW BVW

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 50

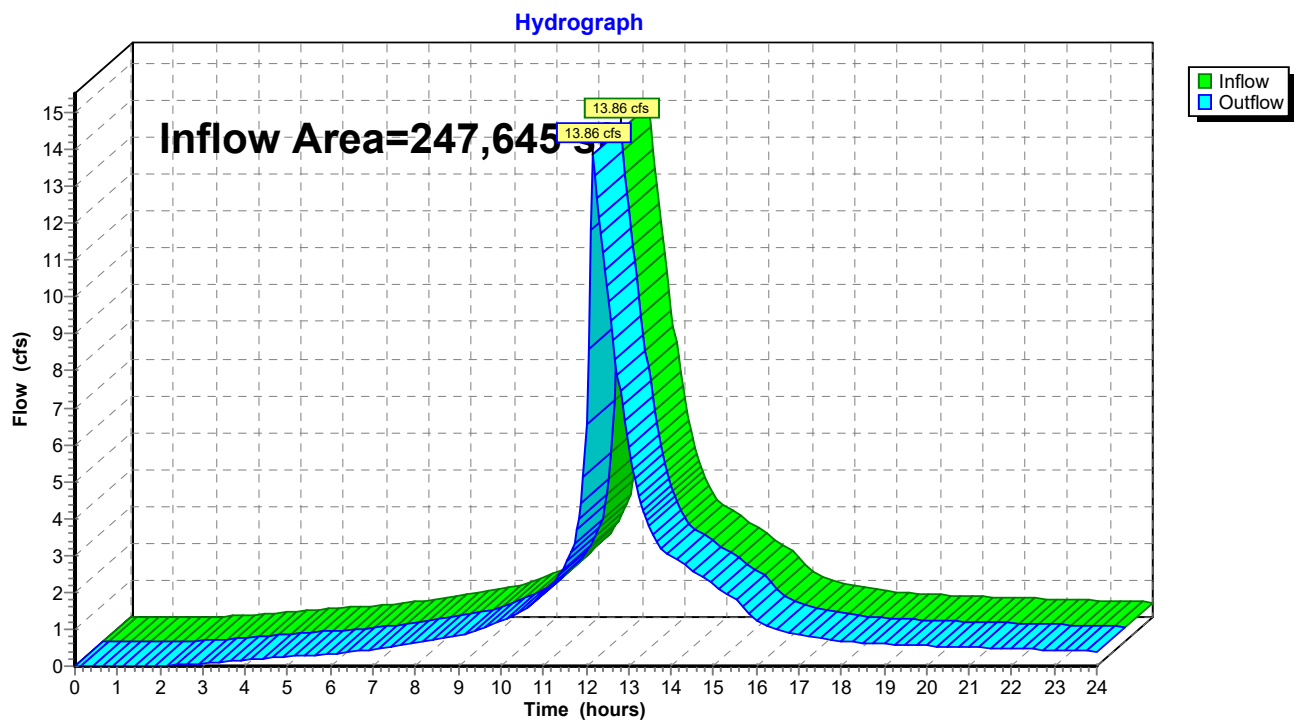
Summary for Reach DP-2: 18" NORTH DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 247,645 sf, 75.74% Impervious, Inflow Depth > 5.37" for 25year 24-hr event
Inflow = 13.86 cfs @ 12.17 hrs, Volume= 110,912 cf
Outflow = 13.86 cfs @ 12.17 hrs, Volume= 110,912 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: 18" NORTH DRAIN



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 51

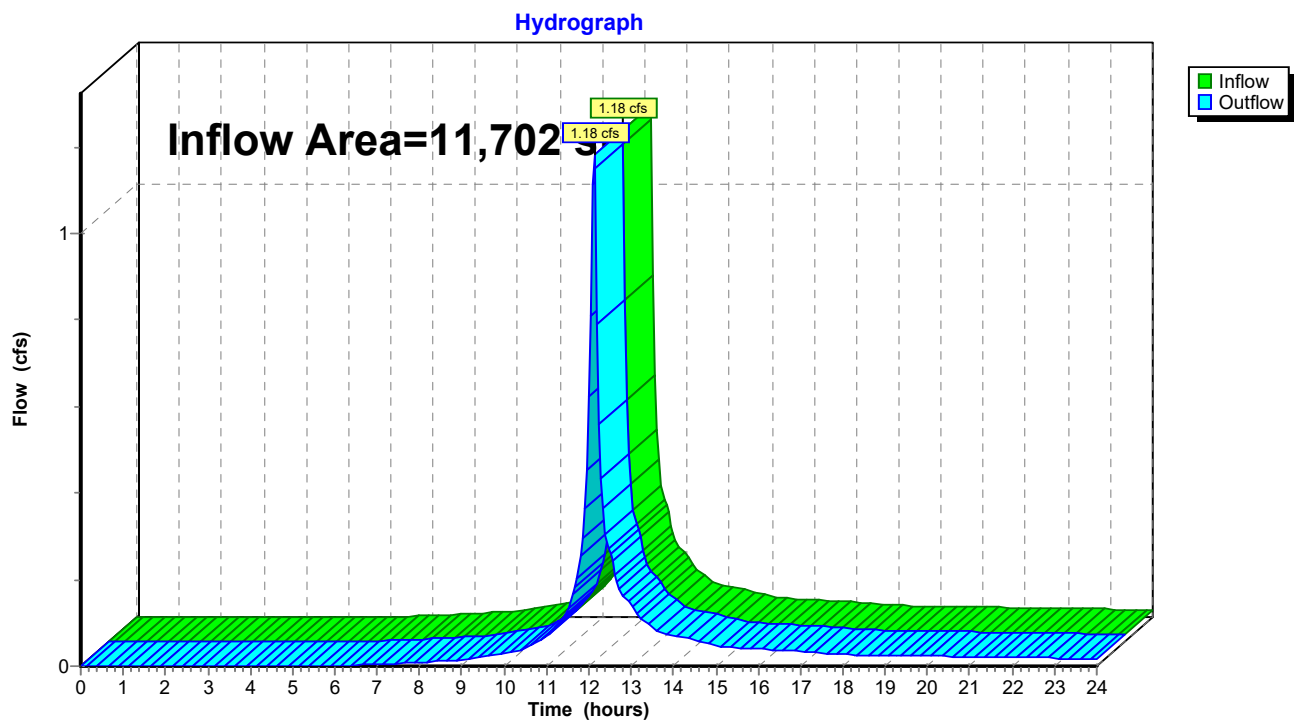
Summary for Reach DP-3: 6" DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 11,702 sf, 2.39% Impervious, Inflow Depth > 3.92" for 25year 24-hr event
Inflow = 1.18 cfs @ 12.13 hrs, Volume= 3,824 cf
Outflow = 1.18 cfs @ 12.13 hrs, Volume= 3,824 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-3: 6" DRAIN



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 52

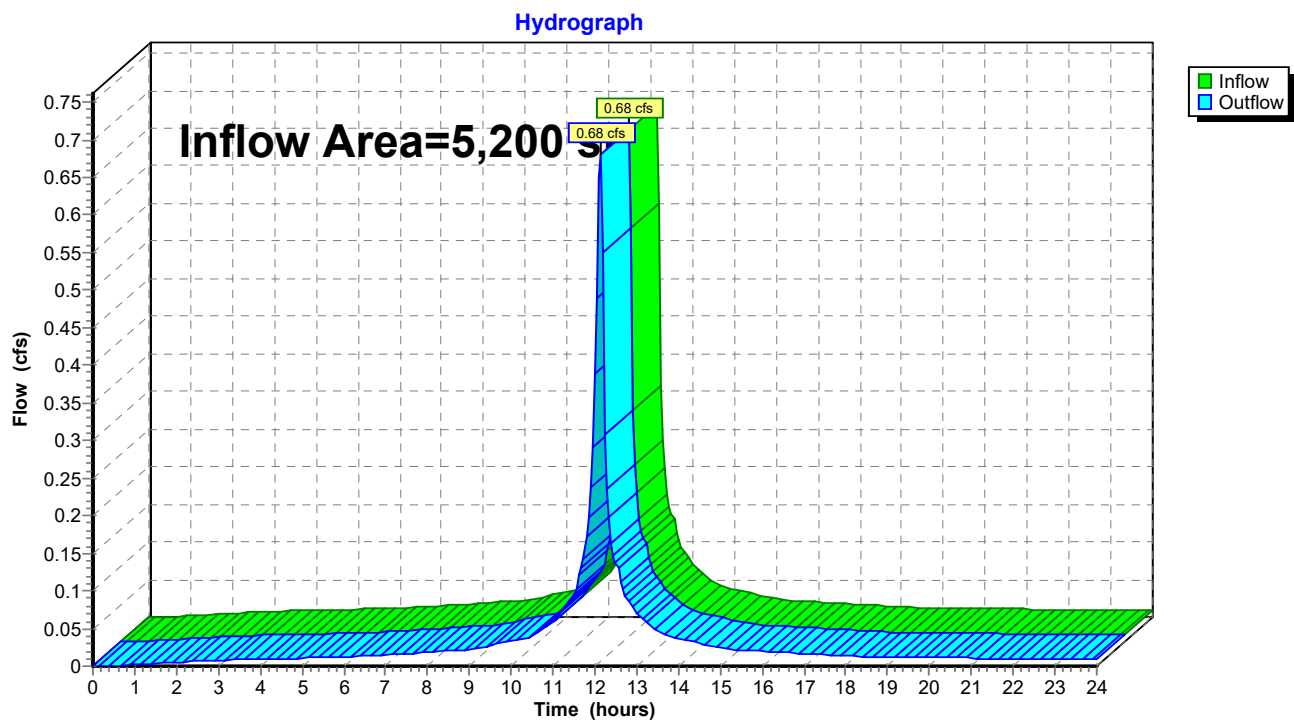
Summary for Reach DP-4: SOUTH BVW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5,200 sf, 100.00% Impervious, Inflow Depth > 5.92" for 25year 24-hr event
Inflow = 0.68 cfs @ 12.13 hrs, Volume= 2,564 cf
Outflow = 0.68 cfs @ 12.13 hrs, Volume= 2,564 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-4: SOUTH BVW



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 53

Summary for Pond Det #1: SS#1

Inflow Area = 133,345 sf, 72.76% Impervious, Inflow Depth > 5.34" for 25year 24-hr event
 Inflow = 16.82 cfs @ 12.13 hrs, Volume= 59,294 cf
 Outflow = 6.31 cfs @ 12.29 hrs, Volume= 58,702 cf, Atten= 62%, Lag= 10.0 min
 Primary = 6.31 cfs @ 12.29 hrs, Volume= 58,702 cf
 Routed to Reach DP-2 : 18" NORTH DRAIN

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 56.70' @ 12.29 hrs Surf.Area= 9,069 sf Storage= 15,085 cf

Plug-Flow detention time= 41.5 min calculated for 58,580 cf (99% of inflow)
 Center-of-Mass det. time= 35.1 min (810.3 - 775.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	54.20'	7,009 cf	72.75'W x 124.66'L x 3.50'H Field A 31,741 cf Overall - 11,715 cf Embedded = 20,026 cf x 35.0% Voids
#2A	54.70'	11,715 cf	ADS_StormTech SC-740 +Cap x 255 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 255 Chambers in 15 Rows
		18,724 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	54.20'	10.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	55.30'	12.0" W x 8.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	57.20'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=6.31 cfs @ 12.29 hrs HW=56.70' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 3.01 cfs @ 7.22 fps)
- 2=Orifice/Grate (Orifice Controls 3.30 cfs @ 4.95 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 54

Pond Det #1: SS#1 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

17 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 122.66' Row Length +12.0" End Stone x 2 = 124.66' Base Length

15 Rows x 51.0" Wide + 6.0" Spacing x 14 + 12.0" Side Stone x 2 = 72.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

255 Chambers x 45.9 cf = 11,714.7 cf Chamber Storage

31,740.7 cf Field - 11,714.7 cf Chambers = 20,026.0 cf Stone x 35.0% Voids = 7,009.1 cf Stone Storage

Chamber Storage + Stone Storage = 18,723.8 cf = 0.430 af

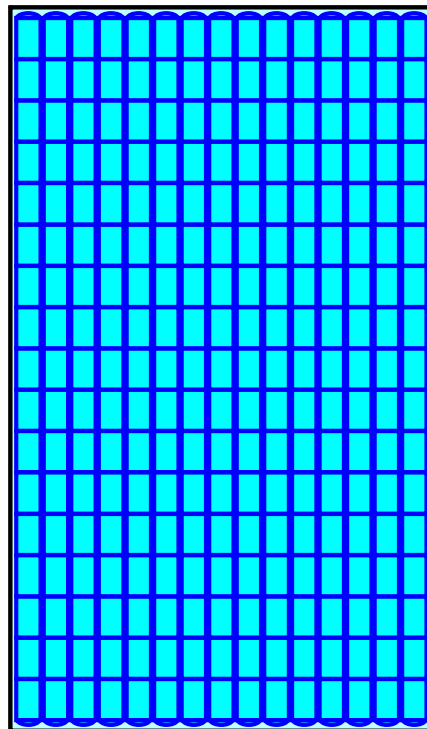
Overall Storage Efficiency = 59.0%

Overall System Size = 124.66' x 72.75' x 3.50'

255 Chambers

1,175.6 cy Field

741.7 cy Stone



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

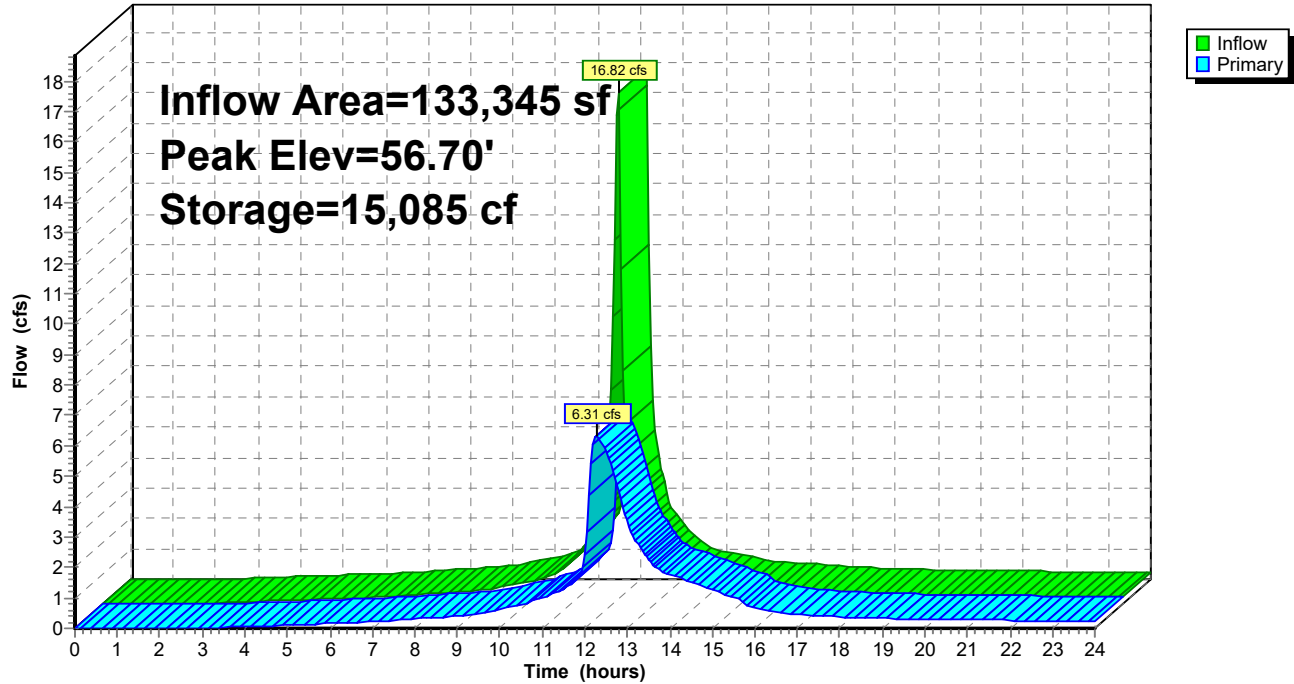
Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 55

Pond Det #1: SS#1

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 56

Summary for Pond Det #2: SS#2

Inflow Area = 73,858 sf, 92.54% Impervious, Inflow Depth > 5.80" for 25year 24-hr event
 Inflow = 9.62 cfs @ 12.13 hrs, Volume= 35,693 cf
 Outflow = 4.15 cfs @ 12.27 hrs, Volume= 35,368 cf, Atten= 57%, Lag= 8.4 min
 Primary = 4.15 cfs @ 12.27 hrs, Volume= 35,368 cf
 Routed to Reach DP-2 : 18" NORTH DRAIN

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 52.04' @ 12.27 hrs Surf.Area= 6,318 sf Storage= 8,641 cf

Plug-Flow detention time= 42.0 min calculated for 35,295 cf (99% of inflow)
 Center-of-Mass det. time= 35.9 min (788.6 - 752.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	50.00'	4,909 cf	53.75'W x 117.54'L x 3.50'H Field A 22,112 cf Overall - 8,085 cf Embedded = 14,026 cf x 35.0% Voids
#2A	50.50'	8,085 cf	ADS_StormTech SC-740 +Cap x 176 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 176 Chambers in 11 Rows
		12,995 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	8.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	51.00'	12.0" W x 8.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	52.90'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=4.13 cfs @ 12.27 hrs HW=52.04' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 1.46 cfs @ 6.58 fps)
- 2=Orifice/Grate (Orifice Controls 2.67 cfs @ 4.00 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

13858 - PR Conditions

NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 57

Pond Det #2: SS#2 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

16 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 115.54' Row Length +12.0" End Stone x 2 = 117.54' Base Length

11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

176 Chambers x 45.9 cf = 8,085.4 cf Chamber Storage

22,111.6 cf Field - 8,085.4 cf Chambers = 14,026.1 cf Stone x 35.0% Voids = 4,909.1 cf Stone Storage

Chamber Storage + Stone Storage = 12,994.6 cf = 0.298 af

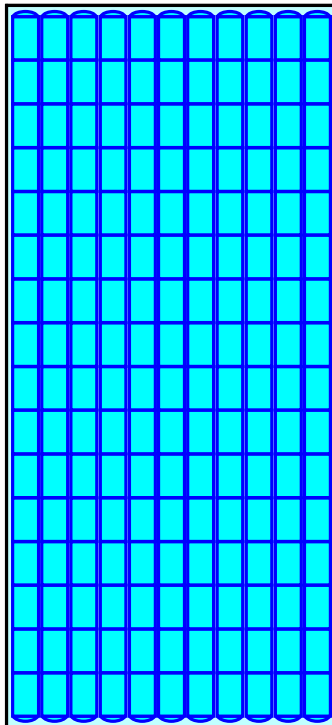
Overall Storage Efficiency = 58.8%

Overall System Size = 117.54' x 53.75' x 3.50'

176 Chambers

818.9 cy Field

519.5 cy Stone



13858 - PR Conditions

Prepared by {enter your company name here}

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

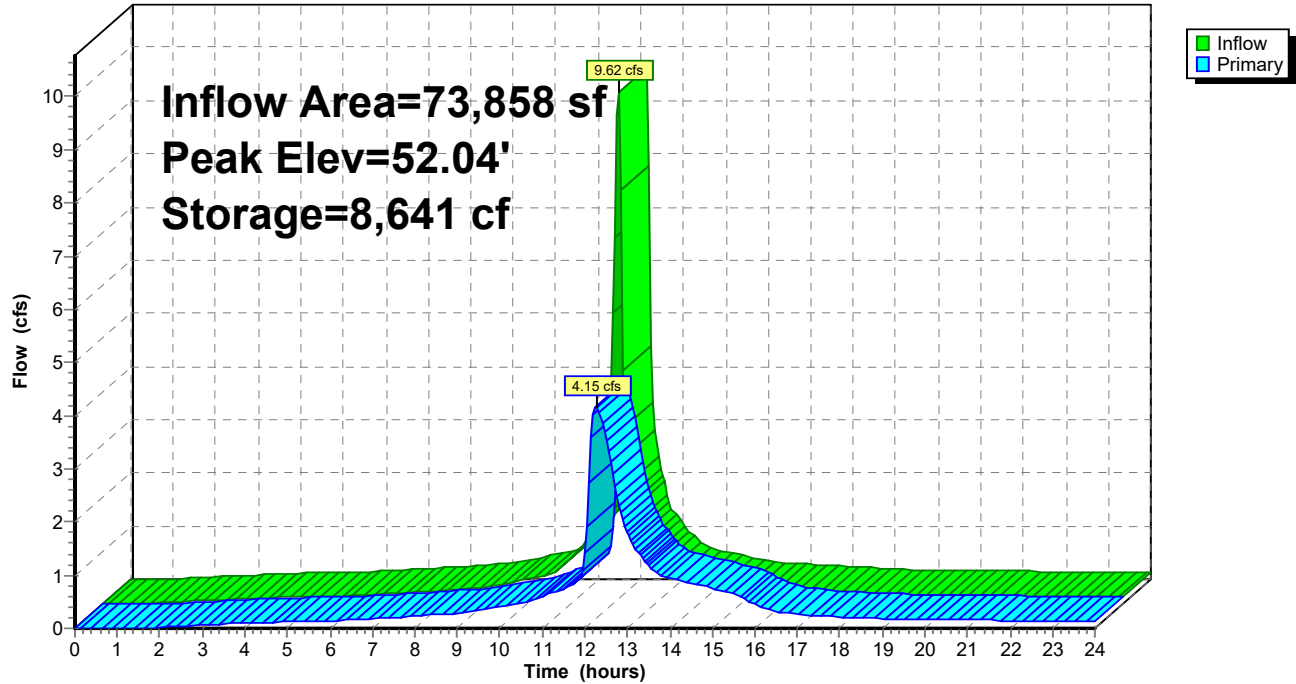
NOAA 24-hr D 25year 24-hr Rainfall=6.16"

Printed 2/18/2022

Page 58

Pond Det #2: SS#2

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 59

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPR-1: UU-NW GRASS AREA Runoff Area=5,726 sf 0.00% Impervious Runoff Depth>4.86"
Tc=6.0 min CN=74 Runoff=0.72 cfs 2,318 cf

SubcatchmentPR-1B: UU-PROPOSED Runoff Area=56,996 sf 52.08% Impervious Runoff Depth>6.26"
Tc=6.0 min CN=86 Runoff=8.76 cfs 29,723 cf

SubcatchmentPR-2A: SS#1 Runoff Area=133,345 sf 72.76% Impervious Runoff Depth>7.09"
Tc=6.0 min CN=93 Runoff=21.96 cfs 78,755 cf

SubcatchmentPR-2B: SS#2 Runoff Area=73,858 sf 92.54% Impervious Runoff Depth>7.56"
Tc=6.0 min CN=97 Runoff=12.42 cfs 46,559 cf

SubcatchmentPR-2C: PR DP-1 (18" North Runoff Area=40,442 sf 54.88% Impervious Runoff Depth>6.73"
Tc=6.0 min CN=90 Runoff=6.50 cfs 22,684 cf

SubcatchmentPR-3: PR DP-3 Runoff Area=11,702 sf 2.39% Impervious Runoff Depth>5.55"
Tc=6.0 min CN=80 Runoff=1.65 cfs 5,416 cf

SubcatchmentPR-4: PR-4 ROOF Runoff Area=5,200 sf 100.00% Impervious Runoff Depth>7.68"
Tc=6.0 min CN=98 Runoff=0.88 cfs 3,330 cf

Reach DP-1: NW BVW Inflow=9.48 cfs 32,041 cf
Outflow=9.48 cfs 32,041 cf

Reach DP-2: 18" NORTH DRAIN Inflow=22.34 cfs 146,912 cf
Outflow=22.34 cfs 146,912 cf

Reach DP-3: 6" DRAIN Inflow=1.65 cfs 5,416 cf
Outflow=1.65 cfs 5,416 cf

Reach DP-4: SOUTH BVW Inflow=0.88 cfs 3,330 cf
Outflow=0.88 cfs 3,330 cf

Pond Det #1: SS#1 Peak Elev=57.68' Storage=18,668 cf Inflow=21.96 cfs 78,755 cf
Outflow=13.27 cfs 78,053 cf

Pond Det #2: SS#2 Peak Elev=52.66' Storage=11,007 cf Inflow=12.42 cfs 46,559 cf
Outflow=5.38 cfs 46,175 cf

Total Runoff Area = 327,269 sf Runoff Volume = 188,784 cf Average Runoff Depth = 6.92"
31.94% Pervious = 104,532 sf 68.06% Impervious = 222,737 sf

13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 60

Summary for Subcatchment PR-1: UU-NW GRASS AREA

Runoff = 0.72 cfs @ 12.13 hrs, Volume= 2,318 cf, Depth> 4.86"
Routed to Reach DP-1 : NW BVW

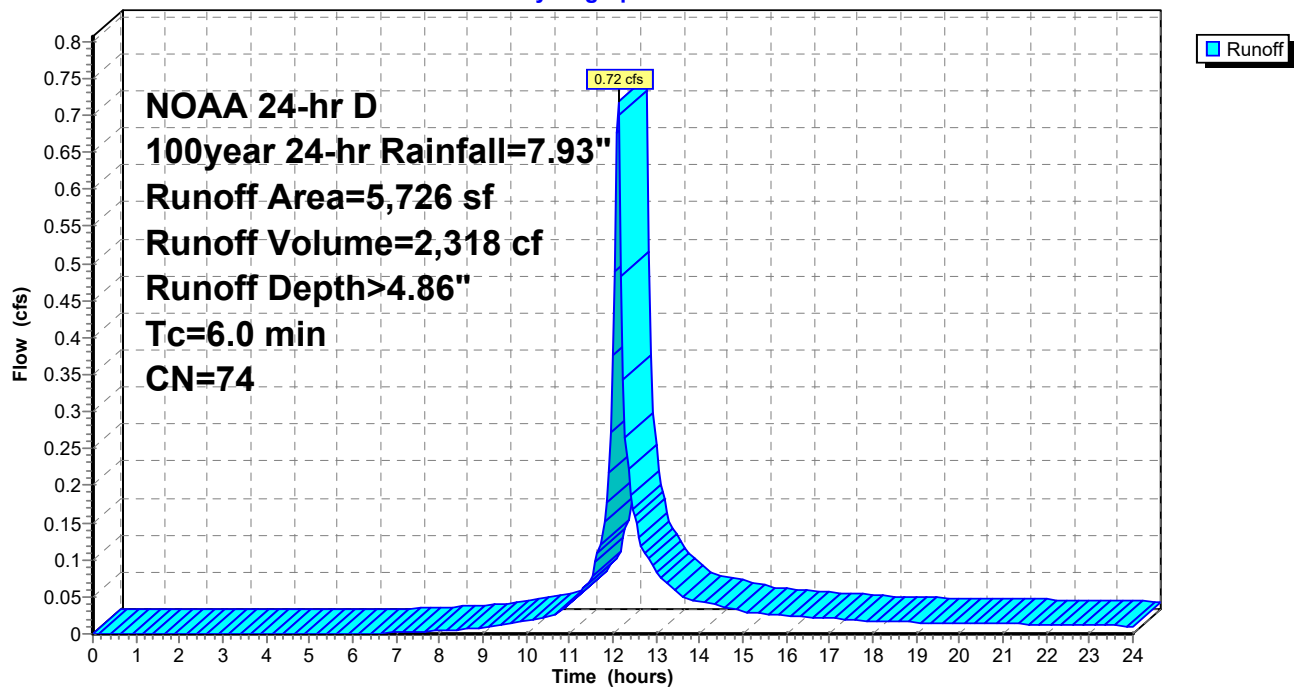
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Area (sf)	CN	Description
5,726	74	>75% Grass cover, Good, HSG C
5,726		100.00% Pervious Area

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

Subcatchment PR-1: UU-NW GRASS AREA

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 61

Summary for Subcatchment PR-1B: UU-PROPOSED

Runoff = 8.76 cfs @ 12.13 hrs, Volume= 29,723 cf, Depth> 6.26"
Routed to Reach DP-1 : NW BVW

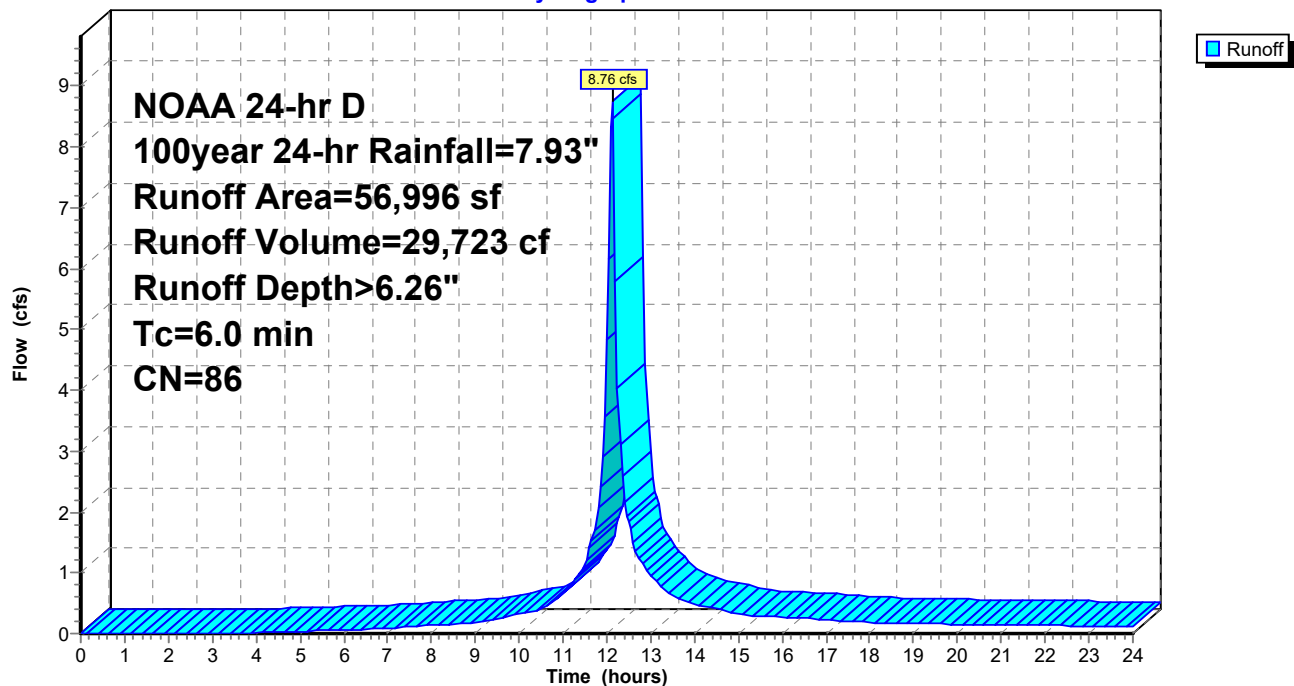
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Area (sf)	CN	Description
7,313	80	>75% Grass cover, Good, HSG D
20,000	70	Woods, Good, HSG C
29,683	98	Paved parking, HSG C
56,996	86	Weighted Average
27,313		47.92% Pervious Area
29,683		52.08% Impervious Area

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

Subcatchment PR-1B: UU-PROPOSED

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 62

Summary for Subcatchment PR-2A: SS#1

Runoff = 21.96 cfs @ 12.13 hrs, Volume= 78,755 cf, Depth> 7.09"
 Routed to Pond Det #1 : SS#1

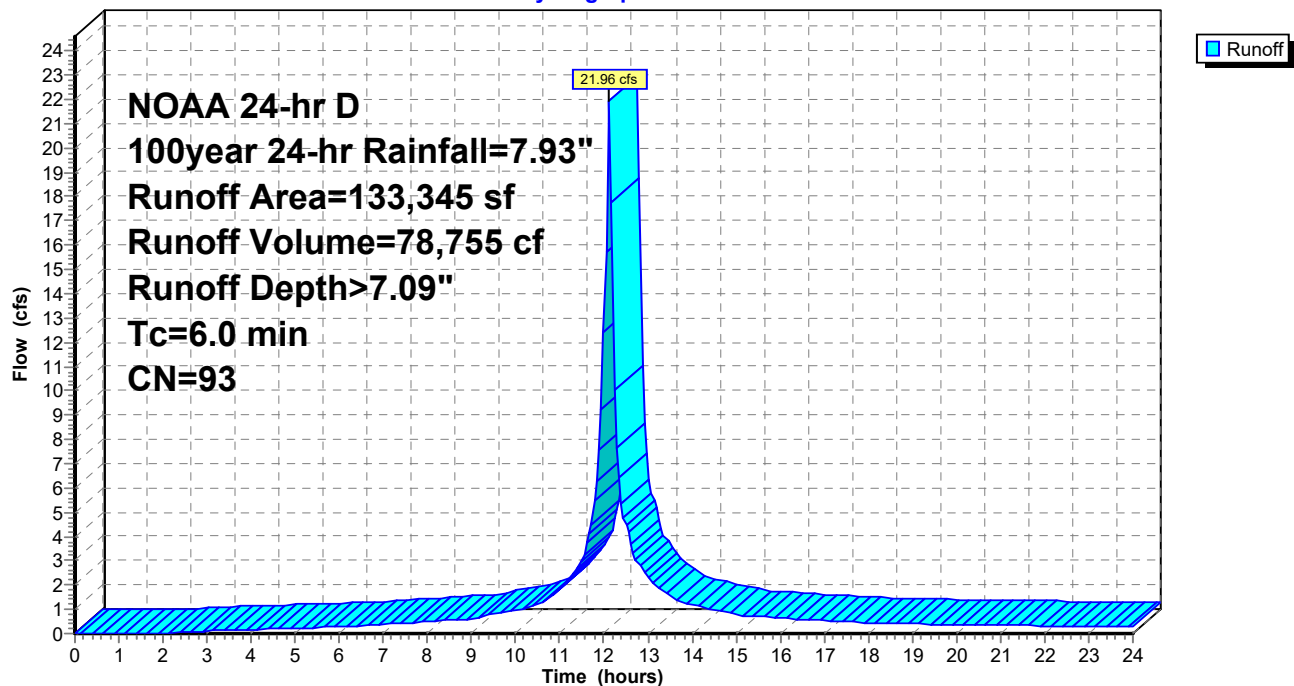
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Area (sf)	CN	Description
36,318	80	>75% Grass cover, Good, HSG D
66,336	98	Paved parking, HSG D
30,691	98	Roofs, HSG D
133,345	93	Weighted Average
36,318		27.24% Pervious Area
97,027		72.76% Impervious Area

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

Subcatchment PR-2A: SS#1

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 63

Summary for Subcatchment PR-2B: SS#2

Runoff = 12.42 cfs @ 12.13 hrs, Volume= 46,559 cf, Depth> 7.56"
 Routed to Pond Det #2 : SS#2

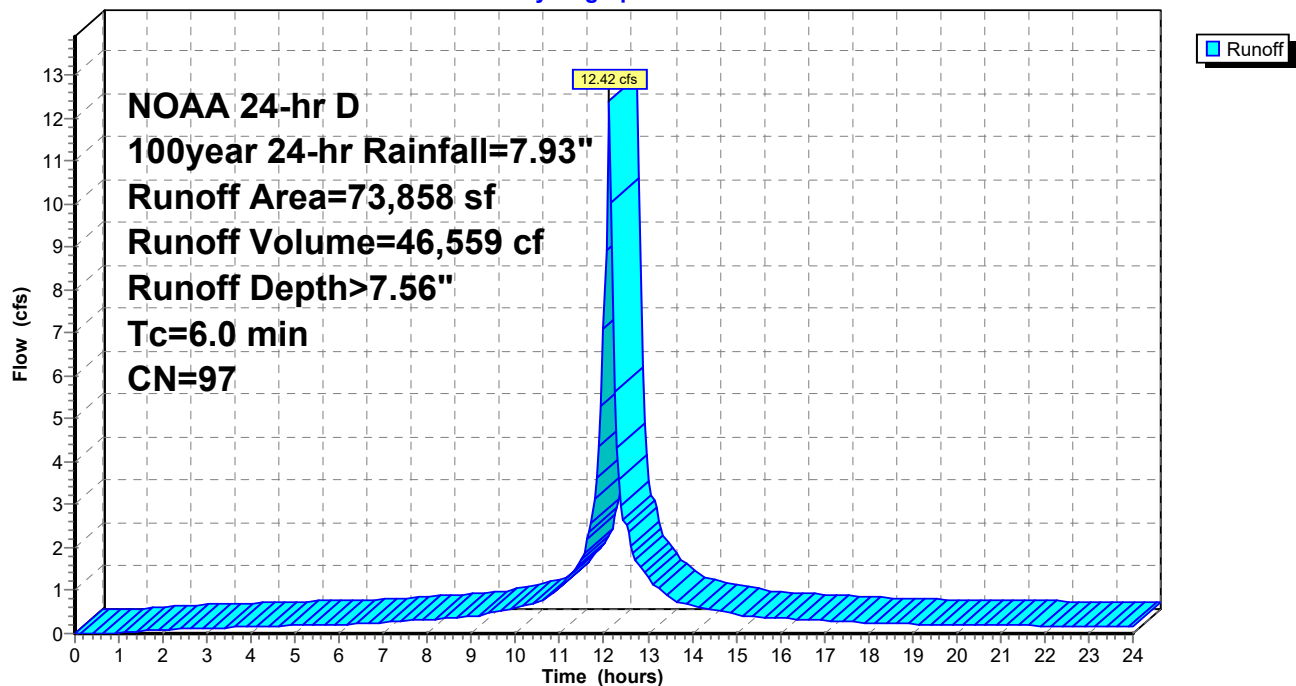
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Area (sf)	CN	Description
5,507	80	>75% Grass cover, Good, HSG D
44,720	98	Paved parking, HSG D
23,631	98	Roofs, HSG D
73,858	97	Weighted Average
5,507		7.46% Pervious Area
68,351		92.54% Impervious Area

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

Subcatchment PR-2B: SS#2

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 64

Summary for Subcatchment PR-2C: PR DP-1 (18" North Drain)

Runoff = 6.50 cfs @ 12.13 hrs, Volume= 22,684 cf, Depth> 6.73"
Routed to Reach DP-2 : 18" NORTH DRAIN

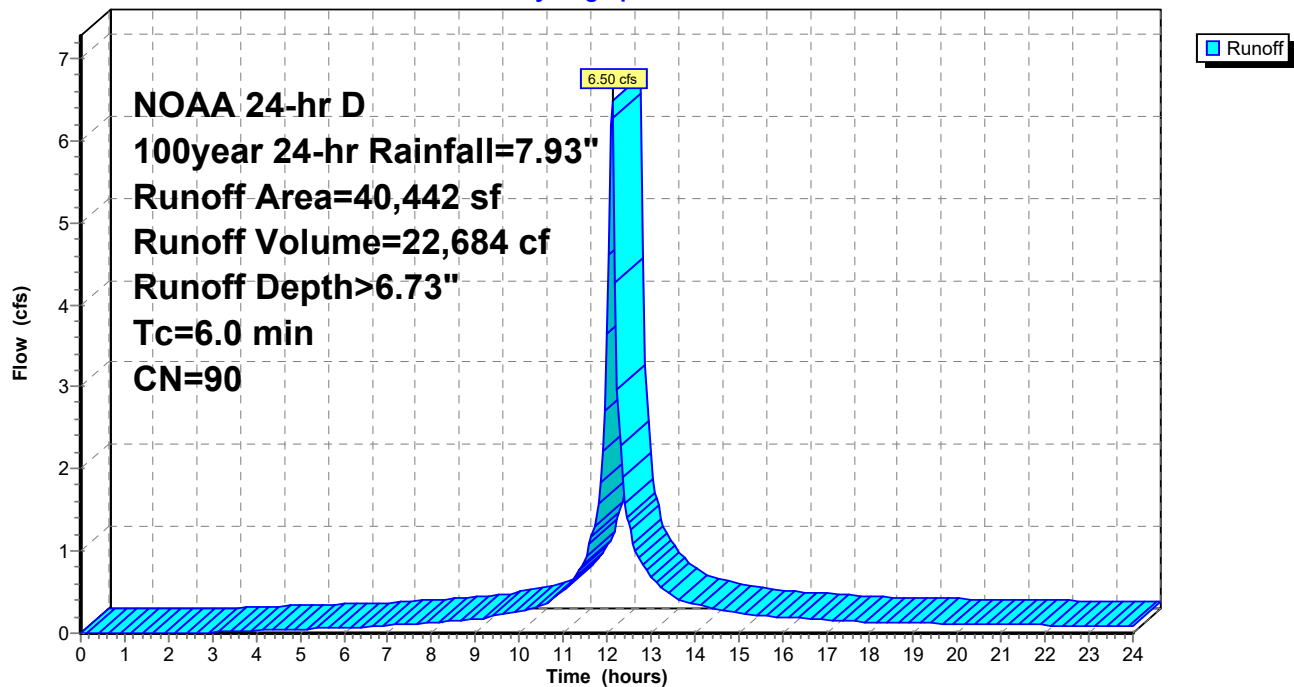
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Area (sf)	CN	Description
18,246	80	>75% Grass cover, Good, HSG D
22,196	98	Paved parking, HSG D
40,442	90	Weighted Average
18,246		45.12% Pervious Area
22,196		54.88% Impervious Area

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

Subcatchment PR-2C: PR DP-1 (18" North Drain)

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 65

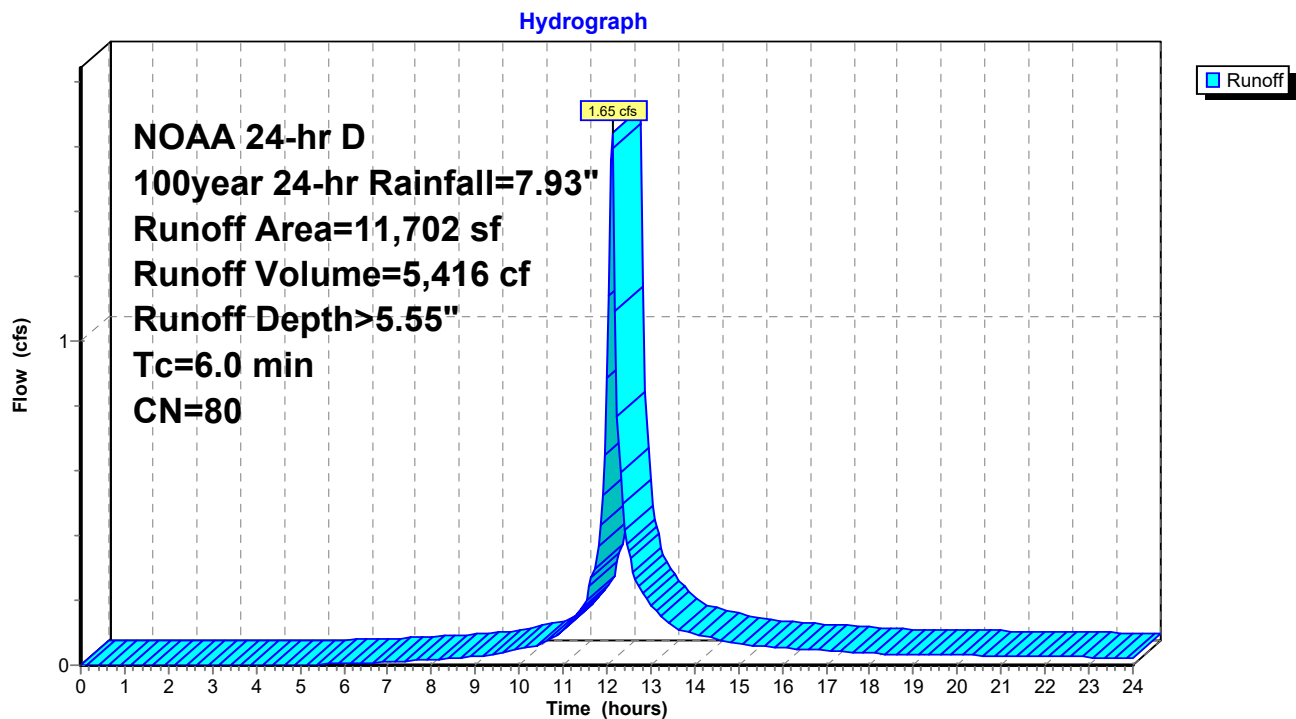
Summary for Subcatchment PR-3: PR DP-3

Runoff = 1.65 cfs @ 12.13 hrs, Volume= 5,416 cf, Depth> 5.55"
Routed to Reach DP-3 : 6" DRAIN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Area (sf)	CN	Description
11,422	80	>75% Grass cover, Good, HSG D
280	98	Paved parking, HSG D
11,702	80	Weighted Average
11,422		97.61% Pervious Area
280		2.39% Impervious Area

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

Subcatchment PR-3: PR DP-3

13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 66

Summary for Subcatchment PR-4: PR-4 ROOF

Runoff = 0.88 cfs @ 12.13 hrs, Volume= 3,330 cf, Depth> 7.68"
Routed to Reach DP-4 : SOUTH BVW

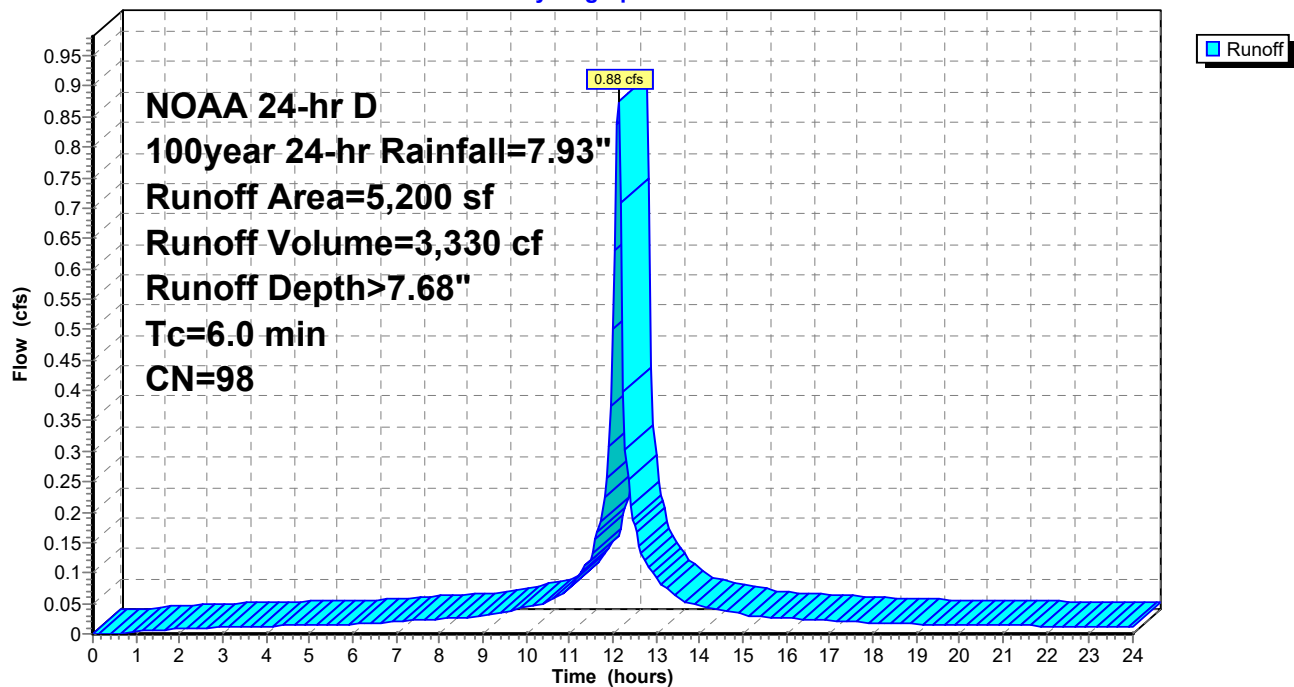
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Area (sf)	CN	Description
5,200	98	Roofs, HSG C
5,200		100.00% Impervious Area

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

Subcatchment PR-4: PR-4 ROOF

Hydrograph



13858 - PR Conditions

Prepared by {enter your company name here}

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Printed 2/18/2022

Page 67

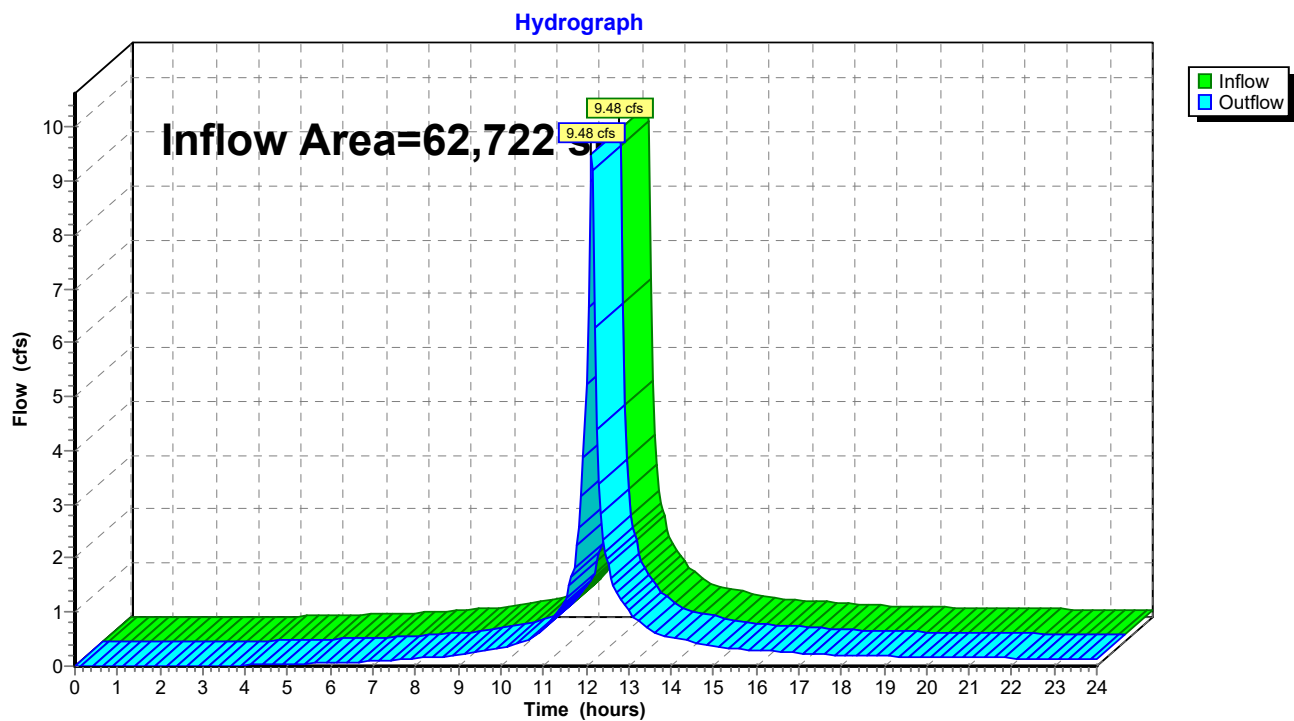
Summary for Reach DP-1: NW BVW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 62,722 sf, 47.32% Impervious, Inflow Depth > 6.13" for 100year 24-hr event
Inflow = 9.48 cfs @ 12.13 hrs, Volume= 32,041 cf
Outflow = 9.48 cfs @ 12.13 hrs, Volume= 32,041 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: NW BVW



13858 - PR Conditions

Prepared by {enter your company name here}

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Printed 2/18/2022

Page 68

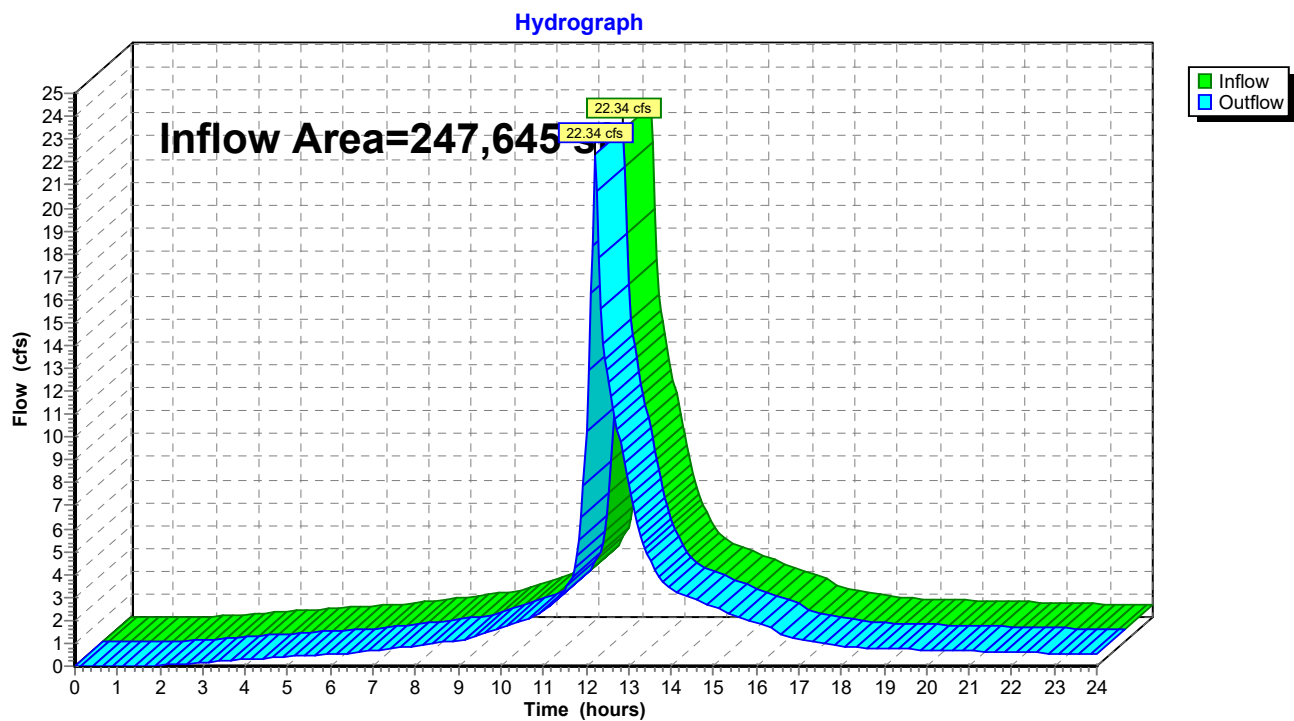
Summary for Reach DP-2: 18" NORTH DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 247,645 sf, 75.74% Impervious, Inflow Depth > 7.12" for 100year 24-hr event
Inflow = 22.34 cfs @ 12.21 hrs, Volume= 146,912 cf
Outflow = 22.34 cfs @ 12.21 hrs, Volume= 146,912 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: 18" NORTH DRAIN



13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 69

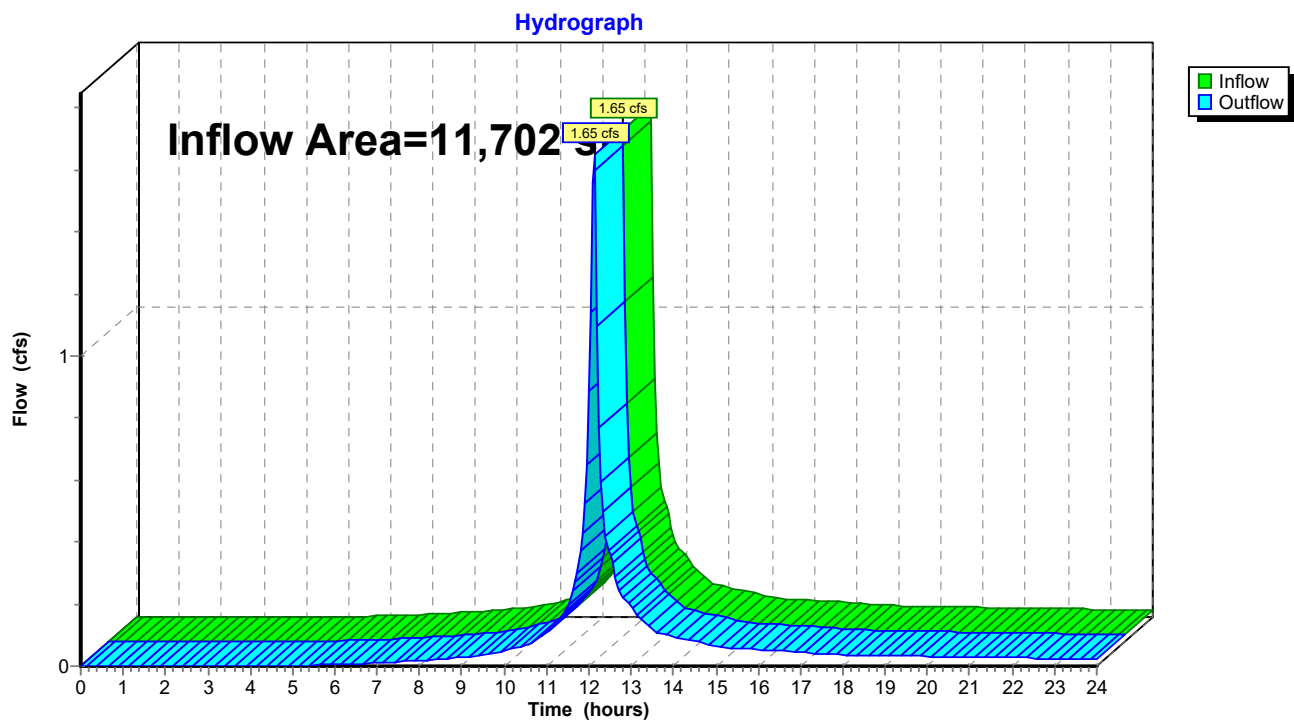
Summary for Reach DP-3: 6" DRAIN

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 11,702 sf, 2.39% Impervious, Inflow Depth > 5.55" for 100year 24-hr event
Inflow = 1.65 cfs @ 12.13 hrs, Volume= 5,416 cf
Outflow = 1.65 cfs @ 12.13 hrs, Volume= 5,416 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-3: 6" DRAIN



Summary for Reach DP-4: SOUTH BVW

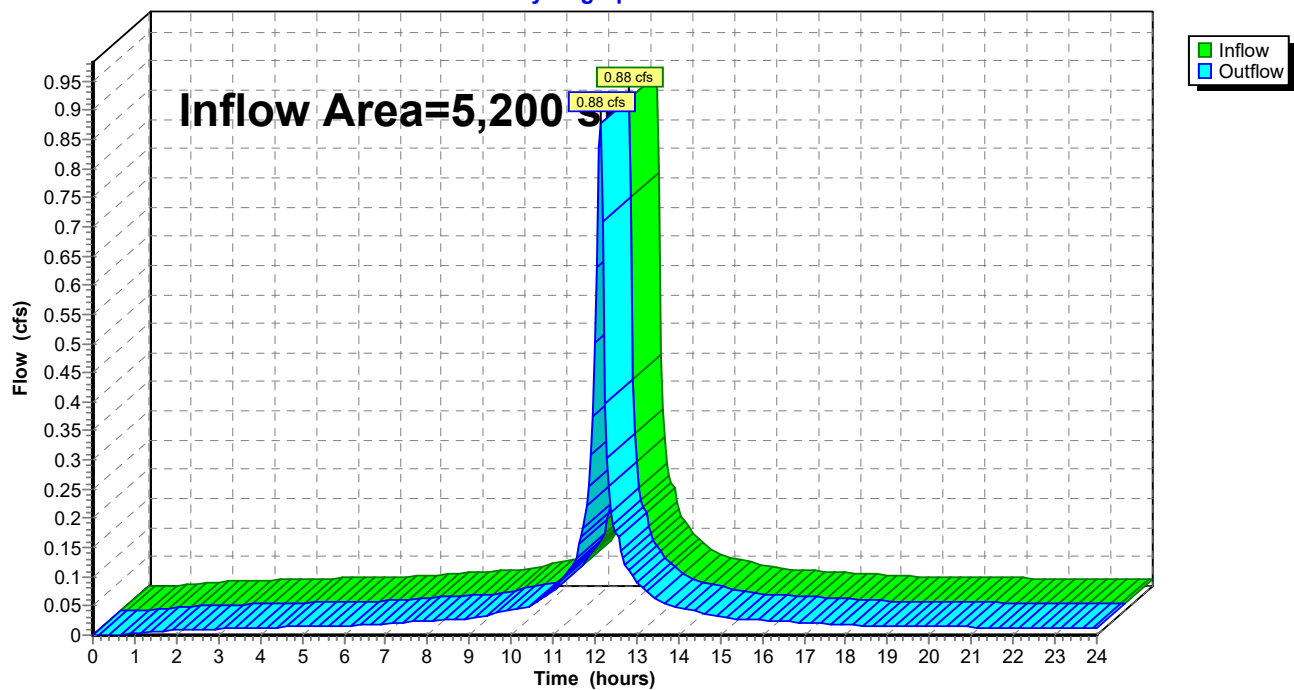
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5,200 sf, 100.00% Impervious, Inflow Depth > 7.68" for 100year 24-hr event
Inflow = 0.88 cfs @ 12.13 hrs, Volume= 3,330 cf
Outflow = 0.88 cfs @ 12.13 hrs, Volume= 3,330 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-4: SOUTH BVW

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 71

Summary for Pond Det #1: SS#1

Inflow Area = 133,345 sf, 72.76% Impervious, Inflow Depth > 7.09" for 100year 24-hr event
 Inflow = 21.96 cfs @ 12.13 hrs, Volume= 78,755 cf
 Outflow = 13.27 cfs @ 12.22 hrs, Volume= 78,053 cf, Atten= 40%, Lag= 5.7 min
 Primary = 13.27 cfs @ 12.22 hrs, Volume= 78,053 cf
 Routed to Reach DP-2 : 18" NORTH DRAIN

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 57.68' @ 12.22 hrs Surf.Area= 9,069 sf Storage= 18,668 cf

Plug-Flow detention time= 39.5 min calculated for 78,053 cf (99% of inflow)
 Center-of-Mass det. time= 33.7 min (801.5 - 767.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	54.20'	7,009 cf	72.75'W x 124.66'L x 3.50'H Field A 31,741 cf Overall - 11,715 cf Embedded = 20,026 cf x 35.0% Voids
#2A	54.70'	11,715 cf	ADS_StormTech SC-740 +Cap x 255 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 255 Chambers in 15 Rows
		18,724 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	54.20'	10.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	55.30'	12.0" W x 8.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	57.20'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=12.56 cfs @ 12.22 hrs HW=57.63' (Free Discharge)

1=Orifice/Grate (Orifice Controls 3.57 cfs @ 8.58 fps)

2=Orifice/Grate (Orifice Controls 4.53 cfs @ 6.79 fps)

3=Sharp-Crested Rectangular Weir (Weir Controls 4.46 cfs @ 2.13 fps)

13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 72

Pond Det #1: SS#1 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

17 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 122.66' Row Length +12.0" End Stone x 2 = 124.66' Base Length

15 Rows x 51.0" Wide + 6.0" Spacing x 14 + 12.0" Side Stone x 2 = 72.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

255 Chambers x 45.9 cf = 11,714.7 cf Chamber Storage

31,740.7 cf Field - 11,714.7 cf Chambers = 20,026.0 cf Stone x 35.0% Voids = 7,009.1 cf Stone Storage

Chamber Storage + Stone Storage = 18,723.8 cf = 0.430 af

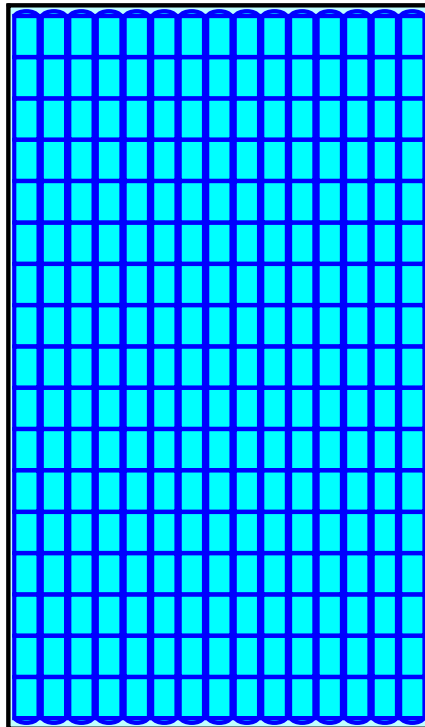
Overall Storage Efficiency = 59.0%

Overall System Size = 124.66' x 72.75' x 3.50'

255 Chambers

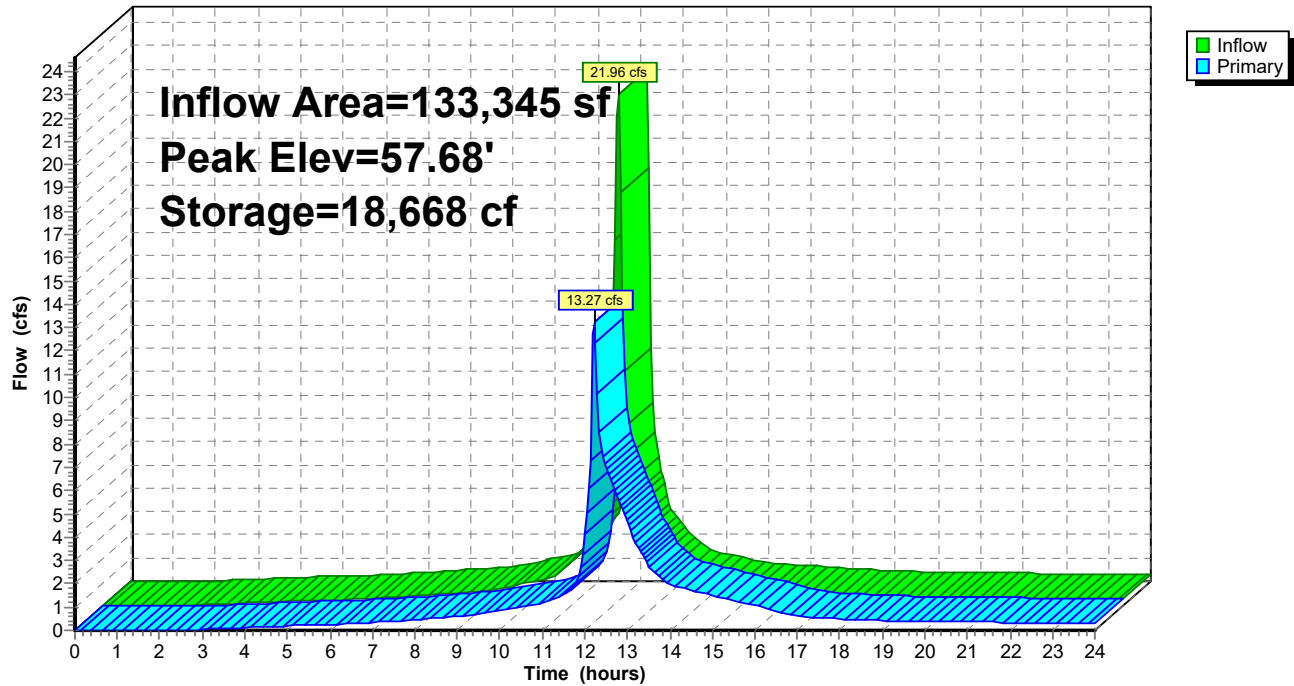
1,175.6 cy Field

741.7 cy Stone



Pond Det #1: SS#1

Hydrograph



13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 74

Summary for Pond Det #2: SS#2

Inflow Area = 73,858 sf, 92.54% Impervious, Inflow Depth > 7.56" for 100year 24-hr event
 Inflow = 12.42 cfs @ 12.13 hrs, Volume= 46,559 cf
 Outflow = 5.38 cfs @ 12.27 hrs, Volume= 46,175 cf, Atten= 57%, Lag= 8.3 min
 Primary = 5.38 cfs @ 12.27 hrs, Volume= 46,175 cf
 Routed to Reach DP-2 : 18" NORTH DRAIN

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 52.66' @ 12.27 hrs Surf.Area= 6,318 sf Storage= 11,007 cf

Plug-Flow detention time= 40.5 min calculated for 46,079 cf (99% of inflow)
 Center-of-Mass det. time= 35.0 min (782.9 - 747.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	50.00'	4,909 cf	53.75'W x 117.54'L x 3.50'H Field A 22,112 cf Overall - 8,085 cf Embedded = 14,026 cf x 35.0% Voids
#2A	50.50'	8,085 cf	ADS_StormTech SC-740 +Cap x 176 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 176 Chambers in 11 Rows
		12,995 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	8.0" W x 4.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	51.00'	12.0" W x 8.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	52.90'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=5.36 cfs @ 12.27 hrs HW=52.65' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 1.69 cfs @ 7.59 fps)
- 2=Orifice/Grate (Orifice Controls 3.67 cfs @ 5.51 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

13858 - PR Conditions

NOAA 24-hr D 100year 24-hr Rainfall=7.93"

Prepared by {enter your company name here}

Printed 2/18/2022

HydroCAD® 10.10-7a s/n 00546 © 2021 HydroCAD Software Solutions LLC

Page 75

Pond Det #2: SS#2 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

16 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 115.54' Row Length +12.0" End Stone x 2 = 117.54' Base Length

11 Rows x 51.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 53.75' Base Width

6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

176 Chambers x 45.9 cf = 8,085.4 cf Chamber Storage

22,111.6 cf Field - 8,085.4 cf Chambers = 14,026.1 cf Stone x 35.0% Voids = 4,909.1 cf Stone Storage

Chamber Storage + Stone Storage = 12,994.6 cf = 0.298 af

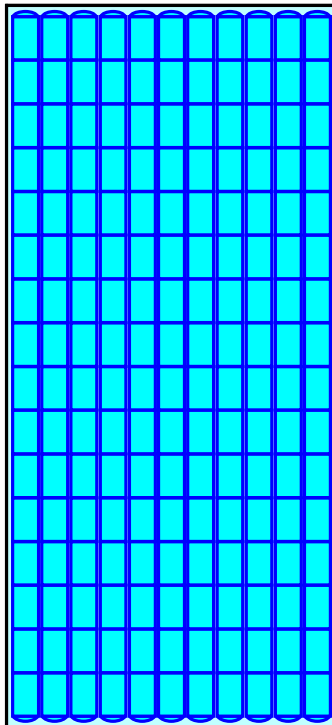
Overall Storage Efficiency = 58.8%

Overall System Size = 117.54' x 53.75' x 3.50'

176 Chambers

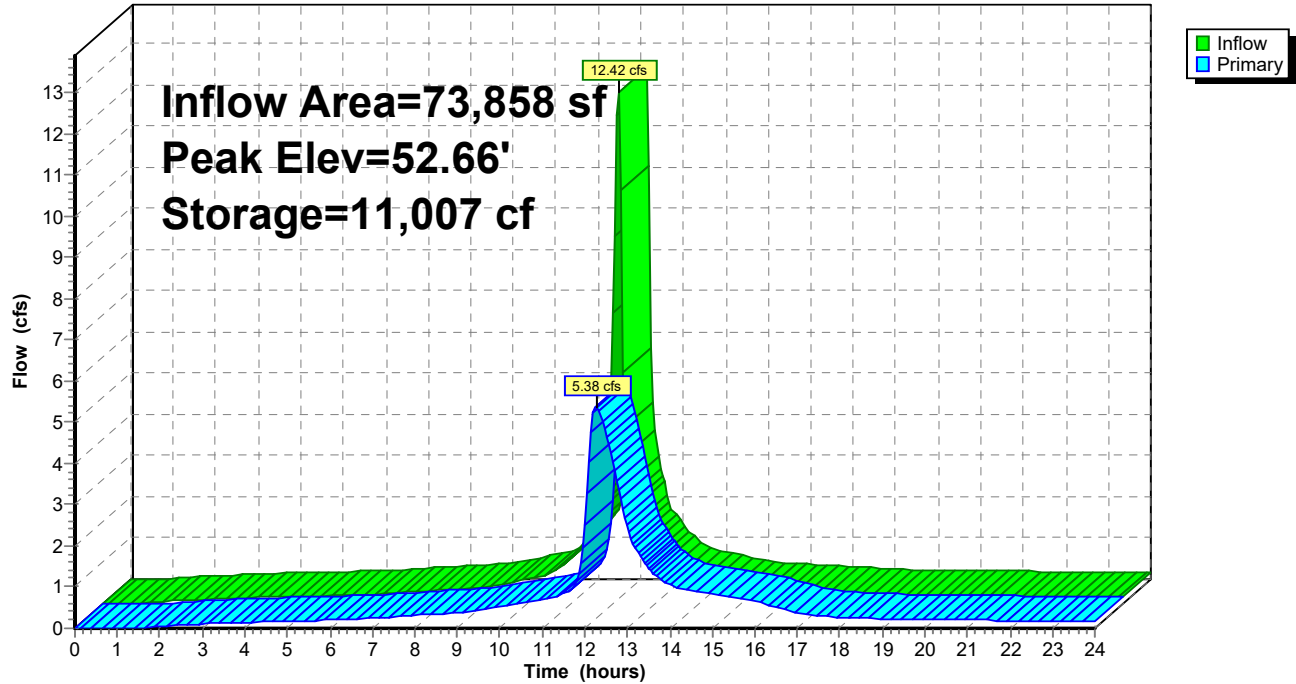
818.9 cy Field

519.5 cy Stone



Pond Det #2: SS#2

Hydrograph



APPENDIX D

Closed Drainage System Design

Rainfall Details

Return Period..... 25 year(s)

Subbasin Summary

Subbasin Name	Area	Weighted Runoff Coefficient	Peak Runoff	Time of Concentration
	(ac)		(cfs)	(days hh:mm:ss)
AD-100	0.10	0.90	0.70	0 00:06:00
AD-101	0.07	0.90	0.51	0 00:06:00
AD-102	0.17	0.64	0.83	0 00:06:00
AD-103	0.16	0.79	1.00	0 00:06:00
AD-104	0.05	0.60	0.22	0 00:06:00
AD-105	0.05	0.67	0.26	0 00:06:00
AD-106	0.06	0.90	0.44	0 00:06:00
AD-107	0.12	0.75	0.72	0 00:06:00
AD-108	0.06	0.71	0.31	0 00:06:00
AD-109	0.12	0.90	0.85	0 00:06:00
CB-100	0.17	0.90	1.18	0 00:06:00
CB-101	0.11	0.60	0.52	0 00:06:00
CB-102	0.04	0.90	0.28	0 00:06:00
CB-103	0.07	0.63	0.36	0 00:06:00
CB-104	0.05	0.90	0.33	0 00:05:00
CB-105	0.03	0.90	0.20	0 00:06:00
CB-106	0.06	0.57	0.26	0 00:06:00
CB-107	0.11	0.84	0.74	0 00:06:00
CB-108	0.16	0.79	1.01	0 00:06:00
CB-109	0.12	0.90	0.85	0 00:06:00
CB-110	0.04	0.90	0.31	0 00:06:00
CB-111	0.08	0.90	0.53	0 00:06:00
CB-112	0.12	0.90	0.84	0 00:06:00
CB-113	0.03	0.90	0.18	0 00:06:00
CB-114	0.10	0.90	0.68	0 00:06:00
CB-115	0.08	0.71	0.45	0 00:06:00
CB-116	0.05	0.90	0.37	0 00:06:00
CB-117	0.09	0.73	0.51	0 00:06:00
CB-118	0.11	0.86	0.72	0 00:06:00
CB-119	0.12	0.85	0.81	0 00:06:00
CB-121	0.08	0.90	0.58	0 00:06:00
CB-122	0.07	0.90	0.46	0 00:06:00
CB-123	0.18	0.46	0.64	0 00:06:00
CB-135	0.33	0.52	1.34	0 00:06:00
CB-136	0.10	0.90	0.67	0 00:06:00
CB-137	0.09	0.90	0.63	0 00:06:00
CB-138	0.02	0.67	0.12	0 00:06:00
RD-1	0.38	0.90	2.64	0 00:06:00
RD-2	0.31	0.90	2.18	0 00:06:00
RD-3	0.39	0.90	2.78	0 00:06:00
RD-4	0.29	0.90	2.01	0 00:06:00
SS-1	0.88	0.43	2.97	0 00:06:00
TD-1	0.09	0.90	0.65	0 00:06:00

Link Summary

From (Inlet) Node	Inlet To Invert (Outlet) Elevation Node	Outlet Invert Elevation	Pipe Length	Pipe Slope	Pipe Diameter	Manning's Roughness	Peak Flow Q	Peak Flow Velocity	Pipe Design Capacity Qf	Q/Qf Ratio
	(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(ft/sec)	(cfs)	
TD#1	61.00 DMH#200	60.65	37	0.94	12	0.0120	0.64	2.99	3.75	0.17
DMH#214	52.10 DMH#213	51.80	34	0.87	15	0.0120	2.24	3.70	6.53	0.34
DMH#215	57.50 DMH#217	57.00	46	1.10	12	0.0120	1.08	3.96	4.04	0.27
DMH#219	55.65 DMH#222	55.25	73	0.55	12	0.0120	1.62	3.02	2.86	0.57
CB#103	53.40 DMH#214	53.10	32	0.95	12	0.0120	0.35	2.77	3.76	0.09
CB#101	52.50 DMH#214	52.20	39	0.77	12	0.0120	0.50	1.82	3.39	0.15
CB#104	54.75 DMH#240	54.50	17	1.45	12	0.0120	0.33	3.05	4.65	0.07
CB#106	58.00 DMH#215	57.60	37	1.09	12	0.0120	0.26	1.90	4.04	0.06
CB#108	56.50 DMH#231	55.50	76	1.32	12	0.0120	1.00	2.88	4.43	0.23
DMH#217	56.40 DMH#231	55.75	63	1.03	15	0.0120	3.97	5.26	7.10	0.56
CB#107	56.00 DMH-206	55.20	24	3.39	12	0.0120	0.73	5.17	7.11	0.10
CB#110	58.00 DMH#215	57.80	19	1.08	12	0.0120	0.84	3.48	4.01	0.21
CB#111	56.00 DMH#219	55.75	27	0.92	12	0.0120	0.83	2.53	3.70	0.22
CB#114	58.70 DMH#221	58.50	38	0.52	12	0.0120	0.66	2.66	2.79	0.24
DMH#221	57.90 DMH#222	57.80	7	1.41	12	0.0120	0.83	3.52	4.58	0.18
CB#113	58.50 DMH#221	58.00	47	1.06	12	0.0120	0.17	1.59	3.98	0.04
CB#112	56.00 DMH#219	55.85	15	0.99	12	0.0120	0.83	2.94	3.84	0.22
DMH#212	55.75 Out-1Pipe - (123)	55.75	9	0.00	18	0.0120	10.89	6.96	5.09	2.14
CB#115	54.50 DMH#230	54.20	7	4.26	12	0.0120	0.45	4.26	7.96	0.06
DMH#226	48.50 DMH#241	48.10	75	0.54	18	0.0120	9.17	5.19	8.33	1.10
DMH#241	48.00 DMH#224	47.70	53	0.56	18	0.0120	10.47	5.92	8.53	1.23
CB#116	54.00 DMH#230	53.80	42	0.48	12	0.0120	0.33	1.85	2.68	0.12
CB#117	54.00 DMH#230	53.90	34	0.29	12	0.0120	0.43	2.01	2.08	0.21
DMH#230	53.70 DMH-206	53.13	62	0.92	12	0.0120	1.25	2.00	3.70	0.34
DMH-206	53.00 DMH#207	52.95	10	0.50	18	0.0120	7.23	4.57	8.08	0.89
DMH#204	59.55 DMH#205	58.75	72	1.11	12	0.0120	2.49	4.94	4.07	0.61
DMH#208	59.00 AB#200	57.30	116	1.46	12	0.0120	1.98	3.14	4.67	0.42
AB#200	57.20 DMH#210	56.40	105	0.76	12	0.0120	2.20	2.80	3.37	0.65
DMH#211	57.25 DMH#210	56.40	89	0.96	18	0.0120	5.26	2.98	11.15	0.47
AD#107	59.00 DMH#210	58.75	32	0.78	12	0.0120	0.71	3.11	3.41	0.21
AD#106	60.25 AB#200	60.25	23	0.00	12	0.0120	0.43	1.86	1.73	0.25
RD#2	60.00 DMH#208	59.50	21	2.41	12	0.0120	2.16	3.79	5.99	0.36
RD#1	60.00 DMH#204	60.00	8	0.00	12	0.0120	2.49	3.54	1.73	1.44
AD#104	58.00 DMH#205	57.75	19	1.32	12	0.0120	0.21	2.67	4.44	0.05
CB#118	56.00 DMH-206	55.20	111	0.72	12	0.0120	0.69	3.17	3.27	0.21
CB#119	54.50 DMH#232	53.80	51	1.37	12	0.0120	0.80	3.99	4.52	0.18
CB#123	51.25 DMH#239	51.15	6	1.55	12	0.0120	0.64	3.37	4.80	0.13
CB#121	50.00 DMH#239	49.80	24	0.84	12	0.0120	0.57	2.62	3.54	0.16
CB#122	50.50 DMH#237	50.30	10	2.03	12	0.0120	0.42	3.34	5.51	0.08
AD#105	58.00 DMH#205	57.00	102	0.98	12	0.0120	0.25	1.14	3.82	0.06
DMH#222	55.15 Out-1Pipe - (151)	55.10	3	1.45	12	0.0120	2.43	4.57	4.64	0.52
CB#102	55.25 DMH#213	55.00	22	1.15	12	0.0120	1.27	3.97	4.15	0.31
AD#108	59.00 DMH#211	58.67	32	1.03	12	0.0120	0.31	2.73	3.92	0.08
DMH#213	51.70 DMH#238	50.25	275	0.53	15	0.0120	3.61	3.97	5.08	0.71
DMH#231	55.40 DMH-206	55.20	11	1.77	15	0.0120	4.89	5.81	9.31	0.52
DMH#205	56.90 DMH#217	56.50	33	1.21	12	0.0120	2.91	4.51	4.25	0.68
DMH#224	47.60 Out-1Pipe - (207)	47.40	23	0.87	18	0.0120	10.47	6.23	10.64	0.98
OCS#400	52.90 DMH#224	51.00	108	1.76	12	0.0120	0.00	0.00	5.11	0.00
DMH#238	50.15 DMH#239	49.00	203	0.57	15	0.0120	3.13	2.55	5.26	0.59
DMH#239	48.90 DMH#237	48.80	18	0.55	18	0.0120	3.44	2.40	8.43	0.41
RD#4	61.00 DMH#236	60.95	5	0.97	12	0.0120	2.00	3.34	3.80	0.53
DMH#236	60.95 DMH#235	60.80	6	2.48	12	0.0120	1.42	4.62	6.07	0.23
OCS#401	53.40 DMH#226	52.50	81	1.11	12	0.0120	5.57	7.16	4.08	1.37
DMH#235	59.30 Null_1	58.40	104	0.87	12	0.0120	1.39	3.05	3.60	0.39
Null_1	58.40 Outlet_216	58.30	13	0.80	12	0.0120	1.34	2.89	3.45	0.39

Link Summary

From (Inlet) Node	Inlet To Invert (Outlet) Elevation Node	Outlet Invert Elevation	Pipe Length	Pipe Slope	Pipe Diameter	Manning's Roughness	Peak Flow Q	Peak Flow Velocity	Pipe Design Capacity Qf	Q/Qf Ratio
	(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(ft/sec)	(cfs)	
CB#100	54.00 DMH#240	53.50	50	1.01	12	0.0120	1.17	3.87	3.88	0.30
DMH#240	53.40 DMH#214	53.10	21	1.46	12	0.0120	1.43	4.38	4.66	0.31
CB#136	58.50 DMH#245	57.85	63	1.03	12	0.0120	0.61	2.91	3.93	0.16
CB#137	58.20 DMH#211	57.75	39	1.16	12	0.0120	0.58	2.81	4.15	0.14
CB#138	58.75 DMH#245	58.50	23	1.11	12	0.0120	0.15	1.99	4.06	0.04
DMH#245	57.75 DMH#211	57.45	28	1.06	12	0.0120	0.78	1.83	3.98	0.20
DMH#237	48.70 DMH#226	48.60	17	0.59	18	0.0120	3.65	2.37	8.71	0.42
AD#109	52.00 DMH#241	51.75	5	4.83	12	0.0120	2.18	5.94	8.48	0.26
DMH#236	60.85 Outlet_229	60.83	5	0.34	6	0.0120	0.58	3.15	0.35	1.64
DMH#232	53.70 Out-1Pipe - (232)	53.60	9	1.08	12	0.0120	0.79	3.28	4.00	0.20
AD#100	60.75 DMH#200	60.65	17	0.59	12	0.0120	0.70	2.68	2.96	0.24
DMH#200	60.55 DMH#201	59.75	80	1.00	12	0.0120	1.47	3.59	3.86	0.38
AD#101	60.00 DMH#201	59.75	10	2.57	12	0.0120	0.72	2.86	6.19	0.12
DMH#201	59.65 DMH#202	59.30	38	0.93	12	0.0120	1.58	3.91	3.73	0.42
DMH#202	59.20 DMH#203	58.70	57	0.87	12	0.0120	1.69	2.41	3.60	0.47
DMH#203	58.65 DMH#211	57.35	124	1.05	12	0.0120	4.28	5.45	3.95	1.08
DMH#210	56.30 DMH#212	55.75	61	0.90	18	0.0120	7.87	4.46	10.79	0.73
AD#102	59.10 DMH#203	58.80	32	0.94	12	0.0120	0.88	2.41	3.75	0.23
RD#3	60.00 DMH#203	59.75	24	1.06	12	0.0120	2.74	4.87	16.39	0.17

Junction Input

Juntion Name	Invert Elevation	Rim Elevation
	(ft)	(ft)
AB#200	57.00	63.00
AD#100	60.75	63.10
AD#101	60.00	63.60
AD#102	59.10	63.10
AD#104	58.00	62.00
AD#105	58.00	62.50
AD#106	60.25	64.20
AD#107	59.00	63.50
AD#108	59.00	62.50
AD#109	52.00	55.00
CB#100	54.00	59.00
CB#101	52.50	56.50
CB#102	55.25	59.25
CB#103	53.40	57.40
CB#104	54.75	58.75
CB#105	58.50	62.25
CB#106	58.00	62.19
CB#107	56.00	60.00
CB#108	56.50	60.50
CB#110	58.00	62.19
CB#111	56.00	60.00
CB#112	56.00	60.00
CB#113	58.50	63.30
CB#114	58.70	62.89
CB#115	54.50	58.50
CB#116	54.00	58.00
CB#117	54.00	58.00
CB#118	56.00	60.00
CB#119	54.50	58.50
CB#121	50.00	54.00
CB#122	50.50	54.50
CB#123	51.25	55.25
CB#136	58.50	62.25
CB#137	58.20	62.50
CB#138	58.75	63.75
DMH#200	60.55	63.40
DMH#201	59.65	63.70
DMH#202	59.20	65.20
DMH#203	58.65	63.50
DMH#204	59.55	63.69
DMH#205	56.90	63.00
DMH#208	56.30	62.30
DMH#210	56.30	64.10
DMH#211	57.25	63.40
DMH#212	55.75	62.80
DMH#213	51.70	59.60
DMH#214	52.10	58.10
DMH#215	57.50	62.35
DMH#217	56.40	63.50
DMH#219	55.65	60.75
DMH#221	57.90	62.87
DMH#222	55.15	62.00
DMH#224	47.60	59.19
DMH#226	48.50	57.75
DMH#230	53.70	58.00
DMH#231	55.40	60.20
DMH#232	53.70	57.69
DMH#235	59.30	65.29
DMH#236	60.85	64.64
DMH#237	48.70	55.00
DMH#238	50.15	59.10
DMH#239	48.90	56.00
DMH#240	53.40	58.19
DMH#241	48.00	55.00
DMH#245	57.75	62.75
DMH-206	53.00	61.20
Null Structure	52.90	0.00
Null_1	58.40	62.58
OCS#400	52.90	61.80
OCS#401	53.40	58.75
RD#1	60.00	61.08
RD#2	60.00	64.00
RD#3	64.00	60.08
RD#4	61.00	62.08
TD#1	61.00	63.15

APPENDIX E

Long-Term Pollution Prevention and Stormwater Operation and Maintenance Plan

LONG-TERM POLLUTION PREVENTION PLAN AND STORMWATER OPERATION AND MAINTENANCE PLAN

New Elementary School, Swampscott, MA

TABLE OF CONTENTS

1.0 INTRODUCTION	1
2.0 LONG-TERM POLLUTION PREVENTION PLAN	2
2.1 Storage of Hazardous Materials	2
2.2 Storage of Waste Products	2
2.3 Spill Prevention and Response	2
2.4 Minimize Soil Erosion	2
2.5 Maintenance of Lawns, Gardens, and other Landscaped Areas	3
2.6 Management of Deicing Chemicals and Snow	3
2.7 Coordination with other Permits and Requirements	3
3.0 STORMWATER MANAGEMENT SYSTEM OPERATION AND MAINTENANCE PLAN	4
3.1 Introduction	4
3.2 Stormwater Operation and Maintenance Requirements	4
Deep Sump and Hooded Catch Basins	4
Area Drains	5
Water Quality Units (Proprietary Separators)	5
Level Spreaders	5
Subsurface Detention/Infiltration Structures	5
Stormwater Outfalls	5
3.3 Street Sweeping	5
3.4 Repair of the Stormwater Management System	5
3.5 Reporting	6
STORMWATER MANAGEMENT SYSTEM INSPECTION FORM	7

FIGURES

Figure 1 – Stormwater Management System Location Map

Figure 2 – Snow Storage Map

1.0 INTRODUCTION

The purpose of this document is to specify the pollution prevention measures and stormwater management system operation and maintenance for the New Elementary School site. The Responsible Party indicated below shall implement the management practices outlined in this document and proactively conduct operations at the project site in an environmentally responsible manner. Compliance with this Manual does not in any way dismiss the responsible party, owner, property manager, or occupants from compliance with other applicable federal, state or local laws.

Responsible Party: Max Kasper
Town of Swampscott/Swampscott Public Schools
22 Monument Avenue, Swampscott, MA
781-596-8830

This Document has been prepared in compliance with Standards 4 and 9 of the 2008 Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards, which state:

Standard 4:

The Long Term Pollution Prevention Plan shall include the proper procedures for the following:

- Good housekeeping
- Storing materials and waste products inside or under cover
- Vehicle washing
- Routine inspections of stormwater best management practices
- Spill prevention and response
- Maintenance of lawns, gardens, and other landscaped areas
- Storage and use of fertilizers, herbicides, and pesticides
- Pet waste management
- Operation and management of septic systems
- Proper management of deicing chemicals and snow

Standard 9:

The Long-Term Operation and Maintenance Plan shall at a minimum include:

- Stormwater management system(s) owner(s)
- The party or parties responsible for operation and maintenance, including how future property owners shall be notified of the presence of the stormwater management system and the requirement for operation and maintenance
- The routine and non-routine maintenance tasks to be undertaken after construction is complete and a schedule for implementing those tasks
- A plan that is drawn to scale and shows the location of all stormwater BMPs in each treatment train along with the discharge point
- A description and delineation of public safety features
- An estimated operations and maintenance budget

2.0 LONG-TERM POLLUTION PREVENTION PLAN

The Responsible Party shall implement the following good housekeeping procedures at the project site to reduce the possibility of accidental releases and to reduce safety hazards.

2.1 Storage of Hazardous Materials

To prevent leaks and spills, keep hazardous materials and waste products under cover or inside. Use drip pans or spill containment systems to prevent chemicals from entering the drainage system. Inspect storage areas for materials and waste products at least once per year to determine amount and type of the material on site, and if the material requires disposal.

Securely store liquid petroleum products and other liquid chemicals in federally- and state-approved containers. Restrict access to maintenance personnel and administrators.

2.2 Storage of Waste Products

Collect and store all waste materials in securely lidded dumpster(s) or other secure containers as applicable to the material. Keep dumpster lids closed and the areas around them clean. Do not fill the dumpsters with liquid waste or hose them out. Sweep areas around the dumpster regularly and put the debris in the garbage, instead of sweeping or hosing it into the parking lot. Legally dispose of collected waste on a regular basis.

Segregate liquid wastes from solid waste and recycle through hazardous waste disposal companies, whenever possible. Contact a hazardous waste hauler for proper disposal to a hazardous waste collection center.

2.3 Spill Prevention and Response

Implement spill response procedures for releases of significant materials such as fuels, oils, or chemical materials onto the ground or other area that could reasonably be expected to discharge to surface or groundwater.

- For minor spills, keep fifty (50) gallon spill control kits and Speedy Dry at all shop and work areas.
- Immediately contact applicable Federal, State, and local agencies for reportable quantities as required by law.
- Immediately perform applicable containment and cleanup procedures following a spill release.
- Promptly remove and dispose of all material collected during the response in accordance with Federal, State and local requirements. A licensed emergency response contractor may be required to assist in cleanup of releases depending on the amount of the release, and the ability of the Contractor to perform the required response.
- Reportable quantities of chemicals, fuels, or oils are established under the Clean Water Act and enforced through Massachusetts Department of Environmental Protection (DEP).

2.4 Minimize Soil Erosion

Soil erosion facilitates mechanical transport of nutrients, pathogens, and organic matter to surface water bodies. Repair all areas where erosion is occurring throughout the project site. Stabilize bare soil with riprap, seed, mulch, or vegetation.

2.5 Maintenance of Lawns, Gardens, and other Landscaped Areas

Pesticides and fertilizers shall not be used in the landscaped areas associated with the project site and shall not be stored on-site. Dumping of lawn wastes, brush or leaves or other materials or debris is not permitted in any Resource Area. Grass clippings, pruned branches and any other landscaped waste should be disposed of or composted in an appropriate location. No irrigation shall be used in the landscaped areas for this project.

2.6 Management of Deicing Chemicals and Snow

The qualified contractor selected for snow plowing and deicing shall be made fully aware of the requirements of this section.

No road salt (sodium chloride) shall be stored on-site. The use of magnesium chloride de-icing product with a 0.5 to 1.0 percent sodium chloride mix for snow and ice treatment is permitted. The product shall be stored in a locked room inside the building and shall be used at exterior stairs and walkways. The snow plow contractor shall adhere to these magnesium chloride use and storage requirements.

During typical snow plowing operations, snow shall be pushed to the designated snow removal areas noted on the Snow Storage Plan (Figure 2). Snow shall not be stockpiled in wetland resource areas or the 100-foot Buffer Zone, catch basins, or bioretention basins. In severe conditions where snow cannot be stockpiled on site, the snow shall be removed from the site and properly disposed of in accordance with DEP Guideline BRP601-01.

Use of sand is permitted only for impervious roadways and parking areas. If sand is applied, the snow plowed from impervious areas shall not be stored on porous asphalt.

Before winter begins, the property owner and the contractor shall review snow plowing, deicing, and stockpiling procedures. Areas designated for stockpiling should be cleaned of any debris. Street and parking lot sweeping should be followed in accordance with the Operation and Maintenance Plan.

2.7 Coordination with other Permits and Requirements

Certain conditions of other approvals affecting the long term management of the property shall be considered part of this Long Term Pollution Prevention Plan. The Owner shall become familiar with those documents and comply with the guidelines set forth in those documents.

3.0 STORMWATER MANAGEMENT SYSTEM OPERATION AND MAINTENANCE PLAN

3.1 Introduction

This Operation and Maintenance Plan (O&M Plan) for Swampscott Elementary School site is required under Standard 9 of the 2008 MassDEP Stormwater Handbook to provide best management practices for implementing maintenance activities for the stormwater management system in a manner that minimizes impacts to wetland resource areas.

The Owner shall implement this O&M Plan and proactively conduct operations at the site in an environmentally responsible manner. Compliance with this O&M Plan does not in any way dismiss the Owner from compliance with other applicable Federal, State or local laws.

Routine maintenance during construction and post-development phases of the project, as defined in the Operation and Maintenance Plan, shall be permitted without amendment to the Order of Conditions. A continuing condition in the Certificate of Compliance shall ensure that maintenance can be performed without triggering further filings under the Wetlands Protection Act.

All stormwater best management practices (BMPs) shall be operated and maintained in accordance with the design plans and the Operation and Maintenance Plan approved by the issuing authority. The Owner shall:

- a. Maintain an operation and maintenance log for the last three years, including inspections, repairs, replacement and disposal (for disposal the log shall indicate the type of material and the disposal location). This is a rolling log in which the responsible party records all operation and maintenance activities for the past three years.
- b. Make this log available to MassDEP and the Conservation Commission upon request; and
- c. Allow members and agents of the MassDEP and the Conservation Commission to enter and inspect the premises to evaluate and ensure that the Owner complies with the Operation and Maintenance requirements for each BMP.

3.2 Stormwater Operation and Maintenance Requirements

Inspect and maintain the stormwater management system as directed below. Refer to the Stormwater Management System Location Map (Figure 1) for the location of each component of the system. Repairs to any component of the system shall be made as soon as possible to prevent any potential pollutants (including silt) from entering the resource areas.

Deep Sump and Hooded Catch Basins

Inspect or clean catch basins four times per year and at the end of foliage and snow-removal seasons. Other inspection and maintenance requirements include:

- Remove organic material, sediment and hydrocarbons four times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin.
- Always clean out catch basins after street sweeping. If any evidence of hydrocarbons is found during inspection, immediately remove the material using absorbent pads or other suitable measures and dispose of legally. Remove other accumulated debris as necessary.
- If handling runoff from land uses with higher potential pollutant loads or discharging runoff near or to a critical area, more frequent cleaning may be necessary.

- Transport and disposal of accumulated sediment off-site shall be in accordance with applicable local, state and federal guidelines and regulations.

Area Drains

Inspect area drains at least once per month and remove debris from the grate. Clean out accumulated sediments at least once per year and more frequently as necessary.

Water Quality Units (Proprietary Separators)

Maintain water quality units according the recommendations set forth by the manufacturer. General inspection and maintenance procedures for proprietary devices are provided below:

- Inspect units following completion of construction, prior to being put into service.
- Inspect units at least twice per year following installation and no less than once per year thereafter.
- Inspect units immediately after any oil, fuel or chemical spill.
- All inspections shall include checking the oil level and sediment depth in the unit. Removal of sediments/oils shall occur per manufacturer recommendations.
- A licensed waste management company shall remove captured petroleum waste products from any oil, chemical or fuel spills and dispose.
- OSHA confined space entry protocols shall be followed if entry into the unit is required.

Level Spreaders

Inspect level spreaders regularly, especially after major storm events (rainfall totals greater than 2.5 inches in 24 hours). Repair any erosion or low spots in the level spreader.

Subsurface Detention/Infiltration Structures

- Inspect subsurface detention/infiltration structures twice per year. Inspect the inlets and observation ports to determine if there is accumulated sediment within the system. Remove all debris and accumulated sediment that may clog the system.

Stormwater Outfalls

Inspect flared end sections and associated riprap spillways at least once per year and after major storm events (rainfall totals greater than 2.5 inches in 24 hours) to ensure that the stability of the outlet area is maintained. Keep the outfall area clear of debris such as trash, branches, and sediment. Make repairs immediately if riprap displacement or downstream channel scour is observed.

3.3 Street Sweeping

Perform street sweeping at least twice per year, whenever there is significant debris present on roads and parking lots. Street sweeping shall occur in the spring and fall. Sweepings must be handled and disposed of properly according to the Swampscott Conservation Commission.

3.4 Repair of the Stormwater Management System

The stormwater management system shall be maintained. The repair of any component of the system shall be made as soon as possible to prevent any potential pollutants including silt from entering the resource areas or the existing closed drainage system.

3.5 Reporting

The Owner shall maintain a record of drainage system inspections and maintenance (per this Plan) and submit a yearly report to the Swampscott Conservation Commission.

STORMWATER MANAGEMENT SYSTEM INSPECTION FORM

New Elementary School Swampscott, MA		Inspected by: _____ Date: _____
Component	Status/Inspection	Action Taken
Deep Sump Catch Basins, Area Drains and Drain Manholes		
Subsurface Detention System		
Water Quality Units		
Stormwater Outfalls & Level Spreaders		
General site conditions – evidence of erosion, etc.		

**SUBMIT COPIES OF STORMWATER MANAGEMENT SYSTEM INSPECTION FORM TO THE
SWAMPSCOTT CONSERVATION COMMISSION WITH THE YEARLY REPORT.**

APPENDIX F

DRAFT Stormwater Pollution Prevention Plan (SWPPP)

DRAFT Stormwater Pollution Prevention Plan (SWPPP)

For Construction Activities At:

New Elementary School

10 Whitman Road
Swampscott, MA 01907
Site Telephone Number: xxx-xxx-xxxx

SWPPP Prepared For:

Lavallee Brensinger Architects

Davis B. Harris
15 Dow Street, Suite 400
Manchester, NH, 03101
T: xxx-xxx-xxxx
Email Address/Fax Number

SWPPP Prepared By:

Nitsch Engineering

Dave Conway
Lorie Dorce
2 Center Plaza
Boston, MA 02108
T: 617-338-0063
F: 617-338-6472

SWPPP Preparation Date:

02/25/2022

Estimated Project Dates:

Project Start Date: XX/XX/XXXX
Project Completion Date: XX/XX/XXXX



Contents

SECTION 1: CONTACT INFORMATION/RESPONSIBLE PARTIES 0

1.1 Operator(s) / Subcontractor(s) 0

1.2 Stormwater Team 2

SECTION 2: SITE EVALUATION, ASSESSMENT, AND PLANNING..... 3

2.1 Project/Site Information..... 3

2.2 Discharge Information 4

2.3 Nature of the Construction Activity 6

2.4 Sequence and Estimated Dates of Construction Activities 7

2.5 Allowable Non-Stormwater Discharges 8

2.6 Site Maps..... 9

SECTION 3: DOCUMENTATION OF COMPLIANCE WITH OTHER FEDERAL REQUIREMENTS10

3.1 Endangered Species Protection.....10

3.2 Historic Preservation11

3.3 Safe Drinking Water Act Underground Injection Control Requirements.....13

SECTION 4: EROSION AND SEDIMENT CONTROLS REQUIREMENTS15

4.1 Natural Buffers or Equivalent Sediment Controls15

4.3 Sediment Track-Out.....18

4.4 Stockpiled Sediment or Soil19

4.6 Minimize the Disturbance of Steep Slopes20

4.7 Preserve Native Topsoil21

4.8 Minimize Soil Compaction.....21

4.9 Storm Drain Inlets22

4.10 Minimize Erosion of Stormwater Conveyances23

4.12 Chemical Treatment.....24

4.13 Dewatering Practices25

4.14 Other Stormwater Controls25

4.15 Site Stabilization26

SECTION 5: POLLUTION PREVENTION STANDARDS27

5.1 Potential Sources of Pollution27

5.2 Spill Prevention and Response29

5.3 Fueling and Maintenance of Equipment or Vehicles.....29

5.4 Washing of Equipment and Vehicles.....30

5.5 Storage, Handling, and Disposal of Construction Products, Materials, and Wastes30

5.6 Washing of Applicators and Containers used for Paint, Concrete, or Other Materials33

5.8 Other Pollution Prevention Practices..... **Error! Bookmark not defined.**

SECTION 6: INSPECTION AND CORRECTIVE ACTION35

6.1 Inspection Personnel and Procedures.....35

6.2 Corrective Action36

6.3 Delegation of Authority.....36

SECTION 7: TRAINING LOG37

SECTION 8: CERTIFICATION AND NOTIFICATION.....38

SWPPP ATTACHMENTS39

SECTION 1: CONTACT INFORMATION/RESPONSIBLE PARTIES

1.1 *Operator(s) / Subcontractor(s)*

Operator(s):

Construction Manager Responsibilities:

Construction Manager shall maintain the Stormwater Pollution Prevention Plan (SWPPP) documentation and will conduct and document self-inspections required under the 2017 Construction General Permit (CGP) once every 7 days and within 24 hours of a storm event 0.25" or greater. Construction Manager will provide copies of inspections reports to the Owner's Representative within 24 hours following each inspection. Incidents of non-compliance will be immediately brought to the attention of the Owner's Representative. Construction Manager shall be responsible for maintaining compliance with the SWPPP, including all requirements in the CGP and will maintain erosion and sediment control Best Management Practices (BMPs) in all areas of the site under its day-to-day control.

Construction Manager shall file a Notice of Intent (NOI) to be covered by the CGP and obtain coverage by the Environmental Protection Agency (EPA) before beginning construction at the project. Permit coverage will be maintained throughout the project. Construction Manager shall not file a Notice of Termination (NOT) until all disturbed areas of the site under its day-to-day control have been fully stabilized with permanent erosion controls that satisfy the final stabilization requirements in the CGP or have met another criteria of the NOT. Construction Manager will maintain a clean site and construction trash and debris will be picked up and disposed of properly by the end of each day.

Each Operator is responsible for advising employees and subcontractors working on this project of the requirements in the CGP and SWPPP. Particular emphasis should be placed on ensuring that employees and subcontractors do not damage BMPs and maintain compliance with the CGP.

Construction Manager Company Name

Construction Manager Contact Person, Position

Street Address

Town, State, Zip Code

T: xxx-xxx-xxxx

Email address:

Owner's Representative Responsibilities:

Owner's Representative shall provide general oversight of the project including review of the SWPPP and any amendments, inspection reports, and corrective actions. **Owner's Representative** shall file a NOI to be covered by the CGP and obtain coverage by the EPA before beginning construction at the project. Permit coverage will be maintained throughout the project. **Owner's Representative** shall not file a notice of Termination until all disturbed areas of the site have been fully stabilized with permanent erosion controls that satisfy the final stabilization requirements in the CGP. **Owner's Representative** will coordinate with the Construction Manager to maintain a clean site so that trash and debris will be picked up and disposed of properly by the end of the day.

Each Operator is responsible for advising employees and subcontractors working on this project of the requirements in the CGP and SWPPP. Particular emphasis should be placed on ensuring that employees and subcontractors do not damage BMPs and maintain compliance with the CGP.

Owner's Representative Company Name

Owner's Representative Contact person, Position

Street Address

Town, State, Zip Code

T: xxx-xxx-xxxx

Email Address:

Site Contractor:

Company Name

Contact person, Position

Street Address

Town, State, Zip Code

T: xxx-xxx-xxxx

Email Address:

Emergency 24-Hour Contact:

Company

Emergency Contact person, Position

T: xxx-xxx-xxxx

1.2 Stormwater Team

Construction Manager: Company

Stormwater Role/Responsibility: Responsible for overseeing the development of the SWPPP, modifications and updates to the SWPPP, and for compliance with the requirements in the CGP (e.g., installing and maintaining stormwater controls, conducting site inspections, picking up trash, taking corrective actions where required, etc.).

Contact:

Construction Manager Contact Person, Position

T: xxx-xxx-xxxx

Email address

I, Construction Manager Contact Person, have read the CGP and Understand the Applicable Requirements

☐ Yes

Date: _____

Site Contractor: Company

Stormwater Role/Responsibility: Responsible for compliance with the requirements in this permit (e.g., installing and maintaining stormwater controls, conducting site inspections, taking corrective actions where required, etc.).

Contact:

Contact Person, Position

T: xxx-xxx-xxxx

Email Address

Refer to the Subcontractor Certifications/Agreements in Attachment G.

SECTION 2: SITE EVALUATION, ASSESSMENT, AND PLANNING

2.1 Project/Site Information

Project Name and Address

Project/Site Name: Swampscott Elementary School
Project Street/Location: 10 Whitman Road
City/Town: Swampscott
State: Massachusetts
ZIP Code: 01907
County or Similar Subdivision: Essex

Project Latitude/Longitude

(Use **one** of three possible formats, and specify method)

Latitude:

1. 42° 28' 20" N (degrees, minutes, seconds)

Longitude:

1. 70° 53' 52" W (degrees, minutes, seconds)

Method for determining latitude/longitude:

☐ USGS topographic map (specify scale: _____)

☐ GPS

☒ Other (please specify): Google Earth

Horizontal Reference Datum:

☐ NAD 27 ☒ NAD 83 ☐ WGS 84

If you used a U.S.G.S topographic map, what was the scale? _____

Additional Project Information

Is the project/site located on Indian country lands, or located on a property of religious or cultural significance to an Indian tribe? ☐ Yes ☒ No

Are you applying for permit coverage as a "federal operator" as defined in Appendix A of the CGP?

☐ Yes ☒ No

Will there be demolition of any structure built or renovated before January 1, 1980?

☒ Yes ☐ No

If yes, do any of the structures being demolished have at least 10,000 square feet of floor space?

☒ Yes ☐ No

Was pre-development land use used for agriculture (see Appendix A of the CGP for definition of "agricultural land")?

☐ Yes ☒ No

Type of Construction Site (check all that apply): ☐ Single-Family Residential

☐ Multi-Family Residential ☐ Commercial ☐ Industrial ☒ Institutional ☐ Highway or Road

☐ Utility ☐ Other _____

2.2 Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)?

☒ Yes ☐ No

Are there any surface waters that are located within 50 feet of your construction disturbances?

☐ Yes ☒ No

Table 1 – Names of Receiving Waters

Name(s) of the first surface water that receives stormwater directly from your site and/or from the MS4 (note: multiple rows provided where your site has more than one point of discharge that flows to different surface waters)
001. Nahant Bay
002.
003.

Table 2 – Impaired Waters / TMDLs (Answer the following for each surface water listed in Table 1 above)

	Is this surface water listed as "impaired" on the CWA303(d) list?	If you answered yes, then answer the following:			
		What pollutant(s) are causing the impairment?	Has a TMDL been completed?	Title of the TMDL document	Pollutant(s) for which there is a TMDL
001.	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Fecal Coliform, Pathogen	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	North Coastal Pathogen TMDL	Fecal Coliform, Pathogen
002.	<input type="checkbox"/> YES <input type="checkbox"/> NO				
003.	<input type="checkbox"/> YES <input type="checkbox"/> NO				

Table 3 – Tier 2, 2.5, or 3 Waters (Answer the following for each surface water listed in Table 1 above)

	Is this surface water designated as a Tier 2, Tier 2.5, or Tier 3 water?	If you answered yes, specify which Tier (2, 2.5, or 3) the surface water is designated as?
001.	<input type="checkbox"/> YES <input type="checkbox"/> NO	
002.	<input type="checkbox"/> YES <input type="checkbox"/> NO	
003.	<input type="checkbox"/> YES <input type="checkbox"/> NO	

2.3 Nature of the Construction Activity

General Description of Project

Provide a general description of the construction project:

The project consists of the construction of a new school building which will include the building utilities services along with its site utility systems (water, sewer, electric, drain, tele-communications, and gas), stormwater management utilities, access driveways and parking facilities, sport field and related structures, and landscaping hardscape and softscape.

Size of Construction Project

Size of Property: 6.1 acres

Total Area of Construction Disturbances: 6.1 acres

Maximum Area to be Disturbed at Any One Time: xx acres

Construction Support Activities

Include a description of the construction support activities or reference Site Maps in Attachment A that include this information.

Contact Information for Construction Support Activity:

Name: XXX

Telephone: XXX-XXX-XXXX

Email: XXXX

Address and/or Latitude and Longitude:

Business Hours

Day-Day Xa.m-Xp.m.

2.4 Sequence and Estimated Dates of Construction Activities

Phase 1: Demolition and Sight Preparation

This Phase consists of the demolition of the existing school and the construction of the parking lot, parent drop-off loop, service/emergency access and partial portion of the pedestrian entrance plaza.

- Schedule: July 2023 – December 2023
- Area Disturbed During Phase: 6.1 acres
- This phase will include the installation of all stormwater control measures as shown on the Site Preparation Plan provided in Attachment A. Stormwater controls will be removed at the end of Phase III upon stabilization of the site.

Phase 2A: New Construction

This Phase consists of the construction of the School with Utilities, Partial Completion of Drainage System, Rough Grading, Geothermal System, Retaining Walls, Outdoor Classroom, Critical Pedestrian Circulation, and Partial Completion of Main Parking Lot

- Schedule: December 2023 – June 2024
- Area Disturbed During Phase: 6.1 acres
- This phase will include the installation of all stormwater control measures as shown on the Site Preparation Plan provided in Attachment A. Stormwater controls will be removed at the end of Phase III upon stabilization of the site.

Phase 2B: School Opens

This Phase consists of the construction of the entry plaza, hard top and play area, bus drop off loop, ball fields, and the rest of the stormwater infrastructure.

- Schedule: September 2024
- Area Disturbed During Phase: 6.1 acres
- This phase will include the installation of all stormwater control measures as shown on the Site Preparation Plan provided in Attachment A. Stormwater controls will be removed at the end of Phase III upon stabilization of the site.

Phase 2C: Completion of Site Work

This Phase consists of the completion of the construction of the playgrounds and bus drop-off loop and the ball fields will require one full growing period before use.

- Schedule: September 2024 – May 2025
- Area Disturbed During Phase: 6.1 acres

2.5 Allowable Non-Stormwater Discharges

List of Allowable Non-Stormwater Discharges Present at the Site

Type of Allowable Non-Stormwater Discharge	Likely to be Present at Your Site?
Discharges from emergency fire-fighting activities	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Fire hydrant flushings	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Landscape irrigation	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Waters used to wash vehicles and equipment, provided that there is no discharge of soaps, solvents, or detergents used for such purposes	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Water used to control dust	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Potable water including uncontaminated water line flushings	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
External building washdown, provided soaps, solvents, and detergents are not used, and external surfaces do not contain hazardous substances (as defined in Appendix A of the CGP) (e.g., paint or caulk containing polychlorinated biphenyls (PCBs))	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
Pavement wash waters, provided spills or leaks of toxic or hazardous substances have not occurred (unless all spill material has been removed) and where soaps, solvents, and detergents are not used.	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Uncontaminated air conditioning or compressor condensate	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
Uncontaminated, non-turbid discharges of ground water or spring water	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated groundwater	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Construction dewatering water discharged in accordance with Part 2.4 of the CGP	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

Note: You are prohibited from directing pavement wash waters directly into any water of the U.S., storm drain inlet, or stormwater conveyance, unless the conveyance is connected to a sediment basin, sediment trap, or similarly effective control.

2.6 Site Maps

Site Maps must include the following:

- a) Boundaries of the property. The map(s) in the SWPPP must show the overall boundary of the property.
- b) Locations where construction activities will occur. The map(s) in the SWPPP must show the locations where construction activities will occur, including
 - i. Locations where earth-disturbing activities will occur (note any phasing), including any demolition activities;
 - ii. Approximate slopes before and after major grading activities (note any steep slopes);
 - iii. Locations where sediment, soil, or other construction materials will be stockpiled;
 - iv. Any water of the U.S. crossings;
 - v. Designated points where vehicles will exit onto paved roads;
 - vi. Locations of structures and other impervious surfaces upon completion of construction; and
 - vii. Locations of onsite and off-site construction support activity areas covered by the permit (see Part 1.2.1.c).
- c) Locations of all waters of the U.S. within and one mile downstream of the site's discharge point. Also identify if any are listed as impaired, or are identified as a Tier 2, Tier 2.5, or Tier 3 water.
- d) Areas of federally listed critical habitats within the site and/or at discharge locations.
- e) Type and extent of pre-construction cover on the site (e.g., vegetative cover, forest, pasture, pavement, structures).
- f) Drainage patterns of stormwater and authorized non-stormwater before and after major grading activities.
- g) Stormwater and authorized non-stormwater discharge locations. The permit requires the site map to show information pertaining to discharge locations including:
 - i. Locations where stormwater and/or authorized non-stormwater will be discharges to storm drain inlets; and
 - ii. Locations where stormwater and/or authorized non-stormwater will be discharged directly to waters of the U.S.
- h) Locations of all potential pollutant-generating activities identified in Part 7.2.3.g. The permit requires identification in the site map of all potential pollutant-generating activities identified in Part 7.2.3.g.
- i) Locations of stormwater controls, including natural buffer areas and any shared controls utilized to comply with this permit. The permit requires identification on the site map of the location of stormwater control measures.
- j) Locations where polymers, flocculants, or other treatment chemicals will be used and stored. The permit requires identification on the site map of the locations where polymers, flocculants, or other treatment chemicals will be used and stored.

Refer to Attachment A

SECTION 3: DOCUMENTATION OF COMPLIANCE WITH OTHER FEDERAL REQUIREMENTS

3.1 *Endangered Species Protection*

Eligibility Criterion

Under which criterion listed in Appendix D of the CGP are you eligible for coverage under this permit?

☐ A ☐ B ☒ C ☐ D ☐ E

For reference purposes, the eligibility criteria listed in Appendix D of the CGP are as follows:

Criterion A. No federally-listed threatened or endangered species or their designated critical habitat(s) are likely to occur in your site's "action area" as defined in Appendix A of the CGP.

Criterion B. The construction site's discharges and discharge-related activities were already addressed in another operator's valid certification of eligibility for your action area under eligibility Criterion A, C, D, E, or F and there is no reason to believe that federally-listed species or federally-designated critical habitat not considered in the prior certification may be present or located in the "action area". To certify your eligibility under this Criterion, there must be no lapse of NPDES permit coverage in the other operator's certification. By certifying eligibility under this Criterion, you agree to comply with any effluent limitations or conditions upon which the other operator's certification was based. You must include in your NOI the tracking number from the other operator's notification of authorization under this permit. If your certification is based on another operator's certification under Criterion C, you must provide EPA with the relevant supporting information required of existing dischargers in Criterion C in your NOI form.

Criterion C. Federally-listed threatened or endangered species or their designated critical habitat(s) are likely to occur in or near your site's "action area," and your site's discharges and discharge-related activities are not likely to adversely affect listed threatened or endangered species or critical habitat. This determination may include consideration of any stormwater controls and/or management practices you will adopt to ensure that your discharges and discharge-related activities are not likely to adversely affect listed species and critical habitat. To make this certification, you must include the following in your NOI: 1) any federally listed species and/or designated habitat located in your "action area"; and 2) the distance between your site and the listed species or designated critical habitat (in miles). You must also include a copy of your site map with your NOI.

Criterion D. Coordination between you and the Services has been concluded. The coordination must have addressed the effects of your site's discharges and discharge-related activities on federally-listed threatened or endangered species and federally-designated critical habitat, and must have resulted in a written concurrence from the relevant Service(s) that your site's discharges and discharge-related activities are not likely to adversely affect listed species or critical habitat. You must include copies of the correspondence between yourself and the Services in your SWPPP and your NOI.

Criterion E. Consultation between a Federal Agency and the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service under section 7 of the ESA has been concluded. The consultation must have addressed the effects of the construction site's discharges and discharge-related activities on federally-listed threatened or endangered species and federally-designated critical habitat. The result of this consultation must be either:

- i. a biological opinion that concludes that the action in question (taking into account the effects of your site's discharges and discharge-related activities) is not likely to jeopardize the continued existence of listed species, nor the destruction or adverse modification of critical habitat; or
- ii. written concurrence from the applicable Service(s) with a finding that the site's discharges and discharge-related activities are not likely to adversely affect federally-listed species or federally-designated habitat.

You must include copies of the correspondence between yourself and the Services in your SWPPP and your NOI.

Criterion F. Your construction activities are authorized through the issuance of a permit under section 10 of the ESA, and this authorization addresses the effects of the site's discharges and discharge-related activities on federally-listed species and federally-designated critical habitat. You must include copies of the correspondence between yourself and the Services in your SWPPP and your NOI.

For criterion A, indicate the basis for your determination that no federally-listed threatened or endangered species or their designated critical habitat(s) are likely to occur in your site's action area (as defined in Appendix A of the CGP). Check the applicable source of information you relied upon:

- ☐ Specific communication with staff of the U.S. Fish & Wildlife Service or National Marine Fisheries Service.
- ☐ Publicly available species list.
- ☒ Other source: NHESP data layer (August 2017 or as amended) from MassGIS, U.S. Fish and Wildlife online system Information for Planning and Conservation (IPaC) – Refer to Attachment K.

For criterion B, provide the Tracking Number from the other operator's notification of permit authorization: **INSERT AUTHORIZATION TRACKING NUMBER FROM OTHER OPERATOR'S NOTIFICATION LETTER/EMAIL**

Provide a brief summary of the basis used by the other operator for selecting criterion A, B, C, D, E, or F: **INSERT TEXT HERE**

For criterion C, provide the following information:

- **INSERT LIST OF FEDERALLY-LISTED SPECIES OR FEDERALLY-DESIGNATED CRITICAL HABITAT LOCATED IN YOUR ACTION AREA**
- **INSERT DISTANCE BETWEEN YOUR SITE AND THE LISTED SPECIES OR CRITICAL HABITAT (in miles)**

Also, provide a brief summary of the basis used for determining that your site's discharges and discharge-related activities are not likely to adversely affect listed species or critical habitat: **INSERT TEXT HERE**

For criterion D, E, or F, attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service concluding consultation or coordination activities. **INSERT COPIES OF LETTERS OR OTHER COMMUNICATIONS HERE**

3.2 Historic Preservation

Appendix E (of the CGP), Step 1

Do you plan on installing any of the following stormwater controls at your site? Check all that apply below, and proceed to Appendix E, Step 2.

- ☐ Dike
- ☐ Berm
- ☒ Catch Basin
- ☐ Pond
- ☒ Stormwater Conveyance Channel (e.g., ditch, trench, perimeter drain, swale, etc.)
- ☐ Culvert
- ☒ Other type of ground-disturbing stormwater control: Water Quality Structures, Jellyfish Structure, Outlet Control Structure, Subsurface Infiltration System, Drain Manhole, Trench Drain, etc...

If you will not be installing any ground-disturbing stormwater controls, no further documentation is required for Section 3.2 of the Template.

Appendix E, Step 2

If you answered yes in Step 1, have prior cultural resource surveys or other evaluations determined that historic properties do not exist, or that prior disturbances at the site have precluded the existence of historic properties? ☒ YES ☐ NO

If yes, provide documentation of the basis for your determination. If no, proceed to Appendix E, Step 3.

Appendix E, Step 3

If you are installing any stormwater controls that require subsurface earth disturbance, you must determine if these activities will have an effect on historic properties. This assessment may be based on historical sources, knowledge of the area, an assessment of the types of earth-disturbing activities you are engaging in, considerations of any controls and/or management practices you will adopt to ensure that your stormwater control related earth-disturbing activities will not have an effect on historic properties, and any other relevant factors.

Does your determination demonstrate that earth disturbances related to the installation of your stormwater controls will have no effect on historic properties? ☒ YES ☐ NO

If yes, provide documentation of the basis for your determination. If no, proceed to Appendix E, Step 4.

Appendix E, Step 4

If you are installing any stormwater controls that require subsurface earth disturbance and you have not satisfied the conditions in Steps 1-3, you must contact and consult with the appropriate historic preservation authorities including the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Office (THPO), or other tribal representative (whichever applies). Your request should include the information outlined in Appendix E of the CGP.

Did SHPO, THPO, or another tribal representative respond to you within 15 calendar days after their receipt to indicate whether the subsurface earth disturbances caused by the installation of stormwater controls affect historic properties? ☐ YES ☐ NO

If no, no further documentation is required for Section 3.2 of the Template.

If yes, describe the nature of their response:

- ☐ Written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by agreed upon actions. INSERT COPIES OF LETTERS, EMAILS, OR

OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE

- ☐ No agreement has been reached regarding measures to mitigate effects to historic properties from the installation of stormwater controls. **INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE**
- ☐ Other: **INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE**

If within 15 days of receipt of your request the applicable SHPO, THPO, or other tribal representative responds with a request for additional information or for further consultation, you must comply with this request and proceed to Step 5.

Appendix E, Step 5

If, following your discussions with the appropriate historic preservation authorities in Step 4, the applicable SHPO, THPO, or tribal representative requests additional information or further consultation, you must respond with such information or consult to determine impacts to historic properties that may be caused by the installation of stormwater controls on your site and appropriate measures for treatment or mitigation of such impacts. If as a result of your discussions with the applicable SHPO, THPO, or tribal representative, you enter into, and comply with, a written agreement regarding treatment and/or mitigation of impacts on your site, then you may indicate this on your NOI, and no further screening steps are necessary.

If, however, agreement on an appropriate treatment or mitigation plan cannot be reached between you and the SHPO, THPO, or other tribal representative within 30 days of your response to the SHPO, THPO, or other tribal representative's request for additional information or further consultation, you may submit your NOI, but you must indicate that you have not negotiated measures to avoid or mitigate such effects. You must also include in your SWPPP the following documentation:

1. Copies of any written correspondence between you and the SHPO, THPO, or other tribal representative; and
2. A description of any significant remaining disagreements as to mitigation measures between you and the SHPO, THPO, or other tribal representative.

After submitting your NOI, and during the 14-day waiting period, the SHPO, THPO, ACHP, or other tribal representative may request that EPA place a hold on authorization based upon concerns regarding potential adverse effects to historic properties. EPA, in coordination with the ACHP, will evaluate any such request and notify you if any additional measures to address adverse effects to historic properties are necessary.

3.3 Safe Drinking Water Act Underground Injection Control Requirements

Do you plan to install any of the following controls? Check all that apply below.

- ☐ Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system);

- ☒ Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow; and
- ☐ Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

If one or more of the above apply, then, INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE STATE AGENCY OR EPA REGIONAL OFFICE

SECTION 4: EROSION AND SEDIMENT CONTROLS REQUIREMENTS

Section 4 of this document describes the stormwater controls that will be implemented throughout construction. The operator must install and maintain all stormwater controls in compliance with Parts 2.2 and 2.3 of the CGP. The operator must install stormwater controls by the time construction activity in any given portion of the site begins.

The stormwater controls shall be designed and installed in accordance with good engineering practices and applicable design specifications. Specifications titled "312500- Erosion and Sedimentation Controls," dated - 2/25/2022 and prepared by Nitsch Engineering and details titled "Erosion and Sedimentation Control Details," dated 2/25/2022 and prepared by Nitsch Engineering have been provided to the contractor under separate cover.

4.1 *Natural Buffers or Equivalent Sediment Controls*

Buffer Compliance Alternatives

Are there any surface waters within 50 feet of your project's earth disturbances? ☐ YES ☒ NO

(Note: If no, no further documentation is required for Part 4.1 in the SWPPP Template. Continue to Part 4.2.)

Check the compliance alternative that you have chosen:

- ☐ I will provide and maintain a 50-foot undisturbed natural buffer.
(Note [1]: You must show the 50-foot boundary line of the natural buffer on your site map.)
(Note [2]: You must show on your site map how all discharges from your construction disturbances through the natural buffer area will first be treated by the site's erosion and sediment controls. Also, show on the site map any velocity dissipation devices used to prevent erosion within the natural buffer area.)
- ☐ I will provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by additional erosion and sediment controls, which in combination achieves the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.
(Note [1]: You must show the boundary line of the natural buffer on your site map.)
(Note [2]: You must show on your site map how all discharges from your construction disturbances through the natural buffer area will first be treated by the site's erosion and sediment controls. Also, show on the site map any velocity dissipation devices used to prevent erosion within the natural buffer area.)
- ☐ It is infeasible to provide and maintain an undisturbed natural buffer of any size, therefore I will implement erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.
- ☐ I qualify for one of the exceptions in Appendix G Section G.2.2 of the CGP. (If you have checked this box, provide information on the applicable buffer exception that applies, below.)

Buffer Exceptions

Which of the following exceptions to the buffer requirements applies to your site?

- ☐ Construction is approved under a CWA Section 404 permit. **INSERT DESCRIPTION OF ANY EARTH DISTURBANCES THAT WILL OCCUR WITHIN THE BUFFER AREA**
(Note [1]: If this exception applies, no further documentation is required for Section 4.1 of this Template.)
(Note [2]: This exception only applies to the limits of disturbance authorized under the Section 404 permit, and does not apply to any upland portion of the construction project.)

- ☐ Buffer disturbances will occur for the construction of a water-dependent structure or water access area (e.g., pier, boat ramp, and trail). **INSERT DESCRIPTION OF ANY EARTH DISTURBANCES THAT WILL OCCUR WITHIN THE BUFFER AREA**
(Note [1]: If this exception applies, no further documentation is required for Section 4.1 of the Template.)
- ☐ There is no discharge of stormwater to the waters of the U.S. through the area between the disturbed portions of the site and any waters of the U.S. located within 50 feet of your site.
(Note: If this exception applies, no further documentation is required for this section of the Template.)
- ☐ No natural buffer exists due to preexisting development disturbances that occurred prior to the initiation of planning for this project.
(Note (1): If this exception applies, no further documentation is required for this section of the Template.)
(Note (2): Where some natural buffer exists but portions of the area within 50 feet of the surface water are occupied by preexisting development disturbances, you must still comply with the one of the CGP Part 2.1.2.1.a compliance alternatives.)
- ☐ For a “linear construction site” (defined in Appendix A of the CGP), site constraints (e.g., limited right-of-way) make it infeasible for me to meet any of the CGP Part G.2.1 compliance alternatives. **INCLUDE DOCUMENTATION HERE OF THE FOLLOWING: (1) WHY IT IS INFEASIBLE FOR YOU TO MEET ONE OF THE BUFFER COMPLIANCE ALTERNATIVES, AND (2) BUFFER WIDTH RETAINED AND/OR SUPPLEMENTAL EROSION AND SEDIMENT CONTROLS TO TREAT DISCHARGES TO THE SURFACE WATER**
- ☐ The project qualifies as “small residential lot” construction (defined in Part 2.1.2.1.e.iv and in Appendix A of the CGP).
Insert information regarding how you complied with the “small residential lot” compliance alternative in Part G.3 of Appendix G of the CGP.

4.2 Perimeter Controls

General

The site will be enclosed by a temporary construction fence as shown on the Erosion and Sedimentation Control Plan in Attachment A. Construction gates will be located at the entrance to the site as shown on the Erosion and Sedimentation Control Plan and all entrances will have stabilized construction entrances. All gates and entrances to the site will be secured during non-working hours. The areas of the site that will receive pollutant discharges will be surrounded by a Specific Perimeter Control listed below as shown on the Erosion and Sedimentation Control Plan in Attachment A. Sediment tracked offsite must be removed by the end of the same workday.

Specific Perimeter Controls

Perimeter Control # 1

- BMP Description: Silt Fence.
- Installation Schedule: Prior to the Start of Construction.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25” or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
Remove any sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
- Responsible Staff: Construction Manager and Site Contractor(s).

Perimeter Control # 2

- BMP Description: Silt Fence with Wattles.
- Installation Schedule: Prior to the Start of Construction.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
Remove any sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
- Responsible Staff: Construction Manager and Site Contractor(s).

Perimeter Control # 3

- BMP Description: Wattles.
- Installation Schedule: Prior to the Start of Construction.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
Remove any sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
- Responsible Staff: Construction Manager and Site Contractor(s).

Perimeter Control # 4

- BMP Description: Chain Link Construction Fence
- Installation Schedule: Prior to the Start of Construction and/or immediately after stockpile is established.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Perimeter Control # 5

- BMP Description: Temporary Chain Link Construction Fence with Ballast Base
- Installation Schedule: Prior to the Start of Construction and/or immediately after stockpile is established.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

4.3 Sediment Track-Out

General

Gates will be located as shown on the Erosion and Sedimentation Control Plan in Attachment A to allow for construction vehicle access. Construction access points will have a stabilized construction entrance station or wheel wash station to minimize the track-out of sediment onto off-site streets, other paved areas, and sidewalks from vehicles exiting the construction site. Where sediment has been tracked out from your site onto paved roads, sidewalks, or other paved areas outside of your site, remove the deposited sediment by the end of the same business day in which the track-out occurs or by the end of the next business day if track-out occurs on a non-business day. Remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked out sediment into any stormwater conveyance, storm drain inlet, or water of the U.S.

Specific Track-Out Controls

Track-Out Control # 1

- | | |
|---|--|
| <ul style="list-style-type: none">• BMP Description:• Installation Schedule:• Inspection Schedule:
• Responsible Staff | <p>Street Sweeping.</p> <p>Start of construction.</p> <p>The areas adjacent to the site should be inspected daily to determine if street sweeping is required.</p> <p>Construction Manager and Site Contractor(s).</p> |
|---|--|

Track-Out Control # 2

- | | |
|--|--|
| <ul style="list-style-type: none">• BMP Description:• Installation Schedule:• Inspection Schedule:
• Maintenance:
• Responsible Staff: | <p>Stabilized Construction Entrance.</p> <p>Start of construction.</p> <p>Once every 7 days and within 24 hours of a storm event 0.25" or greater.</p> <p>Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.</p> <p>Construction Manager and Site Contractor(s).</p> |
|--|--|

Track-Out Control # 3

- | | |
|---|--|
| <ul style="list-style-type: none">• BMP Description:• Installation Schedule:• Inspection Schedule:
• Maintenance:

• Responsible Staff: | <p>Wheel Wash Station.</p> <p>Start of construction.</p> <p>Once every 7 days and within 24 hours of a storm event 0.25" or greater.</p> <p>Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP(s).</p> <p>The operator must provide an effective means of minimizing the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of wash waters. The operator must ensure there is no discharge of soaps, solvents, or detergents in equipment and vehicle wash water. For storage of soaps, detergents, or solvents, the operator shall provide either a cover to minimize the exposure of these detergents to precipitation and to stormwater, or a similarly effective means designed to minimize discharge of pollutants from these areas.</p> <p>Construction Manager and Site Contractor.</p> |
|---|--|

4.4 Stockpiled Sediment or Soil

General

All soil stockpiles will be located outside of any natural buffers and away from existing and proposed catch basins and area drains and outside of proposed infiltration system footprints. A sediment barrier shall be installed along all downgradient perimeter areas. Examples of sediment barriers include silt fence, super silt fence, or wattles.

You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance, storm drain inlet, or water of the U.S.

For stockpiles that will be unused for 14 or more days, a cover such as a tarp or blown straw shall be provided or temporary stabilization should be provided (consistent with Part 2.2.14 of the CGP).

Specific Stockpile Controls

Stockpile Control # 1

- BMP Description: Silt Fence.
- Installation Schedule: Immediately after stockpile is established.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP. Remove any sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
- Responsible Staff: Construction Manager and Site Contractor(s).

Stockpile Control # 2

- BMP Description: Wattles.
- Installation Schedule: Immediately after stockpile is established.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP. Remove any sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
- Responsible Staff: Construction Manager and Site Contractor(s).

Stockpile Control # 3

- BMP Description: Wattle for steep slopes.
- Installation Schedule: When stockpile will remain inactive for 14 or more calendar days.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP. Remove any sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
- Responsible Staff: Construction Manager and Site Contractor(s).

4.5 Minimize Dust

General

Disturbed land will be temporarily stabilized as required by the CGP. Dust will be minimized using measures including sprinkling/irrigation, vegetative cover, mulch, and/or stone. Stockpiles will be handled in accordance with section 4.4 of the SWPPP.

Earth-disturbing activities are considered temporarily ceased when work will not resume for a period of 14 or more calendar days. Stabilization shall be initiated when earth-disturbing activities are temporarily or permanently ceased. Stabilization activities shall be complete within **X** calendar days after the initiation of soil stabilization measures.

Specific Dust Controls

Dust Control # 1

- BMP Description: Sprinkling/Irrigation.
- Installation Schedule: As needed throughout earthwork activities as determined by the site contractor and construction manager.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Dust Control # 2

- BMP Description: Straw or Mulch.
- Installation Schedule: As needed throughout earthwork activities as determined by the site contractor and construction manager. When disturbed land will remain inactive for 14 or more calendar days.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

4.6 *Minimize the Disturbance of Steep Slopes*

General

Steep slopes (defined as slopes of 15% or greater in grade) are expected to be disturbed onsite. Disturbances to steep slopes will be minimized by phasing disturbances to those areas and by using stabilization practices designed to be used on steep grades.

Specific Steep Slope Controls

Steep Slope Control # 1

- BMP Description: Straw or Mulch.
- Installation Schedule: When disturbed land will remain inactive for 14 or more calendar days.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Steep Slope Control # 2

- BMP Description: Hydroseeding.
- Installation Schedule: When disturbed land will remain inactive for 14 or more calendar days.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Steep Slope Control # 3

- BMP Description: Soil Stabilization Mats.
- Installation Schedule: When disturbed land will remain inactive for 14 or more calendar days.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Steep Slope Control # 4

- BMP Description: Rip-Rap.
- Installation Schedule: When disturbed land will remain inactive for 14 or more calendar days.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

4.7 Preserve Native Topsoil

Onsite native topsoil shall be preserved, unless infeasible. Preserving native topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed.

Stockpiling topsoil at off-site locations or transferring topsoil to other locations is an example of a way to preserve native topsoil.

The contractor shall perform construction sequencing such that earth materials are exposed for a minimum of time before they are covered, seeded, or otherwise stabilized.

4.8 Minimize Soil Compaction

General

In areas where infiltration practices will be installed or areas of the site where final vegetative stabilization will occur, soil compaction shall be minimized. This includes restricting vehicle access and equipment use.

Areas used for post-construction infiltration shall be constructed after all ground surfaces are fully stabilized when feasible. If proposed infiltration areas are constructed prior to the site being fully stabilized, additional erosion controls shall be installed. All stockpiled and material storage areas shall be located outside of the areas proposed for post-construction infiltration.

Areas of post-construction landscaping shall be constructed after all ground surface are fully stabilized. If proposed landscaped areas are constructed prior to the site being fully stabilized, additional erosion controls shall be installed. All soil stockpiles and material storage areas shall be located outside of the areas proposed for post-construction landscaping where feasible. Where this is not feasible, use techniques that rehabilitate and condition the soils as necessary to support vegetative growth prior to planting.

4.9 Storm Drain Inlets

General

All existing and proposed storm drain inlets affected by construction activities should be protected using an Inlet Sediment Filter as shown on the Erosion and Sedimentation Control Plan provided in Attachment A.

Clean or remove and replace the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.

Specific Storm Drain Inlet Controls

Storm Drain Inlet Control # 1

- BMP Description: Inlet Sediment Filter.
- Installation Schedule: Prior to the Start of Construction.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Storm Drain Inlet Control # 2

- BMP Description: Inlet Protection with Gravel.
- Installation Schedule: Prior to the Start of Construction .
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Storm Drain Inlet Control # 3

- BMP Description: Inlet Protection with Block and Gravel.
- Installation Schedule: Prior to the Start of Construction.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Storm Drain Inlet Control # 4

- BMP Description: Inlet Protection with Siltation Sack
- Installation Schedule: Prior to the Start of Construction.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.

- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

4.10 Minimize Erosion of Stormwater Conveyances

The contractor shall minimize erosion of stormwater conveyance channels and their embankments, outlets, adjacent streambanks, slopes, and downstream waters. The contractor shall install erosion controls and velocity dissipation devices within and along the length of any stormwater conveyance channel and at any outlet to slow down runoff to minimize erosion.

Stormwater Conveyance Control # 1

- BMP Description: Check Dam.
- Installation Schedule: Start of construction of stormwater conveyance channel.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Stormwater Conveyance Control # 2

- BMP Description: Sediment Trap.
- Installation Schedule: Start of construction of stormwater conveyance channel.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Stormwater Conveyance Control # 3

- BMP Description: Rip Rap.
- Installation Schedule: Start of construction of stormwater conveyance channel.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Stormwater Conveyance Control # 4

- BMP Description: Grouted Rip Rap at outlets.
- Installation Schedule: Start of construction of stormwater conveyance channel.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

4.11 Sediment Basins

There are no proposed sediment basins associated with this project.

Or

All sediment basins should be located outside of any waterbody, resource area, and buffer zones. Sediment basins shall be sized to provide storage for either the volume of runoff from a 2-year, 24-hour storm or 3,600 cubic feet per acre drained.

Where feasible, outlet structures that withdraw water from the surface of the sediment basin shall be used. Erosion and velocity dissipation devices shall be installed at inlets and outlets to prevent erosion.

Accumulated sediment shall be removed to maintain at least one-half of the design capacity. The basin shall be maintained so that it remains in effective operating condition.

Sediment Basin Control # 1

- BMP Description: Check Dam.
- Installation Schedule: Start of construction of stormwater conveyance channel.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Sediment Basin Control # 2

- BMP Description: Sediment Trap.
- Installation Schedule: Start of construction of stormwater conveyance channel.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s)

Sediment Basin Control # 3

- BMP Description: Rip Rap.
- Installation Schedule: Start of construction of stormwater conveyance channel.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Sediment Basin Control # 4

- BMP Description: Grouted Rip Rap at outlets.
- Installation Schedule: Start of construction of stormwater conveyance channel.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

4.12 Chemical Treatment

There are no proposed chemical treatments associated with this project.

4.13 Dewatering Practices

Dewatering will occur in a way that minimizes the discharge of pollutants in ground water or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation. Dewatering water shall be treated in compliance with Section 2.4 of the CGP and water with visible floating solids or foam may not be discharged.

Any applicable permits shall be obtained from local permitting authorities.

Dewatering Control # 1

- BMP Description: Sediment basin or Sediment Trap.
- Installation Schedule: Start of construction of stormwater conveyance channel.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Dewatering Control # 2

- BMP Description: Sediment socks.
- Installation Schedule: Start of construction of stormwater conveyance channel.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Dewatering Control # 3

- BMP Description: Dewatering Tanks.
- Installation Schedule: Start of construction of stormwater conveyance channel.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater. and as required by the manufacturer.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

Dewatering Control # 4

- BMP Description: Filtration Systems.
- Installation Schedule: Start of construction of stormwater conveyance channel.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or Greater and as required by the manufacturer.
- Maintenance: Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
- Responsible Staff: Construction Manager and Site Contractor(s).

4.14 Other Stormwater Controls

Any changes in construction activity that include means of stormwater control not included in this document will be identified, the SWPPP will be amended, and the appropriate erosion and sedimentation controls will be implemented.

4.15 Site Stabilization

Initiate the installation of stabilization measures immediately in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days. Complete the installation of stabilization measures as soon as practicable, but no later than **X** calendar days after stabilization has been initiated.

Site Stabilization Practice #1

☐ Vegetative ☒ Non-Vegetative
☒ Temporary ☐ Permanent

- BMP Description: Soil Stabilization Mat.
- Installation Schedule: As/if required.
- Maintenance and Inspection: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Responsible Staff: Construction Manager and Site Contractor(s).

Site Stabilization Practice #2

☒ Vegetative ☐ Non-Vegetative
☒ Temporary ☐ Permanent

- BMP Description: Temporary Seeding.
- Installation Schedule: As/if required.
- Maintenance and Inspection: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Responsible Staff: Construction Manager and Site Contractor(s).

SECTION 5: POLLUTION PREVENTION STANDARDS

5.1 *Potential Sources of Pollution*

Potential sources of sediment to stormwater runoff:

- Stockpiles and construction staging
- Clearing and grubbing operations
- Grading and site excavation
- Topsoil stripping
- Landscape operations
- Soil tracking offsite from construction vehicles
- Runoff from unstabilized areas
- Construction debris

Potential pollutants and sources, other than sediment, to stormwater runoff:

- Combined Staging Area – fueling activities, equipment maintenance, sanitary facilities, and hazardous waste storage
- Materials Storage Area – building materials, solvents, adhesives, paving materials, paints, aggregates, trash, etc.
- Construction Activity-paving, curb installation, concrete pouring, and building construction

Staging areas are shown on the Erosion and Sedimentation Control Plan provided in Attachment A.

Construction Site Pollutants

Pollutant-Generating Activity	Pollutants or Pollutant Constituents (that could be discharged if exposed to stormwater)	Location on Site (or reference SWPPP site map where this is shown)
Pesticides (insecticides, fungicides, herbicides, rodenticides)	Chlorinated hydrocarbons, organophosphates, carbonates, arsenic	Herbicides used for noxious weed control
Fertilizers	Nitrogen, phosphorous	Newly seeded areas
Plaster	Calcium sulphate, calcium carbonate, sulfuric acid	Building construction
Cleaning Solvents	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates	No equipment cleaning allowed in project limits
Asphalt	Oil, petroleum distillates	Streets and parking lots
Concrete	Limestone, sand pH, chromium	Curb and gutter, sidewalk, building construction
Glue, Adhesives	Polymers, epoxies	Building construction
Paints	Metal oxides, Stoddard solvent, talc, calcium carbonate, arsenic	Building construction
Curing compounds	Naphtha	Curb and gutter, building construction
Wood preservatives	Stoddard solvent, petroleum distillates, arsenic, copper, chromium	Timber pads, bracing, building construction
Hydraulic Oils/fluids	Mineral oil	Leaks/broken hoses from equipment
Gasoline	Benzene, ethyl benzene, toluene, xylene, MTBE	Secondary containment/staging area
Diesel Fuel	Petroleum distillate, oil & grease, naphthalene, xylenes	Secondary containment/staging area
Kerosene	Coal oil, petroleum distillates	Secondary containment/staging area
Antifreeze/coolant	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)	Leaks or broken hoses from equipment
Sanitary toilets	Bacteria, parasites, and viruses	Staging area

5.2 *Spill Prevention and Response*

BMP Description: Spill kit, vehicle washing, silt sack catch basin protection, silt fence

Installation Schedule: Start of construction activity

Maintenance and Inspection: Minimum weekly & as necessary

Responsible Staff: Construction Manager and Site Contractor

- Major vehicle maintenance onsite is prohibited
- Re-fueling of vehicles within 25 feet of a drainage structure is prohibited
- Spill kit shall be kept onsite consisting of:
 - Gloves
 - Absorbent mats
 - Drip pan

Spill Prevention and Control Plan

- Refer to contractor's Spill Plan.
- Manufacturers' recommended spill control methods will be posted onsite and site personnel will be made aware of the requirements.
- Cleanup supplies will be kept onsite in a materials storage area. This equipment will include: goggles, brooms, dustpans, mops, rags, gloves, oil absorbent, sawdust, plastic and metal trash cans, and other materials and supplies specifically designated for cleanup.
- All spills will be immediately cleaned up after discovery.
- The spill area will be well ventilated.
- Cleanup personnel will wear suitable protective clothing.
- Spills of toxic and/or hazardous material will be reported to state, local, and Federal authorities, as required by law. Spills shall also be reported immediately to the owner.
- A spill incident report will be filed detailing the amount and extent of the spill, material(s) involved, and effectiveness of the cleanup. This report will be on file at the Construction Manager/Site Contractor office, as well as kept onsite in the field office. A copy shall also be filed with the Hazard Communication Coordinator (HCC).

The Construction Manager/Site Contractor will designate someone onsite that will serve as the Spill Cleanup Coordinator. At least two other personnel will be designated as alternate spill coordinators. All spill control personnel will be trained in spill prevention, control, and cleanup. The names of the responsible personnel will be posted at the jobsite office of the Construction Manager/ Site Contractor.

5.3 *Fueling and Maintenance of Equipment or Vehicles*

General

Minor vehicle and equipment emergency maintenance can be performed onsite away from drainage structures. Major vehicle and equipment maintenance must be performed offsite. Equipment/vehicle storage areas and any onsite fuel tanks will be inspected weekly and after storm events. Equipment and vehicles will be inspected for leaks, equipment damage, and other service problems on each day of use. Any leaks will be repaired immediately or the equipment/vehicle will be removed from the site.

Minor vehicle and equipment emergency maintenance shall occur when a vehicle cannot be safely removed from the site. The vehicle should be repaired so it can be taken off-site so that the rest of the maintenance can occur.

Major vehicle maintenance onsite is prohibited. Re-fueling or maintenance of vehicles within 25 feet of a drainage structure shall be prohibited. Drip pans, drip cloths, or absorbent pads should be used when replacing spent fluids. The fluids should be collect and stored prior to being disposed of offsite.

Specific Pollution Prevention Practice #1

- BMP Description: Spill Kit.
- Installation Schedule: Onsite throughout construction.
- Responsible Staff: Construction Manager and Site Contractor.

Specific Pollution Prevention Practice #1

- BMP Description: Drip Pans, Drip Cloths, Absorbent Pads.
- Installation Schedule: Onsite throughout construction.
- Responsible Staff: Construction Manager and Site Contractor.

5.4 Washing of Equipment and Vehicles

General

Vehicle and equipment washout areas shall be constructed by the contractor so that no untreated water enters the storm drain system. Soaps, detergents, or solvents must be stored in a way to prevent these detergents from coming into contact with rainwater, or a similarly effective means designed to prevent the discharge of pollutants from these areas.

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1

- BMP Description: Designated vehicle/equipment washing areas
- Installation Schedule: Start of construction.
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Responsible Staff: Construction Manager and Site Contractor

Pollution Prevention Practice # 2

- BMP Description: Spill kit, vehicle washing, straw bale catch basin protection, silt fence
- Installation Schedule: Start of construction activity
- Inspection Schedule: Once every 7 days and within 24 hours of a storm event 0.25" or greater.
- Responsible Staff: Construction Manager and Site Contractor

5.5 Storage, Handling, and Disposal of Construction Products, Materials, and Wastes

5.5.1 Building Products

General

The contractor will recycle all construction materials possible. For materials that cannot be recycled, solid waste will be disposed of in accordance with DEP Regulations for Solid Waste Facilities, 310 CMR 10.00.

Any building materials required to be stored onsite will be stored at a combined staging and materials storage area as shown on the CMP. Larger items will be elevated by appropriate methods to minimize contact with runoff. The storage area will be inspected weekly and after storm events. It will be kept clean, organized, and equipped with appropriate cleaning supplies.

Building product usage shall follow the following good housekeeping BMPs:

- The Responsible Staff: Construction Manager or Site Contractor representative will inspect daily for inspection of the work area to ensure proper management of waste materials.
- Store only enough material onsite required for that job as to satisfy current construction needs.
- Store required materials in tightly lidded containers under cover.
- Store materials in original containers with clearly legible labels.
- Separate and store materials apart from each other.
- Do not mix materials unless specifically in accordance with manufacturers' recommendations.
- Use all products from a container before disposing of the container.
- Follow manufacturers' instructions for handling, storage, and disposing of all materials.
- All materials shall be stored in an area to prevent the discharge of pollutants from building products.

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1

- | | |
|--------------------------|--|
| • BMP Description: | Perimeter Protection control around Stockpiles. |
| • Installation Schedule: | Start of construction/ Immediately after stockpile is established. |
| • Inspection Schedule: | Once every 7 days and within 24 hours of a storm event 0.25" or greater. |
| • Maintenance: | Ensure that all stormwater controls remain in effective condition as described in part 2.1.4 of the CGP.
Remove any sediment before it has accumulated to one-half of the above-ground height of any perimeter control. |
| • Responsible Staff: | Construction Manager and Site Contractor(s). |

5.5.2 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials

- In storage areas, provide either (1) cover to minimize the exposure of these chemicals to precipitation and to stormwater or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.
- Comply with all application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer label.

5.5.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals

General

- Only skilled personnel in a designated area will perform fueling of vehicles onsite.
- Vehicles used onsite will be monitored for fuel and oil leaks.
- Vehicles used onsite will be maintained in good working order.
- Asphalt substances will be applied in accordance with manufacturers' recommendations.
- The use of petroleum products as a release agent for asphalt transport trucks is prohibited.
- Vehicle fueling will only be done in vehicle fueling areas located by the contractor. See section 5.3 of the SWPPP.
- The contractor shall be responsible for locating the fuel storage and re-fueling area onsite to minimize disturbance to construction activities and site area.
- Construction equipment not in active use for 5 minutes or more will be turned off.

5.5.4 Hazardous or Toxic Waste

(Note: Examples include paints, solvents, petroleum-based products, wood preservatives, additives, curing compounds, acids.)

General

- Keep products in their original containers.
- Original container labels should be clearly visible.
- Material safety data sheets will be kept onsite and be available.
- Follow all state, local, and Federal regulations regarding the handling, use, storage, and disposal of hazardous material.

Paints:

- All paint containers will be tightly sealed when not in use.
- Remove excess paint in original labeled containers from the jobsite.
- Paint will not be disposed of onsite. Remove excess paint material from the site and legally dispose of.
- Paint shall not be disposed of in the storm drain system.

5.5.5 Construction and Domestic Waste

General

The contractor will manage domestic waste onsite. The contractor will provide waste containers of sufficient size and number to contain construction and domestic wastes. The waste container lids will be kept closed when not in use and lids will be closed at the end of the business day for those containers that are actively used throughout the day. For waste containers that do not have lids, provide either a cover or a similarly effective means designed to minimize discharge of pollutants. Clean up immediately if containers overflow.

Pollution Prevention Practice # 1

- BMP Description: Dumpster.
- Installation Schedule: Start of construction.
- Maintenance and Inspection: Weekly and covered daily.
- Responsible Staff: Construction Manager and Site Contractor(s).

Pollution Prevention Practice # 2

- BMP Description: Litter/debris pick-up.
- Installation Schedule: Start of construction.
- Maintenance and Inspection: Daily.
- Responsible Staff: Construction Manager and Site Contractor(s).

5.5.6 Sanitary Waste

All sanitary waste portable toilets shall be positioned so that they are secure and will not be tipped or knocked over, and located away from any stormwater inlets or conveyances.

Pollution Prevention Practice # 1

- BMP Description: Porta John.
- Installation Schedule: Start of construction.
- Maintenance and Inspection: As manufacturer requires.
- Responsible Staff: Construction Manager and Site Contractor(s).

5.6 Washing of Applicators and Containers used for Paint, Concrete, or Other Materials

General

Washing of applicators and containers used for paint, concrete, or other materials shall follow the following good housekeeping BMPs:

- An effective means of eliminating the discharge of water from the washout and cleanout of stucco, paint, concrete, form release oils, curing compounds, and other construction materials.
- All washwater must be directed into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation.
- Washout and cleanout wastes should be handled as follows:
 - Do not dump liquid wastes into storm sewers.
 - Dispose of liquid wastes in accordance with applicable requirements.
 - Remove and dispose of hardened concrete waste consistent with the handling of other construction wastes.
- Locate any washout or cleanout activities as far away as possible from surface waters and stormwater inlets or conveyances, and to the extent practicable, designate areas to be used for these activities and conduct such activities only in these areas.

Pollution Prevention Practice # 1

- BMP Description: Designated applicator and container washing areas.
- Installation Schedule: Start of construction.
- Maintenance and Inspection: Daily.
- Responsible Staff: Construction Manager and Site Contractor(s).

5.7 Fertilizers

General

If fertilizer is required onsite, installation will follow the following guidelines:

- Fertilizers will be used at the application rates called for in the specifications for the project.
- Once applied, fertilizer will be worked into the soil to minimize wash off from irrigation and stormwater.
- Fertilizer will be stored under cover.
- The contents of partially used fertilizer bags will be transferred to re-sealable, watertight containers clearly labeled with their contents.
- Avoid applying before heavy rains.
- Never apply to frozen ground.
- Never apply to stormwater conveyance channels with flowing water.

SECTION 6: INSPECTION AND CORRECTIVE ACTION

6.1 *Inspection Personnel and Procedures*

Personnel Responsible for Inspections

Construction Manager
Contact Person

Site Contractor
Contact person

(Note: All personnel conducting inspections must be considered a “qualified person.” CGP Part 4.1.1 clarifies that a “qualified person” is a person knowledgeable in the principles and practices of erosion and sediment controls and pollution prevention, who possesses the skills to assess conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.)

Inspection Schedule

Specific Inspection Frequency

The contractor shall inspect and maintain erosion control measures, and remove sediment therefrom, once every 7 days and within 24 hours of a storm event 0.25” or greater.

Rain Gauge Location:

Essex County, Massachusetts, Hydrologic Unit 01090001

Reductions in Inspection Frequency (if applicable):

Inspection frequency may be reduced to twice per month (no more than 14 days apart) for the first month in areas of the site where the stabilization steps outlined in Parts 2.2.14 of the CGP have been completed. After the first month, inspection frequency may be reduced to once per month. If construction activity resumes in this portion of the site at a later date, the inspection frequency immediately increases to that required in Parts 4.2 and 4.3 as applicable. You must document the beginning and ending dates of this period in the SWPPP.

Inspection frequency may be reduced to once per month and within 24 hours of the occurrence of a storm event of 0.25 inches or greater if the project is located in an arid, semi-arid, or drought-stricken area and construction is occurring during the seasonally dry period or a period in which drought is predicted to occur. If this inspection frequency is followed, you must document the beginning and ending dates of this period in the SWPPP.

Inspections can be temporarily suspended under the following conditions:

- Earth-disturbing activity is suspended due to frozen condition;
- Runoff is unlikely due to continuous frozen conditions that are likely to continue at the site for at least three months based on historic seasonal averaged. **If unexpected weather conditions make discharges likely, the operators must immediately resume the regular inspection schedule;**
- Land disturbances have been suspended; and
- All disturbed areas of the site have been stabilized in accordance with Part 2.2.14a of the CGP.

Inspection frequency may be reduced to once per month under the following conditions:

- The operator is still conducting earth disturbing activities under frozen conditions;
- Runoff is unlikely due to continuous frozen conditions that are likely to continue at the site for at least three months based on historic seasonal averages. **If unexpected weather conditions make discharges likely, the operator must immediately resume the regular inspection schedule;** and
- Except for areas in which the operator is conducting earth-disturbing activities, disturbed areas of the site have been stabilized in accordance with Part 2.2.14a of the CGP.

Inspection Report Forms

Copies of inspection reports are in Attachment D.

6.2 Corrective Action

Personnel Responsible for Corrective Actions

Contact Person, Construction Manager Company

Contact Person, Site Contractor

Corrective Action Forms

A copy of the Corrective Action Form is in Attachment E.

6.3 Delegation of Authority

Duly Authorized Representative(s) or Position(s):

Construction Manager Company

Contact Person

Contact Person Title

Street Address

Town/City, State Zip Code

xxx-xxx-xxxx

Email address

SECTION 7: TRAINING LOG

Refer to Attachment I for a Training Log to be completed for each SWPPP training session.

Table 7-1: Documentation for Completion of Training

Name	Date Training Completed

SECTION 8: CERTIFICATION AND NOTIFICATION

Operator – Owner's Representative

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

Operator – Construction Manager

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

SWPPP ATTACHMENTS

Attachment A – Site Maps

Attachment B – 2017 Construction General Permit

Attachment C – NOI and EPA Authorization Email

Attachment D – Inspection Form

Attachment E – Corrective Action Form

Attachment F – SWPPP Amendment Log

Attachment G – Subcontractor Certifications/Agreements

Attachment H – Grading and Stabilization Activities Log

Attachment I – SWPPP Training Log

Attachment J – Delegation of Authority Form

Attachment K – Endangered Species Documentation

Attachment L – Historic Preservation Documentation

Attachment M – Rainfall Gauge

Attachment N – Order of Conditions

Attachment A – Site Maps

Attachment B – 2017 Construction General Permit

**National Pollutant Discharge Elimination System
General Permit for Discharges from
Construction Activities
(as modified)**

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et. seq., (hereafter CWA), as amended by the Water Quality Act of 1987, P.L. 100-4, "operators" of construction activities (defined in Appendix A) that meet the requirements of Part 1.1 of this National Pollutant Discharge Elimination System (NPDES) general permit, are authorized to discharge pollutants in accordance with the effluent limitations and conditions set forth herein. Permit coverage is required from the "commencement of construction activities" (see Appendix A) until one of the conditions for terminating CGP coverage has been met (see Part 8.2).

This permit becomes effective on **June 27, 2019**.

This permit and the authorization to discharge expire at 11:59pm, **February 16, 2022**.

Signed and issued this 14th day of May 2019
Deborah Szaro,
Acting Regional Administrator, EPA Region 1.

Signed and issued this 14th day of May 2019
Charles W. Maguire,
Director, Water Division, EPA Region 6.

Signed and issued this 14th day of May 2019
Jeff Gratz,
Deputy Director, Water Division, EPA Region 2.

Signed and issued this 14th day of May 2019
Jeffery Robichaud,
Director, Water Division, EPA Region 7.

Signed and issued this 14th day of May 2019
Jose C. Font,
Acting Director, Caribbean Environmental
Protection Division, EPA Region 2.

Signed and issued this 14th day of May 2019
Darcy O'Connor,
Director, Water Division, EPA Region 8.

Signed and issued this 14th day of May 2019
Catharine McManus,
Deputy Director, Water Division, EPA Region 3.

Signed and issued this 14th day of May 2019
Tomás Torres,
Director, Water Division, EPA Region 9.

Signed and issued this 14th day of May 2019
Jeaneanne M. Gettle,
Director, Water Division, EPA Region 4.

Signed and issued this 14th day of May 2019
Daniel D. Opalski,
Director, Water Division, EPA Region 10.

Signed and issued this 14th day of May 2019
Joan M. Tanaka,
Acting Director, Water Division, EPA Region 5.

CONTENTS

1	How to Obtain Coverage Under the Construction General Permit (CGP)	1
1.1	Eligibility Conditions	1
1.2	Types of Discharges Authorized	2
1.3	Prohibited Discharges	4
1.4	Submitting your Notice of Intent (NOI)	4
1.5	Requirement to Post a Notice of Your Permit Coverage	6
2	Technology-Based Effluent Limitations	6
2.1	General Stormwater Control Design, Installation, and Maintenance Requirements	7
2.2	Erosion and Sediment Control Requirements	8
2.3	Pollution Prevention Requirements	14
2.4	Construction Dewatering Requirements	18
3	Water Quality-Based Effluent Limitations	18
3.1	General Effluent Limitation to Meet Applicable Water Quality Standards	18
3.2	Discharge Limitations for Sites Discharging to Sensitive Waters	19
4	Site Inspection Requirements	20
4.1	Person(s) Responsible for Inspecting Site	20
4.2	Frequency of Inspections	20
4.3	Increase in Inspection Frequency for Sites Discharging to Sensitive Waters	21
4.4	Reductions in Inspection Frequency	21
4.5	Areas that MUST Be Inspected	22
4.6	Requirements for Inspections	22
4.7	Inspection Report	23
4.8	Inspections By EPA	23
5	Corrective Actions	24
5.1	Conditions Triggering Corrective Action	24
5.2	Corrective Action Deadlines	24
5.3	Corrective Action Required by EPA	25
5.4	Corrective Action Report	25
6	Staff Training Requirements	25
7	Stormwater Pollution Prevention Plan (SWPPP)	26
7.1	General Requirements	26
7.2	SWPPP Contents	26
7.3	On-Site Availability of Your SWPPP	32
7.4	SWPPP Modifications	32

8	How to Terminate Coverage	33
8.1	Minimum Information Required in NOT	33
8.2	Conditions for Terminating CGP Coverage	34
8.3	How to Submit Your NOT	34
8.4	Deadline for Submitting the NOT	34
8.5	Effective Date of Termination of Coverage.....	34
9	Permit Conditions Applicable to Specific States, Indian Country Lands, or Territories.....	35
Appendix A: Definitions and Acronyms		A-1
Appendix B: Permit Areas Eligible for Coverage and EPA Regional Addresses.....		B-1
Appendix C: Small Construction Waivers and Instructions		C-1
Appendix D: Eligibility Procedures Relating to Threatened & Endangered Species Protection. D-1		
Appendix E: Historic Property Screening Process		E-1
Appendix F: List of Tier 3, Tier 2, and Tier 2.5 Waters.....		F-1
Appendix G: Buffer Requirements		G-1
Appendix H: 2-Year, 24-Hour Storm Frequencies		H-1
Appendix I: Standard Permit Conditions.....		I-1
Appendix J: Notice of Intent (NOI) Form and Instructions.....		J-1
Appendix K: Notice of Termination (NOT) Form and Instructions		K-1
Appendix L: Suggested Format for Request for Chemical Treatment		L-1

1 HOW TO OBTAIN COVERAGE UNDER THE CONSTRUCTION GENERAL PERMIT (CGP)

To be covered under this permit, you must meet the eligibility conditions and follow the requirements for obtaining permit coverage in this Part.

1.1 ELIGIBILITY CONDITIONS

1.1.1 You are an “operator” of a construction site for which discharges will be covered under this permit. For the purposes of this permit and in the context of stormwater discharges associated with construction activity, an “operator” is any party associated with a construction project that meets either of the following two criteria:

- a. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
- b. The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

Where there are multiple operators associated with the same project, all operators must obtain permit coverage.¹ Subcontractors generally are not considered operators for the purposes of this permit.

1.1.2 Your site's construction activities:

- a. Will disturb one or more acres of land, or will disturb less than one acre of land but are part of a common plan of development or sale that will ultimately disturb one or more acres of land; or
- b. Have been designated by EPA as needing permit coverage under 40 CFR 122.26(a)(1)(v) or 40 CFR 122.26(b)(15)(ii);

1.1.3 Your site is located in an area where EPA is the permitting authority (see Appendix B);

1.1.4 Discharges from your site are not:

- a. Already covered by a different NPDES permit for the same discharge; or
- b. In the process of having coverage under a different NPDES permit for the same discharge denied, terminated, or revoked.^{2, 3}

1.1.5 You are able to demonstrate that you meet one of the criteria listed in Appendix D with respect to the protection of species that are federally listed as endangered or threatened under the Endangered Species Act (ESA) and federally designated critical habitat;

1.1.6 You have completed the screening process in Appendix E relating to the protection of historic properties; and

¹ If the operator of a “construction support activity” (see Part 1.2.1c) is different than the operator of the main site, that operator must also obtain permit coverage. See Part 7.1 for clarification on the sharing of permit-related functions between and among operators on the same site and for conditions that apply to developing a SWPPP for multiple operators associated with the same site.

² Parts 1.1.4a and 1.1.4b do not include sites currently covered under the 2012 CGP that are in the process of obtaining coverage under this permit, nor sites covered under this permit that are transferring coverage to a different operator.

³ Notwithstanding a site being made ineligible for coverage under this permit because it falls under the description of Parts 1.1.4a or 1.1.4b, above, EPA may waive the applicable eligibility requirement after specific review if it determines that coverage under this permit is appropriate.

- 1.1.7** You have complied with all requirements in Part 9 imposed by the applicable state, Indian tribe, or territory in which your construction activities and/or discharge will occur.
- 1.1.8** For “new sources” (as defined in Appendix A) only:
- a. EPA has not, prior to authorization under this permit, determined that discharges from your site will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. Where such a determination is made prior to authorization, EPA may notify you that an individual permit application is necessary. However, EPA may authorize your coverage under this permit after you have included appropriate controls and implementation procedures designed to bring your discharge into compliance with this permit, specifically the requirement to meet water quality standards. In the absence of information demonstrating otherwise, EPA expects that compliance with the requirements of this permit, including the requirements applicable to such discharges in Part 3, will result in discharges that will not cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard.
 - b. Discharges from your site to a Tier 2, Tier 2.5, or Tier 3 water⁴ will not lower the water quality of the applicable water. In the absence of information demonstrating otherwise, EPA expects that compliance with the requirements of this permit, including the requirements applicable to such discharges in Part 3.2, will result in discharges that will not lower the water quality of such waters.
- 1.1.9** If you plan to add “cationic treatment chemicals” (as defined in Appendix A) to stormwater and/or authorized non-stormwater prior to discharge, you may not submit your Notice of Intent (NOI) unless and until you notify your applicable EPA Regional Office (see Appendix L) in advance and the EPA Regional Office authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to discharges that cause an exceedance of water quality standards.

1.2 TYPES OF DISCHARGES AUTHORIZED⁵

- 1.2.1** The following stormwater discharges are authorized under this permit provided that appropriate stormwater controls are designed, installed, and maintained (see Parts 2 and 3):
- a. Stormwater discharges, including stormwater runoff, snowmelt runoff, and surface runoff and drainage, associated with construction activity under 40 CFR 122.26(b)(14) or 122.26(b)(15)(i);
 - b. Stormwater discharges designated by EPA as needing a permit under 40 CFR 122.26(a)(1)(v) or 122.26(b)(15)(ii);

⁴ Note: Your site will be considered to discharge to a Tier 2, Tier 2.5, or Tier 3 water if the first water to which you discharge is identified by a state, tribe, or EPA as a Tier 2, Tier 2.5, or Tier 3 water. For discharges that enter a storm sewer system prior to discharge, the first water of the U.S. to which you discharge is the waterbody that receives the stormwater discharge from the storm sewer system. See list of Tier 2, Tier 2.5, and Tier 3 waters in Appendix F.

⁵ See “Discharge” as defined in Appendix A. Note: Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA section 402(k) by disclosure to EPA, state, or local authorities after issuance of this permit via any means, including the Notice of Intent (NOI) to be covered by the permit, the SWPPP, or during an inspection.

- c. Stormwater discharges from construction support activities (*e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas*) provided that:
 - i. The support activity is directly related to the construction site required to have permit coverage for stormwater discharges;
 - ii. The support activity is not a commercial operation, nor does it serve multiple unrelated construction sites;
 - iii. The support activity does not continue to operate beyond the completion of the construction activity at the site it supports; and
 - iv. Stormwater controls are implemented in accordance with Part 2 and Part 3 for discharges from the support activity areas.
- d. Stormwater discharges from earth-disturbing activities associated with the construction of staging areas and the construction of access roads conducted prior to active mining.

1.2.2 The following non-stormwater discharges associated with your construction activity are authorized under this permit provided that, with the exception of water used to control dust and to irrigate vegetation in stabilized areas, these discharges are not routed to areas of exposed soil on your site and you comply with any applicable requirements for these discharges in Parts 2 and 3:

- a. Discharges from emergency fire-fighting activities;
- b. Fire hydrant flushings;
- c. Landscape irrigation;
- d. Water used to wash vehicles and equipment, provided that there is no discharge of soaps, solvents, or detergents used for such purposes;
- e. Water used to control dust;
- f. Potable water including uncontaminated water line flushings;
- g. External building washdown, provided soaps, solvents, and detergents are not used, and external surfaces do not contain hazardous substances (as defined in Appendix A) (*e.g., paint or caulk containing polychlorinated biphenyls (PCBs)*);
- h. Pavement wash waters, provided spills or leaks of toxic or hazardous substances have not occurred (unless all spill material has been removed) and where soaps, solvents, and detergents are not used. You are prohibited from directing pavement wash waters directly into any water of the U.S., storm drain inlet, or stormwater conveyance, unless the conveyance is connected to a sediment basin, sediment trap, or similarly effective control;
- i. Uncontaminated air conditioning or compressor condensate;
- j. Uncontaminated, non-turbid discharges of ground water or spring water;
- k. Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated ground water; and
- l. Construction dewatering water discharged in accordance with Part 2.4.

1.2.3 Also authorized under this permit are discharges of stormwater listed above in Part 1.2.1, or authorized non-stormwater discharges listed above in Part 1.2.2, commingled with a

discharge authorized by a different NPDES permit and/or a discharge that does not require NPDES permit authorization.

1.3 PROHIBITED DISCHARGES⁶

- 1.3.1 Wastewater from washout of concrete, unless managed by an appropriate control as described in Part 2.3.4;
- 1.3.2 Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;
- 1.3.3 Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
- 1.3.4 Soaps, solvents, or detergents used in vehicle and equipment washing or external building washdown; and
- 1.3.5 Toxic or hazardous substances from a spill or other release.

To prevent the above-listed prohibited non-stormwater discharges, operators must comply with the applicable pollution prevention requirements in Part 2.3.

1.4 SUBMITTING YOUR NOTICE OF INTENT (NOI)

All “operators” (as defined in Appendix A) associated with your construction site, who meet the Part 1.1 eligibility requirements, and who seek coverage under this permit, must submit to EPA a complete and accurate NOI in accordance with the deadlines in **Table 1** prior to commencing construction activities.

Exception: If you are conducting construction activities in response to a public emergency (*e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services*), and the related work requires immediate authorization to avoid imminent endangerment to human health, public safety, or the environment, or to reestablish essential public services, you may discharge on the condition that a complete and accurate NOI is submitted within 30 calendar days after commencing construction activities (see Table 1) establishing that you are eligible for coverage under this permit. You must also provide documentation in your Stormwater Pollution Prevention Plan (SWPPP) to substantiate the occurrence of the public emergency.

1.4.1 Prerequisite for Submitting Your NOI

You must develop a SWPPP consistent with Part 7 before submitting your NOI for coverage under this permit.

1.4.2 How to Submit Your NOI

You must use EPA's NPDES eReporting Tool (NeT) to electronically prepare and submit your NOI for coverage under the 2017 CGP, unless you received a waiver from your EPA Regional Office.

To access NeT, go to <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting>.

Waivers from electronic reporting may be granted based on one of the following conditions:

⁶ EPA includes these prohibited non-stormwater discharges here as a reminder to the operator that the only non-stormwater discharges authorized by this permit are at Part 1.2.2. Any unauthorized non-stormwater discharges must be covered under an individual permit or alternative general permit.

- a. If your operational headquarters is physically located in a geographic area (*i.e.*, ZIP code or census tract) that is identified as under-served for broadband Internet access in the most recent report from the Federal Communications Commission; or
- b. If you have limitations regarding available computer access or computer capability.

If the EPA Regional Office grants you approval to use a paper NOI, and you elect to use it, you must complete the form in Appendix J.

1.4.3 Deadlines for Submitting Your NOI and Your Official Date of Permit Coverage

Table 1 provides the deadlines for submitting your NOI and the official start date of your permit coverage, which differ depending on when you commence construction activities.

Table 1 NOI Submittal Deadlines and Official Start Date for Permit Coverage.

Type of Operator	NOI Submittal Deadline ⁷	Permit Authorization Date ⁸
Operator of a new site (<i>i.e.</i> , a site where construction activities commence on or after February 16, 2017)	At least 14 calendar days before commencing construction activities.	14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.
Operator of an existing site (<i>i.e.</i> , a site with 2012 CGP coverage where construction activities commenced prior to February 16, 2017)	No later than May 17, 2017 .	
New operator of a permitted site (<i>i.e.</i> , an operator that through transfer of ownership and/or operation replaces the operator of an already permitted construction site that is either a "new site" or an "existing site")	At least 14 calendar days before the date the transfer to the new operator will take place.	
Operator of an "emergency-related project" (<i>i.e.</i> , a project initiated in response to a public emergency (<i>e.g.</i> , mud slides, earthquake, extreme flooding conditions, disruption in essential public services), for which the related work requires immediate authorization to avoid imminent endangerment to human health or the environment, or to reestablish essential public services)	No later than 30 calendar days after commencing construction activities.	You are considered provisionally covered under the terms and conditions of this permit immediately, and fully covered 14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.

1.4.4 Modifying your NOI

⁷ If you miss the deadline to submit your NOI, any and all discharges from your construction activities will continue to be unauthorized under the CWA until they are covered by this or a different NPDES permit. EPA may take enforcement action for any unpermitted discharges that occur between the commencement of construction activities and discharge authorization.

⁸ Discharges are not authorized if your NOI is incomplete or inaccurate or if you are not eligible for permit coverage.

If after submitting your NOI you need to correct or update any fields, you may do so by submitting a "Change NOI" form using NeT. Waivers from electronic reporting may be granted as specified in Part 1.4.1. If the EPA Regional Office has granted you approval to submit a paper NOI modification, you may indicate any NOI changes on the same NOI form in Appendix J.

When there is a change to the site's operator, the new operator must submit a new NOI, and the previous operator must submit a Notice of Termination (NOT) form as specified in Part 8.3.

1.4.5 Your Official End Date of Permit Coverage

Once covered under this permit, your coverage will last until the date that:

- a. You terminate permit coverage consistent with Part 8; or
- b. You receive permit coverage under a different NPDES permit or a reissued or replacement version of this permit after expiring on February 16, 2022; or
- c. You fail to submit an NOI for coverage under a revised or replacement version of this permit before the deadline for existing construction sites where construction activities continue after this permit has expired.

1.5 REQUIREMENT TO POST A NOTICE OF YOUR PERMIT COVERAGE

You must post a sign or other notice of your permit coverage at a safe, publicly accessible location in close proximity to the construction site. The notice must be located so that it is visible from the public road that is nearest to the active part of the construction site, and it must use a font large enough to be readily viewed from a public right-of-way.⁹ At a minimum, the notice must include:

- a. The NPDES ID (*i.e.*, *permit tracking number assigned to your NOI*);
- b. A contact name and phone number for obtaining additional construction site information;
- c. The Uniform Resource Locator (URL) for the SWPPP (if available), or the following statement: "If you would like to obtain a copy of the Stormwater Pollution Prevention Plan (SWPPP) for this site, contact the EPA Regional Office at [*include the appropriate CGP Regional Office contact information found at <https://www.epa.gov/npdes/contact-us-stormwater#regional>*];" and
- d. The following statement "If you observe indicators of stormwater pollutants in the discharge or in the receiving waterbody, contact the EPA through the following website: <https://www.epa.gov/enforcement/report-environmental-violations>."

2 TECHNOLOGY-BASED EFFLUENT LIMITATIONS

You must comply with the following technology-based effluent limitations in this Part for all authorized discharges.¹⁰

⁹ If the active part of the construction site is not visible from a public road, then place the notice of permit coverage in a position that is visible from the nearest public road and as close as possible to the construction site.

¹⁰ For each of the effluent limits in Part 2, as applicable to your site, you must include in your SWPPP (1) a description of the specific control(s) to be implemented to meet the effluent limit; (2) any applicable design specifications; (3) routine maintenance specifications; and (4) the projected schedule for its (their)

2.1 GENERAL STORMWATER CONTROL DESIGN, INSTALLATION, AND MAINTENANCE REQUIREMENTS

You must design, install, and maintain stormwater controls required in Parts 2.2 and 2.3 to minimize the discharge of pollutants in stormwater from construction activities. To meet this requirement, you must:

2.1.1 Account for the following factors in designing your stormwater controls:

- a. The expected amount, frequency, intensity, and duration of precipitation;
- b. The nature of stormwater runoff and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features. You must design stormwater controls to control stormwater volume, velocity, and peak flow rates to minimize discharges of pollutants in stormwater and to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points; and
- c. The soil type and range of soil particle sizes expected to be present on the site.

2.1.2 Design and install all stormwater controls in accordance with good engineering practices, including applicable design specifications.¹¹

2.1.3 Complete installation of stormwater controls by the time each phase of construction activities has begun.

- a. By the time construction activity in any given portion of the site begins, install and make operational any downgradient sediment controls (*e.g., buffers, perimeter controls, exit point controls, storm drain inlet protection*) that control discharges from the initial site clearing, grading, excavating, and other earth-disturbing activities.¹²
- b. Following the installation of these initial controls, install and make operational all stormwater controls needed to control discharges prior to subsequent earth-disturbing activities.

2.1.4 Ensure that all stormwater controls are maintained and remain in effective operating condition during permit coverage and are protected from activities that would reduce their effectiveness.

- a. Comply with any specific maintenance requirements for the stormwater controls listed in this permit, as well as any recommended by the manufacturer.¹³
- b. If at any time you find that a stormwater control needs routine maintenance, you must immediately initiate the needed maintenance work, and complete such work by the close of the next business day.

installation/implementation. See Part 7.2.6.

¹¹ Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practices and must be explained in your SWPPP. You must also comply with any additional design and installation requirements specified for the effluent limits in Parts 2.2 and 2.3.

¹² Note that the requirement to install stormwater controls prior to each phase of construction activities for the site does not apply to the earth disturbance associated with the actual installation of these controls. Operators should take all reasonable actions to minimize the discharges of pollutants during the installation of stormwater controls.

¹³ Any departures from such maintenance recommendations made by the manufacturer must reflect good engineering practices and must be explained in your SWPPP.

- c. If at any time you find that a stormwater control needs repair or replacement, you must comply with the corrective action requirements in Part 5.

2.2 EROSION AND SEDIMENT CONTROL REQUIREMENTS

You must implement erosion and sediment controls in accordance with the following requirements to minimize the discharge of pollutants in stormwater from construction activities.

2.2.1 Provide and maintain natural buffers and/or equivalent erosion and sediment controls when a water of the U.S. is located within 50 feet of the site's earth disturbances.

- a. **Compliance Alternatives.** For any discharges to waters of the U.S. located within 50 feet of your site's earth disturbances, you must comply with one of the following alternatives:
 - i. Provide and maintain a 50-foot undisturbed natural buffer; or
 - ii. Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that achieve, in combination, the sediment load reduction equivalent to a 50-foot undisturbed natural buffer; or
 - iii. If infeasible to provide and maintain an undisturbed natural buffer of any size, implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

See Appendix G, Part G.2 for additional conditions applicable to each compliance alternative.

- b. **Exceptions.** See Appendix G, Part G.2 for exceptions to the compliance alternatives.

2.2.2 Direct stormwater to vegetated areas and maximize stormwater infiltration and filtering to reduce pollutant discharges, unless infeasible.

2.2.3 Install sediment controls along any perimeter areas of the site that will receive pollutant discharges.¹⁴

- a. Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
- b. **Exception.** For areas at "linear construction sites" (as defined in Appendix A) where perimeter controls are infeasible (*e.g., due to a limited or restricted right-of-way*), implement other practices as necessary to minimize pollutant discharges to perimeter areas of the site.

2.2.4 Minimize sediment track-out.

- a. Restrict vehicle use to properly designated exit points;
- b. Use appropriate stabilization techniques¹⁵ at all points that exit onto paved roads.

¹⁴ Examples of perimeter controls include filter berms, silt fences, vegetative strips, and temporary diversion dikes.

¹⁵ Examples of appropriate stabilization techniques include the use of aggregate stone with an underlying geotextile or non-woven filter fabric, and turf mats.

- i. **Exception:** Stabilization is not required for exit points at linear utility construction sites that are used only episodically and for very short durations over the life of the project, provided other exit point controls¹⁶ are implemented to minimize sediment track-out;
- c. Implement additional track-out controls¹⁷ as necessary to ensure that sediment removal occurs prior to vehicle exit; and
- d. Where sediment has been tracked-out from your site onto paved roads, sidewalks, or other paved areas outside of your site, remove the deposited sediment by the end of the same business day in which the track-out occurs or by the end of the next business day if track-out occurs on a non-business day. Remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked-out sediment into any stormwater conveyance, storm drain inlet, or water of the U.S.¹⁸

2.2.5 Manage stockpiles or land clearing debris piles composed, in whole or in part, of sediment and/or soil:

- a. Locate the piles outside of any natural buffers established under Part 2.2.1 and away from any stormwater conveyances, drain inlets, and areas where stormwater flow is concentrated;
- b. Install a sediment barrier along all downgradient perimeter areas;¹⁹
- c. For piles that will be unused for 14 or more days, provide cover²⁰ or appropriate temporary stabilization (consistent with Part 2.2.14);
- d. You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance, storm drain inlet, or water of the U.S.

2.2.6 Minimize dust. On areas of exposed soil, minimize dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged in stormwater from the site.

2.2.7 Minimize steep slope disturbances. Minimize the disturbance of “steep slopes” (as defined in Appendix A).

¹⁶ Examples of other exit point controls include preventing the use of exit points during wet periods; minimizing exit point use by keeping vehicles on site to the extent possible; limiting exit point size to the width needed for vehicle and equipment usage; using scarifying and compaction techniques on the soil; and avoiding establishing exit points in environmentally sensitive areas (e.g., karst areas; steep slopes).

¹⁷ Examples of additional track-out controls include the use of wheel washing, rumble strips, and rattle plates.

¹⁸ Fine grains that remain visible (*i.e., staining*) on the surfaces of off-site streets, other paved areas, and sidewalks after you have implemented sediment removal practices are not a violation of Part 2.2.4.

¹⁹ Examples of sediment barriers include berms, dikes, fiber rolls, silt fences, sandbags, gravel bags, or straw bale.

²⁰ Examples of cover include tarps, blown straw and hydroseeding.

2.2.8 Preserve native topsoil, unless infeasible.²¹

2.2.9 Minimize soil compaction.²² In areas of your site where final vegetative stabilization will occur or where infiltration practices will be installed:

- a. Restrict vehicle and equipment use in these locations to avoid soil compaction; and
- b. Before seeding or planting areas of exposed soil that have been compacted, use techniques that rehabilitate and condition the soils as necessary to support vegetative growth.

2.2.10 Protect storm drain inlets.

- a. Install inlet protection measures that remove sediment from discharges prior to entry into any storm drain inlet that carries stormwater flow from your site to a water of the U.S., provided you have authority to access the storm drain inlet;²³ and
- b. Clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.

2.2.11 Control stormwater discharges, including both peak flowrates and total stormwater volume, to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points.²⁴

2.2.12 If you install a sediment basin or similar impoundment:

- a. Situate the basin or impoundment outside of any water of the U.S. and any natural buffers established under Part 2.2.1;
- b. Design the basin or impoundment to avoid collecting water from wetlands;
- c. Design the basin or impoundment to provide storage for either:
 - i. The calculated volume of runoff from a 2-year, 24-hour storm (see Appendix H); or
 - ii. 3,600 cubic feet per acre drained.

²¹ Stockpiling topsoil at off-site locations, or transferring topsoil to other locations, is an example of a practice that is consistent with the requirements in Part 2.2.8. Preserving native topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed. For example, some sites may be designed to be highly impervious after construction, and therefore little or no vegetation is intended to remain, or may not have space to stockpile native topsoil on site for later use, in which case, it may not be feasible to preserve topsoil.

²² Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted.

²³ Inlet protection measures can be removed in the event of flood conditions or to prevent erosion.

²⁴ Examples of control measures that can be used to comply with this requirement include the use of erosion controls and/or velocity dissipation devices (e.g., check dams, sediment traps), within and along the length of a stormwater conveyance and at the outfall to slow down runoff.

- d. Utilize outlet structures that withdraw water from the surface of the sediment basin or similar impoundment, unless infeasible;²⁵
- e. Use erosion controls and velocity dissipation devices to prevent erosion at inlets and outlets; and
- f. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition.

2.2.13 If using treatment chemicals (e.g., polymers, flocculants, coagulants):

- a. **Use conventional erosion and sediment controls before and after the application of treatment chemicals.** Chemicals may only be applied where treated stormwater is directed to a sediment control (e.g., *sediment basin, perimeter control*) before discharge.
- b. **Select appropriate treatment chemicals.** Chemicals must be appropriately suited to the types of soils likely to be exposed during construction and present in the discharges being treated (i.e., *the expected turbidity, pH, and flow rate of stormwater flowing into the chemical treatment system or area*).
- c. **Minimize discharge risk from stored chemicals.** Store all treatment chemicals in leak-proof containers that are kept under storm-resistant cover and surrounded by secondary containment structures (e.g., *spill berms, decks, spill containment pallets*), or provide equivalent measures designed and maintained to minimize the potential discharge of treatment chemicals in stormwater or by any other means (e.g., *storing chemicals in a covered area, having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill*).
- d. **Comply with state/local requirements.** Comply with applicable state and local requirements regarding the use of treatment chemicals.
- e. **Use chemicals in accordance with good engineering practices and specifications of the chemical provider/supplier.** Use treatment chemicals and chemical treatment systems in accordance with good engineering practices, and with dosing specifications and sediment removal design specifications provided by the provider/supplier of the applicable chemicals, or document in your SWPPP specific departures from these specifications and how they reflect good engineering practice.
- f. **Ensure proper training.** Ensure that all persons who handle and use treatment chemicals at the construction site are provided with appropriate, product-specific training. Among other things, the training must cover proper dosing requirements.
- g. **Perform additional measures specified by the EPA Regional Office for the authorized use of cationic chemicals.** If you have been authorized to use cationic chemicals at your site pursuant to Part 1.1.9, you must perform all additional measures as conditioned by your authorization to ensure that the use of such chemicals will not cause an exceedance of water quality standards.

²⁵ The circumstances in which it is infeasible to design outlet structures in this manner are rare. Exceptions may include areas with extended cold weather, where using surface outlets may not be feasible during certain time periods (although they must be used during other periods). If you determine that it is infeasible to meet this requirement, you must provide documentation in your SWPPP to support your determination, including the specific conditions or time periods when this exception will apply.

2.2.14 Stabilize exposed portions of the site. Implement and maintain stabilization measures (e.g., seeding protected by erosion controls until vegetation is established, sodding, mulching, erosion control blankets, hydromulch, gravel) that minimize erosion from exposed portions of the site in accordance with Parts 2.2.14a and 2.2.14b.

a. Stabilization Deadlines:²⁶

Total Amount of Land Disturbance Occurring At Any One Time ²⁷	Deadline
<p>i. Five acres or less (≤5.0)</p> <p>Note: this includes sites disturbing more than five acres (>5.0) total over the course of a project, but that limit disturbance at any one time (i.e., phase the disturbance) to five acres or less (≤5.0)</p>	<ul style="list-style-type: none"> Initiate the installation of stabilization measures immediately²⁸ in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;²⁹ and Complete the installation of stabilization measures as soon as practicable, but no later than 14 calendar days after stabilization has been initiated.³⁰

²⁶ EPA may determine, based on an inspection carried out under Part 4.8 and corrective actions required under Part 5.3, that the level of sediment discharge on the site makes it necessary to require a faster schedule for completing stabilization. For instance, if sediment discharges from an area of exposed soil that is required to be stabilized are compromising the performance of existing stormwater controls, EPA may require stabilization to correct this problem.

²⁷ Limiting disturbances to five (5) acres or less at any one time means that at no time during the project do the cumulative earth disturbances exceed five (5) acres. The following examples would qualify as limiting disturbances at any one time to five (5) acres or less:

1. The total area of disturbance for a project is five (5) acres or less.
2. The total area of disturbance for a project will exceed five (5) acres, but the operator ensures that no more than five (5) acres will be disturbed at any one time through implementation of stabilization measures. In this way, site stabilization can be used to “free up” land that can be disturbed without exceeding the five (5)-acre cap to qualify for the 14-day stabilization deadline. For instance, if an operator completes stabilization of two (2) acres of land on a five (5)-acre disturbance, then two (2) additional acres could be disturbed while still qualifying for the longer 14-day stabilization deadline.

²⁸ The following are examples of activities that would constitute the immediate initiation of stabilization:

1. Prepping the soil for vegetative or non-vegetative stabilization as long as seeding, planting, and/or installation of non-vegetative stabilization products takes place as soon as practicable, but no later than one (1) calendar day of completing soil preparation;
2. Applying mulch or other non-vegetative product to the exposed area;
3. Seeding or planting the exposed area;
4. Starting any of the activities in # 1 – 3 on a portion of the entire area that will be stabilized; and
5. Finalizing arrangements to have stabilization product fully installed in compliance with the deadlines for completing stabilization.

²⁹ The requirement to initiate stabilization immediately is triggered as soon as you know that construction work on a portion of the site is temporarily ceased and will not resume for 14 or more days, or as soon as you know that construction work is permanently ceased. In the context of this provision, “immediately” means as soon as practicable, but no later than the end of the next business day, following the day when the construction activities have temporarily or permanently ceased.

³⁰ If vegetative stabilization measures are being implemented, stabilization is considered “installed” when all activities necessary to seed or plant the area are completed. If non-vegetative stabilization measures are being implemented, stabilization is considered “installed” when all such measures are implemented or applied.

ii. More than five acres (>5.0)	<ul style="list-style-type: none"> • Initiate the installation of stabilization measures immediately³¹ in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;³² and • Complete the installation of stabilization measures as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated.³³
---	--

iii. **Exceptions:**

(a) Arid, semi-arid, and drought-stricken areas (as defined in Appendix A). If it is the seasonally dry period or a period in which drought is occurring, and vegetative stabilization measures are being used:

- (i) Immediately initiate and, within 14 calendar days of a temporary or permanent cessation of work in any portion of your site, complete the installation of temporary non-vegetative stabilization measures to the extent necessary to prevent erosion;
- (ii) As soon as practicable, given conditions or circumstances on the site, complete all activities necessary to seed or plant the area to be stabilized; and
- (iii) If construction is occurring during the seasonally dry period, indicate in your SWPPP the beginning and ending dates of the seasonally dry period and your site conditions. Also include the schedule you will follow for initiating and completing vegetative stabilization.

(b) Operators that are affected by unforeseen circumstances³⁴ that delay the initiation and/or completion of vegetative stabilization:

- (i) Immediately initiate and, within 14 calendar days, complete the installation of temporary non-vegetative stabilization measures to prevent erosion;
- (ii) Complete all soil conditioning, seeding, watering or irrigation installation, mulching, and other required activities related to the planting and initial establishment of vegetation as soon as conditions or circumstances allow it on your site; and
- (iii) Document in the SWPPP the circumstances that prevent you from meeting the deadlines in Part 2.2.14a and the schedule you will follow for initiating and completing stabilization.

(c) Discharges to a sediment- or nutrient-impaired water or to a water that is identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes. Complete stabilization as soon as

³¹ See footnote 27

³² See footnote 28

³³ See footnote 29

³⁴ Examples include problems with the supply of seed stock or with the availability of specialized equipment and unsuitability of soil conditions due to excessive precipitation and/or flooding.

practicable, but no later than seven (7) calendar days after stabilization has been initiated.

b. **Final Stabilization Criteria** (for any areas not covered by permanent structures):

- i. Establish uniform, perennial vegetation (*i.e., evenly distributed, without large bare areas*) that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas; and/or
- ii. Implement permanent non-vegetative stabilization measures³⁵ to provide effective cover.

iii. **Exceptions:**

- (a) **Arid, semi-arid, and drought-stricken areas** (as defined in Appendix A). Final stabilization is met if the area has been seeded or planted to establish vegetation that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas within three (3) years and, to the extent necessary to prevent erosion on the seeded or planted area, non-vegetative erosion controls have been applied that provide cover for at least three years without active maintenance.
- (b) **Disturbed areas on agricultural land that are restored to their preconstruction agricultural use.** The Part 2.2.14b final stabilization criteria does not apply.
- (c) **Areas that need to remain disturbed.** In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed, and only the minimum area needed remains disturbed (*e.g., dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, materials*).

2.3 POLLUTION PREVENTION REQUIREMENTS³⁶

You must implement pollution prevention controls in accordance with the following requirements to minimize the discharge of pollutants in stormwater and to prevent the discharge of pollutants from spilled or leaked materials from construction activities.

2.3.1 For equipment and vehicle fueling and maintenance:

- a. Provide an effective means of eliminating the discharge of spilled or leaked chemicals, including fuels and oils, from these activities;³⁷

³⁵ Examples of permanent non-vegetative stabilization measures include riprap, gravel, gabions, and geotextiles.

³⁶ Under this permit, you are not required to minimize exposure for any products or materials where the exposure to precipitation and to stormwater will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

³⁷ Examples of effective means include:

- Locating activities away from waters of the U.S. and stormwater inlets or conveyances so that stormwater coming into contact with these activities cannot reach waters of the U.S.;
- Providing secondary containment (*e.g., spill berms, decks, spill containment pallets*) and cover where appropriate; and
- Having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill.

- b. If applicable, comply with the Spill Prevention Control and Countermeasures (SPCC) requirements in 40 CFR part 112 and Section 311 of the CWA;
- c. Ensure adequate supplies are available at all times to handle spills, leaks, and disposal of used liquids;
- d. Use drip pans and absorbents under or around leaky vehicles;
- e. Dispose of or recycle oil and oily wastes in accordance with other federal, state, tribal, or local requirements; and
- f. Clean up spills or contaminated surfaces immediately, using dry clean up measures (do not clean contaminated surfaces by hosing the area down), and eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.

2.3.2 For equipment and vehicle washing:

- a. Provide an effective means of minimizing the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of wash waters;³⁸
- b. Ensure there is no discharge of soaps, solvents, or detergents in equipment and vehicle wash water; and
- c. For storage of soaps, detergents, or solvents, provide either (1) cover (e.g., *plastic sheeting, temporary roofs*) to minimize the exposure of these detergents to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.

2.3.3 For storage, handling, and disposal of building products, materials, and wastes:

- a. *For building materials and building products*³⁹, provide either (1) cover (e.g., *plastic sheeting, temporary roofs*) to minimize the exposure of these products to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.

Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

- b. *For pesticides, herbicides, insecticides, fertilizers, and landscape materials:*
 - i. In storage areas, provide either (1) cover (e.g., *plastic sheeting, temporary roofs*) to minimize the exposure of these chemicals to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas; and
 - ii. Comply with all application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer label (see also Part 2.3.5).
- c. *For diesel fuel, oil, hydraulic fluids, other petroleum products, and other chemicals:*

³⁸ Examples of effective means include locating activities away from waters of the U.S. and stormwater inlets or conveyances and directing wash waters to a sediment basin or sediment trap, using filtration devices, such as filter bags or sand filters, or using other similarly effective controls.

³⁹ Examples of building materials and building products typically present at construction sites include asphalt sealants, copper flashing, roofing materials, adhesives, concrete admixtures, and gravel and mulch stockpiles.

- i. Store chemicals in water-tight containers, and provide either (1) cover (*e.g., plastic sheeting, temporary roofs*) to minimize the exposure of these containers to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas (*e.g., having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill*), or provide secondary containment (*e.g., spill berms, decks, spill containment pallets*); and
 - ii. Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge.
- d. *For hazardous or toxic wastes:*⁴⁰
- i. Separate hazardous or toxic waste from construction and domestic waste;
 - ii. Store waste in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion, and which are labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable federal, state, tribal, or local requirements;
 - iii. Store all outside containers within appropriately-sized secondary containment (*e.g., spill berms, decks, spill containment pallets*) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas (*e.g., storing chemicals in a covered area, having a spill kit available on site*);
 - iv. Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended method of disposal and in compliance with federal, state, tribal, and local requirements;
 - v. Clean up spills immediately, using dry clean-up methods, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge; and
 - vi. Follow all other federal, state, tribal, and local requirements regarding hazardous or toxic waste.
- e. *For construction and domestic wastes:*⁴¹
- i. Provide waste containers (*e.g., dumpster, trash receptacle*) of sufficient size and number to contain construction and domestic wastes;
 - ii. Keep waste container lids closed when not in use and close lids at the end of the business day for those containers that are actively used throughout the day. For waste containers that do not have lids, provide either (1) cover (*e.g., a tarp, plastic sheeting, temporary roof*) to minimize exposure of wastes to precipitation,

⁴⁰ Examples of hazardous or toxic waste that may be present at construction sites include paints, caulks, sealants, fluorescent light ballasts, solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids.

⁴¹ Examples of construction and domestic waste include packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, demolition debris; and other trash or building materials.

or (2) a similarly effective means designed to minimize the discharge of pollutants (e.g., secondary containment);

- iii. On business days, clean up and dispose of waste in designated waste containers; and
- iv. Clean up immediately if containers overflow.
- f. For sanitary waste, position portable toilets so that they are secure and will not be tipped or knocked over, and located away from waters of the U.S. and stormwater inlets or conveyances.

2.3.4 For washing applicators and containers used for stucco, paint, concrete, form release oils, curing compounds, or other materials:

- a. Direct wash water into a leak-proof container or leak-proof and lined pit designed so that no overflows can occur due to inadequate sizing or precipitation;
- b. Handle washout or cleanout wastes as follows:
 - i. Do not dump liquid wastes in storm sewers or waters of the U.S.;
 - ii. Dispose of liquid wastes in accordance with applicable requirements in Part 2.3.3; and
 - iii. Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes in Part 2.3.3; and
- c. Locate any washout or cleanout activities as far away as possible from waters of the U.S. and stormwater inlets or conveyances, and, to the extent feasible, designate areas to be used for these activities and conduct such activities only in these areas.

2.3.5 For the application of fertilizers:

- a. Apply at a rate and in amounts consistent with manufacturer's specifications, or document in the SWPPP departures from the manufacturer specifications where appropriate in accordance with Part 7.2.6.b.ix;
- b. Apply at the appropriate time of year for your location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;
- c. Avoid applying before heavy rains that could cause excess nutrients to be discharged;
- d. Never apply to frozen ground;
- e. Never apply to stormwater conveyance channels; and
- f. Follow all other federal, state, tribal, and local requirements regarding fertilizer application.

2.3.6 Emergency Spill Notification Requirements

Discharges of toxic or hazardous substances from a spill or other release are prohibited, consistent with Part 1.3.5. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR 110, 40 CFR 117, or 40 CFR 302 occurs during a 24-hour period, you must notify the National Response Center (NRC) at (800) 424-8802 or, in the Washington, DC metropolitan area, call (202) 267-2675 in accordance with the requirements of 40 CFR 110, 40 CFR 117, and 40 CFR 302 as soon as you have knowledge of the release. You must also, within seven (7) calendar days of knowledge of the release, provide a

description of the release, the circumstances leading to the release, and the date of the release. State, tribal, or local requirements may necessitate additional reporting of spills or discharges to local emergency response, public health, or drinking water supply agencies.

2.4 CONSTRUCTION DEWATERING REQUIREMENTS

Comply with the following requirements to minimize the discharge of pollutants in ground water or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, in accordance with Part 1.2.2.⁴²

- 2.4.1** Treat dewatering discharges with controls to minimize discharges of pollutants;⁴³
- 2.4.2** Do not discharge visible floating solids or foam;
- 2.4.3** Use an oil-water separator or suitable filtration device (such as a cartridge filter) that is designed to remove oil, grease, or other products if dewatering water is found to contain these materials;
- 2.4.4** To the extent feasible, use vegetated, upland areas of the site to infiltrate dewatering water before discharge. You are prohibited from using waters of the U.S. as part of the treatment area;
- 2.4.5** At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 2.2.11;
- 2.4.6** With backwash water, either haul it away for disposal or return it to the beginning of the treatment process; and
- 2.4.7** Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications.

3 WATER QUALITY-BASED EFFLUENT LIMITATIONS

3.1 GENERAL EFFLUENT LIMITATION TO MEET APPLICABLE WATER QUALITY STANDARDS

Discharges must be controlled as necessary to meet applicable water quality standards. Discharges must also comply with any additional state or tribal requirements that are in Part 9.

In the absence of information demonstrating otherwise, EPA expects that compliance with the conditions in this permit will result in stormwater discharges being controlled as necessary to meet applicable water quality standards. If at any time you become aware, or EPA determines, that discharges are not being controlled as necessary to meet applicable water quality standards, you must take corrective action as required in Parts 5.1 and 5.2, and document the corrective actions as required in Part 5.4.

⁴² Uncontaminated, clear (non-turbid) dewatering water can be discharged without being routed to a control.

⁴³ Appropriate controls include sediment basins or sediment traps, sediment socks, dewatering tanks, tube settlers, weir tanks, filtration systems (e.g., *bag or sand filters*), and passive treatment systems that are designed to remove sediment. Appropriate controls to use downstream of dewatering controls to minimize erosion include vegetated buffers, check dams, riprap, and grouted riprap at outlets.

EPA may insist that you install additional controls (to meet the narrative water quality-based effluent limit above) on a site-specific basis, or require you to obtain coverage under an individual permit, if information in your NOI or from other sources indicates that your discharges are not controlled as necessary to meet applicable water quality standards. This includes situations where additional controls are necessary to comply with a wasteload allocation in an EPA-established or approved TMDL.

If during your coverage under a previous permit, you were required to install and maintain stormwater controls specifically to meet the assumptions and requirements of an EPA-approved or established TMDL (for any parameter) or to otherwise control your discharge to meet water quality standards, you must continue to implement such controls as part of your coverage under this permit.

3.2 DISCHARGE LIMITATIONS FOR SITES DISCHARGING TO SENSITIVE WATERS⁴⁴

For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes, you must comply with the inspection frequency specified in 4.3 and you must comply with the stabilization deadline specified in Part 2.2.14.a.iii.(c).⁴⁵

If you discharge to a water that is impaired for a parameter other than a sediment-related parameter or nutrients, EPA will inform you if any additional controls are necessary for your discharge to be controlled as necessary to meet water quality standards, including for it to be consistent with the assumptions of any available wasteload allocation in any applicable TMDL, or if coverage under an individual permit is necessary.

In addition, on a case-by-case basis, EPA may notify operators of new sites or operators of existing sites with increased discharges that additional analyses, stormwater controls, or other measures are necessary to comply with the applicable

⁴⁴ Sensitive waters include waters that are impaired and Tier 2, Tier 2.5, and Tier 3 waters.

"Impaired waters" are those waters identified by the state, tribe, or EPA as not meeting an applicable water quality standard and (1) requires development of a TMDL (pursuant to section 303(d) of the CWA; or (2) is addressed by an EPA-approved or established TMDL; or (3) is not in either of the above categories but the waterbody is covered by a pollution control program that meets the requirements of 40 CFR 130.7(b)(1). Your construction site will be considered to discharge to an impaired water if the first water of the U.S. to which you discharge is an impaired water for the pollutants contained in the discharge from your site. For discharges that enter a storm sewer system prior to discharge, the first water of the U.S. to which you discharge is the waterbody that receives the stormwater discharge from the storm sewer system. For assistance in determining whether your site discharges to impaired waters, EPA has developed a tool that is available both within the electronic NOI form in NeT, and at <https://water.epa.gov/polwaste/npdes/stormwater/discharge.cfm>.

Tiers 2, 2.5 and 3 refer to waters either identified by the state as high quality waters or Outstanding National Resource Waters under 40 CFR 131.12(a)(2) and (3). For the purposes of this permit, you are considered to discharge to a Tier 2, Tier 2.5, or Tier 3 water if the first water of the U.S. to which you discharge is identified by a state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3. For discharges that enter a storm sewer system prior to discharge, the water of the U.S. to which you discharge is the first water of the U.S. that receives the stormwater discharge from the storm sewer system. See list of Tier 2, Tier 2.5, and Tier 3 waters in Appendix F.

EPA may determine on a case-by-case basis that a site discharges to a sensitive water.

⁴⁵ If you qualify for any of the reduced inspection frequencies in Part 4.4, you may conduct inspections in accordance with Part 4.4 for any portion of your site that discharges to a sensitive water.

antidegradation requirements, or notify you that an individual permit application is necessary.

If you discharge to a water that is impaired for polychlorinated biphenyls (PCBs) and are engaging in demolition of any structure with at least 10,000 square feet of floor space built or renovated before January 1, 1980, you must:

- a. Implement controls⁴⁶ to minimize the exposure of PCB-containing building materials, including paint, caulk, and pre-1980 fluorescent lighting fixtures, to precipitation and to stormwater; and
- b. Ensure that disposal of such materials is performed in compliance with applicable state, federal, and local laws.

4 SITE INSPECTION REQUIREMENTS

4.1 PERSON(S) RESPONSIBLE FOR INSPECTING SITE

The person(s) inspecting your site may be a person on your staff or a third party you hire to conduct such inspections. You are responsible for ensuring that the person who conducts inspections is a "qualified person."⁴⁷

4.2 FREQUENCY OF INSPECTIONS.⁴⁸

At a minimum, you must conduct a site inspection in accordance with one of the two schedules listed below, unless you are subject to the Part 4.3 site inspection frequency for discharges to sensitive waters or qualify for a Part 4.4 reduction in the inspection frequency:

4.2.1 At least once every seven (7) calendar days; or

4.2.2 Once every 14 calendar days *and* within 24 hours of the occurrence of a storm event of 0.25 inches or greater, or the occurrence of runoff from snowmelt sufficient to cause a discharge.⁴⁹ To determine if a storm event of 0.25 inches or greater has occurred on your site, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

⁴⁶ Examples of controls to minimize exposure of PCBs to precipitation and stormwater include separating work areas from non-work areas and selecting appropriate personal protective equipment and tools, constructing a containment area so that all dust or debris generated by the work remains within the protected area, using tools that minimize dust and heat (<212°F). For additional information, refer to Part 2.3.3 of the CGP Fact Sheet.

⁴⁷ A "qualified person" is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

⁴⁸ Inspections are only required during the site's normal working hours.

⁴⁹ "Within 24 hours of the occurrence of a storm event" means that you must conduct an inspection within 24 hours once a storm event has produced 0.25 inches within a 24-hour period, even if the storm event is still continuing. Thus, if you have elected to inspect bi-weekly in accordance with Part 4.2.2 and there is a storm event at your site that continues for multiple days, and each day of the storm produces 0.25 inches or more of rain, you must conduct an inspection within 24 hours of the first day of the storm and within 24 hours after the end of the storm.

4.3 INCREASE IN INSPECTION FREQUENCY FOR SITES DISCHARGING TO SENSITIVE WATERS.

For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes (see Part 3.2), instead of the inspection frequency specified in Part 4.2, you must conduct inspections in accordance with the following inspection frequencies:

Once every seven (7) calendar days *and* within 24 hours of the occurrence of a storm event of 0.25 inches or greater, or the occurrence of runoff from snowmelt sufficient to cause a discharge. To determine if a storm event of 0.25 inches or greater has occurred on your site, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

4.4 REDUCTIONS IN INSPECTION FREQUENCY**4.4.1 Stabilized areas.**

- a. You may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, then once per month in any area of your site where the stabilization steps in 2.2.14a have been completed. If construction activity resumes in this portion of the site at a later date, the inspection frequency immediately increases to that required in Parts 4.2 and 4.3, as applicable. You must document the beginning and ending dates of this period in your SWPPP.
- b. **Exception.** For "linear construction sites" (as defined in Appendix A) where disturbed portions have undergone final stabilization at the same time active construction continues on others, you may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, in any area of your site where the stabilization steps in 2.2.14a have been completed. After the first month, inspect once more within 24 hours of the occurrence of a storm event of 0.25 inches or greater. If there are no issues or evidence of stabilization problems, you may suspend further inspections. If "wash-out" of stabilization materials and/or sediment is observed, following re-stabilization, inspections must resume at the inspection frequency required in Part 4.4.1a. Inspections must continue until final stabilization is visually confirmed following a storm event of 0.25 inches or greater.

4.4.2 Arid, semi-arid, or drought-stricken areas (as defined in Appendix A). If it is the seasonally dry period or a period in which drought is occurring, you may reduce the frequency of inspections to once per month and within 24 hours of the occurrence of a storm event of 0.25 inches or greater. You must document that you are using this reduced schedule and the beginning and ending dates of the seasonally dry period in your SWPPP. To determine if a storm event of 0.25 inches or greater has occurred on your site, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

4.4.3 Frozen conditions:

- a. If you are suspending construction activities due to frozen conditions, you may temporarily suspend inspections on your site until thawing conditions (as defined in Appendix A) begin to occur if:

- i. Runoff is unlikely due to continuous frozen conditions that are likely to continue at your site for at least three (3) months based on historic seasonal averages. If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Parts 4.2 and 4.3, as applicable;
 - ii. Land disturbances have been suspended; and
 - iii. All disturbed areas of the site have been stabilized in accordance with Part 2.2.14a.
- b. If you are still conducting construction activities during frozen conditions, you may reduce your inspection frequency to once per month if:
 - i. Runoff is unlikely due to continuous frozen conditions that are likely to continue at your site for at least three (3) months based on historic seasonal averages. If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Parts 4.2 and 4.3, as applicable; and
 - ii. Except for areas in which you are actively conducting construction activities, disturbed areas of the site have been stabilized in accordance with Part 2.2.14a.

You must document the beginning and ending dates of this period in your SWPPP.

4.5 AREAS THAT MUST BE INSPECTED

During your site inspection, you must at a minimum inspect the following areas of your site:

- 4.5.1** All areas that have been cleared, graded, or excavated and that have not yet completed stabilization consistent with Part 2.2.14a;
- 4.5.2** All stormwater controls (including pollution prevention controls) installed at the site to comply with this permit;⁵⁰
- 4.5.3** Material, waste, borrow, and equipment storage and maintenance areas that are covered by this permit;
- 4.5.4** All areas where stormwater typically flows within the site, including drainageways designed to divert, convey, and/or treat stormwater;
- 4.5.5** All points of discharge from the site; and
- 4.5.6** All locations where stabilization measures have been implemented.

You are not required to inspect areas that, at the time of the inspection, are considered unsafe to your inspection personnel.

4.6 REQUIREMENTS FOR INSPECTIONS

During your site inspection, you must at a minimum:

- 4.6.1** Check whether all stormwater controls (*i.e., erosion and sediment controls and pollution prevention controls*) are properly installed, appear to be operational, and are working as intended to minimize pollutant discharges;

⁵⁰ This includes the requirement to inspect for sediment that has been tracked out from the site onto paved roads, sidewalks, or other paved areas consistent with Part 2.2.4.

- 4.6.2** Check for the presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the site;
- 4.6.3** Identify any locations where new or modified stormwater controls are necessary to meet the requirements of Parts 2 and/or 3;
- 4.6.4** Check for signs of visible erosion and sedimentation (*i.e., sediment deposits*) that have occurred and are attributable to your discharge at points of discharge and, if applicable, the banks of any waters of the U.S. flowing within or immediately adjacent to the site;
- 4.6.5** Identify any incidents of noncompliance observed;
- 4.6.6** If a discharge is occurring during your inspection:
 - a. Identify all discharge points at the site; and
 - b. Observe and document the visual quality of the discharge, and take note of the characteristics of the stormwater discharge, including color; odor; floating, settled, or suspended solids; foam; oil sheen; and other indicators of stormwater pollutants.
- 4.6.7** Based on the results of your inspection, complete any necessary maintenance under Part 2.1.4 and corrective action under Part 5.

4.7 INSPECTION REPORT

- 4.7.1** You must complete an inspection report within 24 hours of completing any site inspection. Each inspection report must include the following:
 - a. The inspection date;
 - b. Names and titles of personnel making the inspection;
 - c. A summary of your inspection findings, covering at a minimum the observations you made in accordance with Part 4.6, including any necessary maintenance or corrective actions;
 - d. If you are inspecting your site at the frequency specified in Part 4.2.2, Part 4.3, or Part 4.4.1b, and you conducted an inspection because of rainfall measuring 0.25 inches or greater, you must include the applicable rain gauge or weather station readings that triggered the inspection; and
 - e. If you determined that it is unsafe to inspect a portion of your site, you must describe the reason you found it to be unsafe and specify the locations to which this condition applies.
- 4.7.2** Each inspection report must be signed in accordance with Appendix I, Part I.11 of this permit.
- 4.7.3** You must keep a copy of all inspection reports at the site or at an easily accessible location, so that it can be made available at the time of an on-site inspection or upon request by EPA.
- 4.7.4** You must retain all inspection reports completed for this Part for at least three (3) years from the date that your permit coverage expires or is terminated.

4.8 INSPECTIONS BY EPA

You must allow EPA, or an authorized representative of EPA, to conduct the following activities at reasonable times. To the extent that you are utilizing shared controls that are

not on site to comply with this permit, you must make arrangements for EPA to have access at all reasonable times to those areas where the shared controls are located.

- 4.8.1** Enter onto all areas of the site, including any construction support activity areas covered by this permit, any off-site areas where shared controls are utilized to comply with this permit, discharge locations, adjoining waterbodies, and locations where records are kept under the conditions of this permit;
- 4.8.2** Access and copy any records that must be kept under the conditions of this permit;
- 4.8.3** Inspect your construction site, including any construction support activity areas covered by this permit (see Part 1.2.1c), any stormwater controls installed and maintained at the site, and any off-site shared controls utilized to comply with this permit; and
- 4.8.4** Sample or monitor for the purpose of ensuring compliance.

5 CORRECTIVE ACTIONS

5.1 CONDITIONS TRIGGERING CORRECTIVE ACTION.

You must take corrective action to address any of the following conditions identified at your site:

- 5.1.1** A stormwater control needs repair or replacement (beyond routine maintenance required under Part 2.1.4); or
- 5.1.2** A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly; or
- 5.1.3** Your discharges are causing an exceedance of applicable water quality standards; or
- 5.1.4** A prohibited discharge has occurred (see Part 1.3).

5.2 CORRECTIVE ACTION DEADLINES

For any corrective action triggering conditions in Part 5.1, you must:

- 5.2.1** Immediately take all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events;
- 5.2.2** When the problem does not require a new or replacement control or significant repair, the corrective action must be completed by the close of the next business day;
- 5.2.3** When the problem requires a new or replacement control or significant repair, install the new or modified control and make it operational, or complete the repair, by no later than seven (7) calendar days from the time of discovery. If it is infeasible to complete the installation or repair within seven (7) calendar days, you must document in your records why it is infeasible to complete the installation or repair within the 7-day timeframe and document your schedule for installing the stormwater control(s) and making it operational as soon as feasible after the 7-day timeframe. Where these actions result in changes to any of the stormwater controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within seven (7) calendar days of completing this work.

5.3 CORRECTIVE ACTION REQUIRED BY EPA

You must comply with any corrective actions required by EPA as a result of permit violations found during an inspection carried out under Part 4.8.

5.4 CORRECTIVE ACTION REPORT

For each corrective action taken in accordance with this Part, you must complete a report in accordance with the following:

- 5.4.1** Within 24 hours of identifying the corrective action condition, document the specific condition and the date and time it was identified.
- 5.4.2** Within 24 hours of completing the corrective action (in accordance with the deadlines in Part 5.2), document the actions taken to address the condition, including whether any SWPPP modifications are required.
- 5.4.3** Each corrective action report must be signed in accordance with Appendix I, Part I.1.1 of this permit.
- 5.4.4** You must keep a copy of all corrective action reports at the site or at an easily accessible location, so that it can be made available at the time of an on-site inspection or upon request by EPA.
- 5.4.5** You must retain all corrective action reports completed for this Part for at least three (3) years from the date that your permit coverage expires or is terminated.

6 STAFF TRAINING REQUIREMENTS

Each operator, or group of multiple operators, must assemble a “stormwater team” to carry out compliance activities associated with the requirements in this permit.

- 6.1** Prior to the commencement of construction activities, you must ensure that the following personnel⁵¹ on the stormwater team understand the requirements of this permit and their specific responsibilities with respect to those requirements:
 - a. Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention controls);
 - b. Personnel responsible for the application and storage of treatment chemicals (if applicable);
 - c. Personnel who are responsible for conducting inspections as required in Part 4.1; and
 - d. Personnel who are responsible for taking corrective actions as required in Part 5.
- 6.2** You are responsible for ensuring that all activities on the site comply with the requirements of this permit. You are not required to provide or document formal training for subcontractors or other outside service providers, but you must ensure that such personnel understand any requirements of this permit that may be affected by the work they are subcontracted to perform.

⁵¹ If the person requiring training is a new employee who starts after you commence construction activities, you must ensure that this person has the proper understanding as required above prior to assuming particular responsibilities related to compliance with this permit.

For emergency-related projects, the requirement to train personnel prior to commencement of construction activities does not apply, however, such personnel must have the required training prior to NOI submission.

- 6.3** At a minimum, members of the stormwater team must be trained to understand the following if related to the scope of their job duties (*e.g., only personnel responsible for conducting inspections need to understand how to conduct inspections*):
- The permit deadlines associated with installation, maintenance, and removal of stormwater controls and with stabilization;
 - The location of all stormwater controls on the site required by this permit and how they are to be maintained;
 - The proper procedures to follow with respect to the permit's pollution prevention requirements; and
 - When and how to conduct inspections, record applicable findings, and take corrective actions.
- 6.4** Each member of the stormwater team must have easy access to an electronic or paper copy of applicable portions of this permit, the most updated copy of your SWPPP, and other relevant documents or information that must be kept with the SWPPP.

7 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

7.1 GENERAL REQUIREMENTS

All operators associated with a construction site under this permit must develop a SWPPP consistent with the requirements in Part 7 prior to their submittal of the NOI.^{52, 53} The SWPPP must be kept up-to-date throughout coverage under this permit.

If a SWPPP was prepared under a previous version of this permit, the operator must review and update the SWPPP to ensure that this permit's requirements are addressed prior to submitting an NOI for coverage under this permit.

7.2 SWPPP CONTENTS

At a minimum, the SWPPP must include the information specified in this Part and as specified in other parts of this permit.

- 7.2.1 All Site Operators.** Include a list of all other operators who will be engaged in construction activities at the site, and the areas of the site over which each operator has control.
- 7.2.2 Stormwater Team.** Identify the personnel (by name or position) that are part of the stormwater team, as well as their individual responsibilities, including which members are responsible for conducting inspections.

⁵² The SWPPP does not establish the effluent limits and other permit terms and conditions that apply to your site's discharges; these limits, terms, and conditions are established in this permit.

Where there are multiple operators associated with the same site, they may develop a group SWPPP instead of multiple individual SWPPPs. Regardless of whether there is a group SWPPP or multiple individual SWPPPs, each operator is responsible for compliance with the permit's terms and conditions. In other words, if Operator A relies on Operator B to satisfy its permit obligations, Operator A does not have to duplicate those permit-related functions if Operator B is implementing them for both operators to be in compliance with the permit. However, Operator A remains responsible for permit compliance if Operator B fails to implement any measures necessary for Operator A to comply with the permit. In addition, all operators must ensure, either directly or through coordination with other operators, that their activities do not compromise any other operators' controls and/or any shared controls.

7.2.3 Nature of Construction Activities.⁵⁴ Include the following:

- a. A description of the nature of your construction activities, including the age or dates of past renovations for structures that are undergoing demolition;
- b. The size of the property (in acres or length in miles if a linear construction site);
- c. The total area expected to be disturbed by the construction activities (to the nearest quarter acre or nearest quarter mile if a linear construction site);
- d. A description of any on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1 c);
- e. The maximum area expected to be disturbed at any one time, including on-site and off-site construction support activity areas;
- f. A description and projected schedule for the following:
 - i. Commencement of construction activities in each portion of the site, including clearing and grubbing, mass grading, demolition activities, site preparation (*i.e.*, *excavating, cutting and filling*), final grading, and creation of soil and vegetation stockpiles requiring stabilization;
 - ii. Temporary or permanent cessation of construction activities in each portion of the site;
 - iii. Temporary or final stabilization of exposed areas for each portion of the site; and
 - iv. Removal of temporary stormwater controls and construction equipment or vehicles, and the cessation of construction-related pollutant-generating activities.
- g. A list and description of all pollutant-generating activities⁵⁵ on the site. For each pollutant-generating activity, include an inventory of pollutants or pollutant constituents (*e.g.*, *sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels*) associated with that activity, which could be discharged in stormwater from your construction site. You must take into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed or removed during construction;
- h. Business days and hours for the project;
- i. If you are conducting construction activities in response to a public emergency (see Part 1.4), a description of the cause of the public emergency (*e.g.*, *mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services*), information substantiating its occurrence (*e.g.*, *state disaster declaration or similar state or local declaration*), and a description of the construction necessary to reestablish affected public services.

7.2.4 Site Map. Include a legible map, or series of maps, showing the following features of the site:

- a. Boundaries of the property;

⁵⁴ If plans change due to unforeseen circumstances or for other reasons, the requirement to describe the sequence and estimated dates of construction activities is not meant to “lock in” the operator to meeting these dates. When departures from initial projections are necessary, this should be documented in the SWPPP itself, or in associated records, as appropriate.

⁵⁵ Examples of pollutant-generating activities include paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations.

- b. Locations where construction activities will occur, including:
 - i. Locations where earth-disturbing activities will occur (note any phasing), including any demolition activities;
 - ii. Approximate slopes before and after major grading activities (note any steep slopes (as defined in Appendix A));
 - iii. Locations where sediment, soil, or other construction materials will be stockpiled;
 - iv. Any water of the U.S. crossings;
 - v. Designated points where vehicles will exit onto paved roads;
 - vi. Locations of structures and other impervious surfaces upon completion of construction; and
 - vii. Locations of on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1c).
- c. Locations of all waters of the U.S. within and one mile downstream of the site's discharge point. Also identify if any are listed as impaired, or are identified as a Tier 2, Tier 2.5, or Tier 3 water;
- d. Areas of federally listed critical habitat within the site and/or at discharge locations;
- e. Type and extent of pre-construction cover on the site (e.g., vegetative cover, forest, pasture, pavement, structures);
- f. Drainage patterns of stormwater and authorized non-stormwater before and after major grading activities;
- g. Stormwater and authorized non-stormwater discharge locations, including:
 - i. Locations where stormwater and/or authorized non-stormwater will be discharged to storm drain inlets;⁵⁶ and
 - ii. Locations where stormwater or authorized non-stormwater will be discharged directly to waters of the U.S.
- h. Locations of all potential pollutant-generating activities identified in Part 7.2.3g;
- i. Locations of stormwater controls, including natural buffer areas and any shared controls utilized to comply with this permit; and
- j. Locations where polymers, flocculants, or other treatment chemicals will be used and stored.

7.2.5 Non-Stormwater Discharges. Identify all authorized non-stormwater discharges in Part 1.2.2 that will or may occur.

7.2.6 Description of Stormwater Controls.

- a. For each of the Part 2.2 erosion and sediment control effluent limits, Part 2.3 pollution prevention effluent limits, and Part 2.4 construction dewatering effluent limits, as applicable to your site, you must include the following:
 - i. A description of the specific control(s) to be implemented to meet the effluent limit;

⁵⁶ The requirement to show storm drain inlets in the immediate vicinity of the site on your site map only applies to those inlets that are easily identifiable from your site or from a publicly accessible area immediately adjacent to your site.

- ii. Any applicable stormwater control design specifications (including references to any manufacturer specifications and/or erosion and sediment control manuals/ordinances relied upon);⁵⁷
 - iii. Routine stormwater control maintenance specifications; and
 - iv. The projected schedule for stormwater control installation/implementation.
- b. You must also include any of the following additional information as applicable.
- i. **Natural buffers and/or equivalent sediment controls** (see Part 2.2.1 and Appendix G). You must include the following:
 - (a) The compliance alternative to be implemented;
 - (b) If complying with alternative 2, the width of natural buffer retained;
 - (c) If complying with alternative 2 or 3, the erosion and sediment control(s) you will use to achieve an equivalent sediment reduction, and any information you relied upon to demonstrate the equivalency;
 - (d) If complying with alternative 3, a description of why it is infeasible for you to provide and maintain an undisturbed natural buffer of any size;
 - (e) For "linear construction sites" where it is infeasible to implement compliance alternative 1, 2, or 3, a rationale for this determination, and a description of any buffer width retained and/or supplemental erosion and sediment controls installed; and
 - (f) A description of any disturbances that are exempt under Part 2.2.1 that occur within 50 feet of a water of the U.S.
 - ii. **Perimeter controls for a "linear construction site"** (see Part 2.2.3). For areas where perimeter controls are not feasible, include documentation to support this determination and a description of the other practices that will be implemented to minimize discharges of pollutants in stormwater associated with construction activities.

Note: Routine maintenance specifications for perimeter controls documented in the SWPPP must include the Part 2.2.3a requirement that sediment be removed before it has accumulated to one-half of the above-ground height of any perimeter control.
 - iii. **Sediment track-out controls** (see Parts 2.2.4b and 2.2.4c). Document the specific stabilization techniques and/or controls that will be implemented to remove sediment prior to vehicle exit.
 - iv. **Sediment basins** (see Part 2.2.12). In circumstances where it is infeasible to utilize outlet structures that withdraw water from the surface, include documentation to support this determination, including the specific conditions or time periods when this exception will apply.
 - v. **Treatment chemicals** (see Part 2.2.13), you must include the following:
 - (a) A listing of the soil types that are expected to be exposed during construction in areas of the project that will drain to chemical treatment systems. Also include a listing of soil types expected to be found in fill material to be used in these same areas, to the extent you have this information prior to construction;

⁵⁷ Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practice and must be explained in the SWPPP.

- (b) A listing of all treatment chemicals to be used at the site and why the selection of these chemicals is suited to the soil characteristics of your site;
 - (c) If the applicable EPA Regional Office authorized you to use cationic treatment chemicals for sediment control, include the specific controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to an exceedance of water quality standards;
 - (d) The dosage of all treatment chemicals to be used at the site or the methodology to be used to determine dosage;
 - (e) Information from any applicable Safety Data Sheet (SDS);
 - (f) Schematic drawings of any chemically enhanced stormwater controls or chemical treatment systems to be used for application of the treatment chemicals;
 - (g) A description of how chemicals will be stored consistent with Part 2.2.13c;
 - (h) References to applicable state or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems; and
 - (i) A description of the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to use of the treatment chemicals at your site.
- vi. **Stabilization measures** (see Part 2.2.14). You must include the following:
- (a) The specific vegetative and/or non-vegetative practices that will be used;
 - (b) The stabilization deadline that will be met in accordance with Part 2.2.14.a.i-ii;
 - (c) If complying with the deadlines for sites in arid, semi-arid, or drought-stricken areas, the beginning and ending dates of the seasonally dry period and the schedule you will follow for initiating and completing vegetative stabilization; and
 - (d) If complying with deadlines for sites affected by unforeseen circumstances that delay the initiation and/or completion of vegetative stabilization, document the circumstances and the schedule for initiating and completing stabilization.
- vii. **Spill prevention and response procedures** (see Part 1.3.5 and Part 2.3). You must include the following:
- (a) Procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases. Identify the name or position of the employee(s) responsible for detection and response of spills or leaks; and
 - (b) Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity consistent with Part 2.3.6 and established under either 40 CFR 110, 40 CFR 117, or 40 CFR 302, occurs during a 24-hour period. Contact information must be in locations that are readily accessible and available to all employees.

You may also reference the existence of Spill Prevention Control and

Countermeasure (SPCC) plans developed for the construction activity under Part 311 of the CWA, or spill control programs otherwise required by an NPDES permit for the construction activity, provided that you keep a copy of that other plan on site.⁵⁸

- viii. **Waste management procedures** (see Part 2.3.3). Describe the procedures you will follow for handling, storing and disposing of all wastes generated at your site consistent with all applicable federal, state, tribal, and local requirements, including clearing and demolition debris, sediment removed from the site, construction and domestic waste, hazardous or toxic waste, and sanitary waste.
- ix. **Application of fertilizers** (see Part 2.3.5). Document any departures from the manufacturer specifications where appropriate.

7.2.7 Procedures for Inspection, Maintenance, and Corrective Action. Describe the procedures you will follow for maintaining your stormwater controls, conducting site inspections, and, where necessary, taking corrective actions, in accordance with Part 2.1.4, Part 4, and Part 5 of this permit. Also include:

- a. The inspection schedule you will follow, which is based on whether your site is subject to Part 4.2 or Part 4.3, or whether your site qualifies for any of the reduced inspection frequencies in Part 4.4;
- b. If you will be conducting inspections in accordance with the inspection schedule in Part 4.2.2, Part 4.3, or Part 4.4.1b, the location of the rain gauge or the address of the weather station you will be using to obtain rainfall data;
- c. If you will be reducing your inspection frequency in accordance with Part 4.4.1b, the beginning and ending dates of the seasonally defined arid period for your area or the valid period of drought;
- d. If you will be reducing your inspection frequency in accordance with Part 4.4.3, the beginning and ending dates of frozen conditions on your site; and
- e. Any maintenance or inspection checklists or other forms that will be used.

7.2.8 Staff Training. Include documentation that the required personnel were, or will be, trained in accordance with Part 6.

7.2.9 Compliance with Other Requirements.

- a. **Threatened and Endangered Species Protection.** Include documentation required in Appendix D supporting your eligibility with regard to the protection of threatened and endangered species and designated critical habitat.
- b. **Historic Properties.** Include documentation required in Appendix E supporting your eligibility with regard to the protection of historic properties.
- c. **Safe Drinking Water Act Underground Injection Control (UIC) Requirements for Certain Subsurface Stormwater Controls.** If you are using any of the following stormwater controls at your site, document any contact you have had with the applicable state agency⁵⁹ or EPA Regional Office responsible for implementing the requirements for underground injection wells in the Safe Drinking Water Act and EPA's implementing

⁵⁸ Even if you already have an SPCC or other spill prevention plan in existence, your plans will only be considered adequate if they meet all of the requirements of this Part, either as part of your existing plan or supplemented as part of the SWPPP.

⁵⁹ For state UIC program contacts, refer to the following EPA website: <https://www.epa.gov/uic>.

regulations at 40 CFR 144 -147. Such controls would generally be considered Class V UIC wells:

- i. Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system);
- ii. Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow; and
- iii. Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system).

7.2.10 SWPPP Certification. You must sign and date your SWPPP in accordance with Appendix I, Part I.11.

7.2.11 Post-Authorization Additions to the SWPPP. Once you are authorized for coverage under this permit, you must include the following documents as part of your SWPPP:

- a. A copy of your NOI submitted to EPA along with any correspondence exchanged between you and EPA related to coverage under this permit;
- b. A copy of the acknowledgment letter you receive from NeT assigning your NPDES ID (*i.e.*, *permit tracking number*);
- c. A copy of this permit (an electronic copy easily available to the stormwater team is also acceptable).

7.3 ON-SITE AVAILABILITY OF YOUR SWPPP

You must keep a current copy of your SWPPP at the site or at an easily accessible location so that it can be made available at the time of an on-site inspection or upon request by EPA; a state, tribal, or local agency approving stormwater management plans; the operator of a storm sewer system receiving discharges from the site; or representatives of the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS).

EPA may provide access to portions of your SWPPP to a member of the public upon request. Confidential Business Information (CBI) will be withheld from the public, but may not be withheld from EPA, USFWS, or NMFS.⁶⁰

If an on-site location is unavailable to keep the SWPPP when no personnel are present, notice of the plan's location must be posted near the main entrance of your construction site.

7.4 SWPPP MODIFICATIONS

⁶⁰ Information covered by a claim of confidentiality will be disclosed by EPA only to the extent of, and by means of, the procedures set forth in 40 CFR Part 2, Subpart B. In general, submitted information protected by a business confidentiality claim may be disclosed to other employees, officers, or authorized representatives of the United States concerned with implementing the CWA. The authorized representatives, including employees of other executive branch agencies, may review CBI during the course of reviewing draft regulations.

- 7.4.1** You must modify your SWPPP, including the site map(s), within seven (7) days of any of the following conditions:
- a. Whenever new operators become active in construction activities on your site, or you make changes to your construction plans, stormwater controls, or other activities at your site that are no longer accurately reflected in your SWPPP. This includes changes made in response to corrective actions triggered under Part 5. You do not need to modify your SWPPP if the estimated dates in Part 7.2.3f change during the course of construction;
 - b. To reflect areas on your site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;
 - c. If inspections or investigations by EPA or its authorized representatives determine that SWPPP modifications are necessary for compliance with this permit;
 - d. Where EPA determines it is necessary to install and/or implement additional controls at your site in order to meet the requirements of this permit, the following must be included in your SWPPP:
 - i. A copy of any correspondence describing such measures and requirements; and
 - ii. A description of the controls that will be used to meet such requirements.
 - e. To reflect any revisions to applicable federal, state, tribal, or local requirements that affect the stormwater controls implemented at the site; and
 - f. If applicable, if a change in chemical treatment systems or chemically enhanced stormwater control is made, including use of a different treatment chemical, different dosage rate, or different area of application.
- 7.4.2** You must maintain records showing the dates of all SWPPP modifications. The records must include the name of the person authorizing each change (see Part 7.2.10 above) and a brief summary of all changes.
- 7.4.3** All modifications made to the SWPPP consistent with Part 7.4 must be authorized by a person identified in Appendix I, Part I.11.b.
- 7.4.4** Upon determining that a modification to your SWPPP is required, if there are multiple operators covered under this permit, you must immediately notify any operators who may be impacted by the change to the SWPPP.

8 HOW TO TERMINATE COVERAGE

Until you terminate coverage under this permit, you must comply with all conditions and effluent limitations in the permit. To terminate permit coverage, you must submit to EPA a complete and accurate Notice of Termination (NOT), which certifies that you have met the requirements for terminating in Part 8.

8.1 MINIMUM INFORMATION REQUIRED IN NOT

- 8.1.1** NPDES ID (*i.e.*, *permit tracking number*) provided by EPA when you received coverage under this permit;
- 8.1.2** Basis for submission of the NOT (see Part 8.2);
- 8.1.3** Operator contact information;
- 8.1.4** Name of site and address (or a description of location if no street address is available); and

8.1.5 NOT certification.

8.2 CONDITIONS FOR TERMINATING CGP COVERAGE

You must terminate CGP coverage only if one or more of the following conditions has occurred:

8.2.1 You have completed all construction activities at your site and, if applicable, construction support activities covered by this permit (see Part 1.2.1c), and you have met the following requirements:

- a. For any areas that (1) were disturbed during construction, (2) are not covered over by permanent structures, and (3) over which you had control during the construction activities, you have met the requirements for final vegetative or non-vegetative stabilization in Part 2.2.14b;
- b. You have removed and properly disposed of all construction materials, waste and waste handling devices, and have removed all equipment and vehicles that were used during construction, unless intended for long-term use following your termination of permit coverage;
- c. You have removed all stormwater controls that were installed and maintained during construction, except those that are intended for long-term use following your termination of permit coverage or those that are biodegradable; and
- d. You have removed all potential pollutants and pollutant-generating activities associated with construction, unless needed for long-term use following your termination of permit coverage; or

8.2.2 You have transferred control of all areas of the site for which you are responsible under this permit to another operator, and that operator has submitted an NOI and obtained coverage under this permit; or

8.2.3 Coverage under an individual or alternative general NPDES permit has been obtained.

8.3 HOW TO SUBMIT YOUR NOT

You must use EPA's NPDES eReporting Tool (NeT) to electronically prepare and submit your NOT for the 2017 CGP.

To access NeT, go to <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting>.

Waivers from electronic reporting may be granted as specified in Part 1.4.1. If the EPA Regional Office grants you approval to use a paper NOT, and you elect to use it, you must complete the form in Appendix K.

8.4 DEADLINE FOR SUBMITTING THE NOT

You must submit your NOT within 30 calendar days after any one of the conditions in Part 8.2 occurs.

8.5 EFFECTIVE DATE OF TERMINATION OF COVERAGE

Your authorization to discharge under this permit terminates at midnight of the calendar day that a complete NOT is submitted to EPA.

9 PERMIT CONDITIONS APPLICABLE TO SPECIFIC STATES, INDIAN COUNTRY LANDS, OR TERRITORIES

The provisions in this Part provide modifications or additions to the applicable conditions of this permit to reflect specific additional conditions required as part of the state or tribal CWA Section 401 certification process, or the Coastal Zone Management Act (CZMA) certification process, or as otherwise established by the permitting authority. The specific additional revisions and requirements only apply to activities in those specific states, Indian country, and areas in certain states subject to construction projects by Federal Operators. States, Indian country, and areas subject to construction by Federal Operators not included in this Part do not have any modifications or additions to the applicable conditions of this permit.

9.1 EPA Region 1

9.1.1 NHR100000 State of New Hampshire

- a. If you disturb 100,000 square feet or more of contiguous area, you must also apply for an Alteration of Terrain (AoT) permit from DES pursuant to RSA 485- A:17 and Env-Wq 1500. This requirement also applies to a lower disturbance threshold of 50,000 square feet or more when construction occurs within the protected shoreline under the Shoreland Water Quality Protection Act (see RSA 483-B and Env-Wq 1400). A permit application must also be filed if your project disturbs an area of greater than 2,500 square feet, is within 50 feet of any surface water, and has a flow path of 50 feet or longer disturbing a grade of 25 percent or greater. Project sites with disturbances smaller than those discussed above, that have the potential to adversely affect state surface waters, are subject to the conditions of an AoT General Permit by Rule.
- b. You must determine that any excavation dewatering discharges are not contaminated before they will be authorized as an allowable non-stormwater discharge under this permit (see Part 1.2.2). The water is considered uncontaminated if there is no groundwater contamination within 1,000 feet of the groundwater dewatering location. Information on groundwater contamination can be generated over the Internet via the NHDES web site <http://des.nh.gov/> by using the One Stop Data Mapper at <http://des.nh.gov/onestop/gis.htm>. If it is determined that the groundwater to be dewatered is near a remediation or other waste site you must apply for the Remediation General Permit (see <https://www3.epa.gov/region1/npdes/rqp.html>.)
- c. You must treat any uncontaminated excavation dewatering discharges as necessary to remove suspended solids and turbidity. The discharges must be sampled at least once per week during weeks when discharges occur. Samples must be analyzed for total suspended solids (TSS) or turbidity and must meet monthly average and daily maximum limits of 50 milligrams per liter (mg/L) and 100 mg/L, respectively for TSS or 33 mg/l and 67 mg/l, respectively for turbidity. TSS (a.k.a. Residue, Nonfilterable) or turbidity sampling and analysis must be performed in accordance with Tables IB and II in 40 CFR 136.3 (http://www.ecfr.gov/cgi-bin/text-idx?SID=0243e3c4283cbd7d8257eb6afc7ce9a2&mc=true&node=se40.25.136_13&rgn=div8). Records of any sampling and analysis must be maintained and kept with the SWPPP for at least three years after final site stabilization.
- d. Construction site owners and operators must consider opportunities for post-construction groundwater recharge using infiltration best management practices

(BMPs) during site design and preparation of the SWPPP. If your construction site is in a town that is required to obtain coverage under the NPDES General Permit for discharges from Municipal Separate Storm Sewer Systems (MS4) you may be required to use such practices. The SWPPP must include a description of any on-site infiltration that will be installed as a post-construction stormwater management measure or reasons for not employing such measures such as 1) The facility is located in a wellhead protection area as defined in RSA 485- C:2; or 2) The facility is located in an area where groundwater has been reclassified to GAA, GAI or GA2 pursuant to RSA 485-C and Env-DW 901; or 3) Any areas that would be exempt from the groundwater recharge requirements contained in Env-Wq 1507.04, including all land uses or activities considered to be a "High-load Area" (see Env-Wq 1502.30). For design considerations for infiltration measures see Env-Wq 1508.06.

- e. Appendix F contains a list of Tier 2, or high quality waters. Although there is no official list of tier 2 waters, it can be assumed that all NH surface waters are tier 2 for turbidity unless 1) the surface water that you are proposing to discharge into is listed as impaired for turbidity in the states listing of impaired waters (see Surface Water Quality - Watershed Report Cards at http://des.nh.gov/organization/divisions/water/wmb/swqa/report_cards.htm) or 2) sampling upstream of the proposed discharge location shows turbidity values greater than 10 NTU. A single grab sample collected during dry weather (no precipitation within 48 hours) is acceptable.
- f. To ensure compliance with RSA 485-C, RSA 485-A, RSA 485-A:13, I(a), Env-Wq 1700 and Env-Wq 302, the following information may be requested by NHDES. This information must be kept on site unless you receive a written request from NHDES that it be sent to the address shown in Part 9.1.4 (g).
 - i. A site map required in Part 7.2.4, showing the type and location of all post-construction infiltration BMPs utilized at the facility or the reason(s) why none were installed;
 - ii. A list of all non-stormwater discharges that occur at the facility, including their source locations and the control measures being used (see Part 1.2.2).
 - iii. Records of sampling and analysis of TSS required for construction dewatering discharges (see Part 9.1.4 (c)).
- g. All required or requested documents must be sent to:

NH Department of Environmental Services, Wastewater Engineering Bureau,
Permits & Compliance Section
P.O. Box 95
Concord, NH 03302-0095

9.1.2 VTR10F000 Areas in the State of Vermont subject to construction by a Federal Operator

- a. Earth disturbance at any one time is limited to five acres.
- b. All areas of earth disturbance must have temporary or final stabilization within 14 days of the initial disturbance. After this time, disturbed areas must be temporarily or permanently stabilized in advance of any runoff producing event. A runoff producing event is an event that produces runoff from the construction site. Temporary stabilization is not required if the work is occurring in a self-contained

excavation (i.e. no outlet) with a depth of two feet or greater (e.g. house foundation excavation, utility trenches). Areas of a construction site that drain to sediment basins are not considered eligible for this exemption, and the exemption applies only to the excavated area itself.

- c. The use of the cationic polymers is prohibited unless approved under a site-specific plan.
- d. Site inspections on active construction sites shall be conducted daily during the period from October 15 – April 15.
- e. Any applicant under EPA's CGP shall allow authorized Agency representatives, at reasonable times and upon presentation of credentials, to enter upon the project site for purposes of inspecting the project and determining compliance with this Certification.
- f. The Agency may reopen and alter or amend the conditions of this Certification over the life of the project when such action is necessary to assure compliance with the VWQS.

9.2 EPA Region 3

9.2.1 DCR100000 District of Columbia

- a. The permittee must comply with the District of Columbia Water Pollution Control Act of 1984, as amended, (D.C. Official Code § 8-103.01 et seq.) and its implementing regulations in Title 21, Chapters 11 and 19 of the District of Columbia Municipal Regulations. Nothing in this permit will be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to District of Columbia laws and regulations.
- b. The permittee must comply with the District of Columbia Stormwater Management, and Soil Erosion and Sediment Control in Chapter 5 of Title 21 of the District of Columbia Municipal Regulations.
- c. The permittee must comply with District of Columbia Flood Management control in Chapter 31 of Title 20 of the District of Columbia Municipal Regulations.
- d. The Department may request a copy of the Stormwater Pollution Prevention Plan (SWPPP) and the permittee is required to submit the SWPPP to the Department within 14 days of such request. The Department may conduct an inspection of any facility covered by this permit to ensure compliance with District's law requirements, including water quality standards. The Department may enforce its certification conditions.
- e. The Department may require the permittee to perform water quality monitoring during the permit term if monitoring is necessary for the protection of public health or the environment as designated under the authority in Chapter 19 of Title 21 of the District of Columbia Municipal Regulations.
- f. The Department may require the permittee to provide measurable verification of the effectiveness of Best Management Practices (BMPs) and other control measures used in the stormwater management program, including water quality monitoring.
- g. The Department has determined that compliance with this permit does not protect the permittee from enforcement actions deemed necessary by the Department

under its associated regulations to address an imminent threat to public health or a significant adverse environmental impact which results in a violation of the District of Columbia Water Pollution Control Act of 1984, as amended, (D.C. Official Code § 8-103.01 et seq.) and its implementing regulations.

- h. The Department reserves the right to modify this Section 401 Water Quality Certification if any changes, modifications, or deletions are made to this general permit. In addition, the Department reserves the right to add and/or alter the terms and conditions of this Section 401 Water Quality Certification to carry out its responsibilities during the term of this general permit with respect to water quality, including any revisions to District of Columbia Water Quality Standards in Chapter 11 of Title 21 of the District of Columbia Municipal Regulations.
- i. Should any violation of the District's Water Quality Standards, or the conditions of this Section 401 Water Quality Certification occur, the Department will direct the permittee to correct the violation(s). The Department has the right to take any action as authorized by the District laws and regulations to address the violations of this permit or the Water Pollution Control Act and implementing regulations. Substantial civil and criminal penalties are authorized for discharging into District waters in violation of an order or permit issued by the Department. This Section 401 Water Quality Certification does not relieve the permittee of the duty to comply with other applicable District's statutes and regulations.
- j. The permittee must submit copies of Notice of Intent (NOI) and Notice of Termination to DOEE at the same time these documents are submitted to EPA.
- k. The permittee shall allow DOEE to inspect any facilities, equipment, practices, or operations regulated or required under this permit and to access records maintained under the conditions of this permit.
- l. All required or requested documents shall be signed and sent to the: Department of Energy & Environment, 1200 First Street, N.E., 5th Floor, Washington, DC 20002, Attention: Associate Director, Inspection and Enforcement Division.

9.2.2 DER10F000 Areas in the State of Delaware subject to construction by a Federal Operator

- a. Federal agencies engaging in construction activities must submit, to DNREC, a sediment and stormwater management (S&S) plan and obtain approval from DNREC in accordance with 7 Del. C. §4010, 7 DE Admin. Code 5101, and 7 DE Admin. Code 7201.
- b. Federal agencies engaging in construction activities must provide for construction review by a certified construction reviewer in accordance with 7 Del. C. §§4010 & 4013 and 7 DE Admin. Code 5101, subsection 6.1.6.
- c. Federal agencies engaging in construction activities must certify that all responsible personnel involved in the construction project will have attended the blue card training prior to initiation of any land disturbing activity – see 7 Del. C. §§ 4002 & 4014 and 7 DE Admin. Code 5101.

9.3 EPA Region 5

9.3.1 MNR10I000 Indian country within the State of Minnesota

9.3.1.1 Fond du Lac Band of Lake Superior Chippewa. The following conditions apply only to discharges on the Fond du Lac Band of Lake Superior Chippewa Reservation:

- a. A copy of the Stormwater Pollution Prevention Plan (SWPPP) must be submitted to the Office of Water Protection at least fifteen (15) days in advance of sending the Notice of Intent (NOI) to EPA. The SWPPP can be submitted electronically to richardgitar@FDLREZ.com or by hardcopy sent to:

Fond du Lac Reservation
Office of Water Protection
1720 Big Lake Road
Cloquet, MN 55720

CGP applicants are encouraged to work with the FDL Office of Water Protection in the identification of all proposed receiving.

- b. Copies of the Notice of Intent (NOI) and the Notice of Termination (NOT) must be sent to the Fond du Lac Office of Water Protection at the same time they are submitted to EPA.
- c. The turbidity limit shall NOT exceed 10% of natural background within the receiving water(s) as determined by Office of Water Protection staff.
- d. Turbidity sampling must take place within 24 hours of a ½-inch or greater rainfall event. The results of the sampling must be reported to the Office of Water Protection within 7 days of the sample collection. All sample reporting must include the date and time, location (GPS: UTM/Zone 15), and NTU. CGP applicants are encouraged to work with the Office of Water Protection in determining the most appropriate location(s) for sampling.
- e. Receiving waters with open water must be sampled for turbidity prior to any authorized discharge as determined by Office of Water Protection staff. This requirement only applies to receiving waters in which no ambient turbidity data exists.
- f. This Certification does not pertain to any new discharge to Outstanding Reservation Resource Waters (ORRW) as described in § 105 b.3. of the Fond du Lac Water Quality Standards (Ordinance # 12/98, as amended). Although additional waters may be designated in the future, currently Perch Lake, Rice Portage Lake, Miller Lake, Deadfish Lake, and Jaskari Lake are designated as ORRWs. New dischargers wishing to discharge to an ORRW must obtain an individual permit from EPA for stormwater discharges from large and small construction activities.
- g. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in the Water Quality Standards of the Fond du Lac Reservation, Ordinance 12/98, as amended. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the Fond du Lac Reservation for any of the uses designated in the Water Quality Standards of the Fond du Lac Reservation. These uses include wildlife, aquatic life, warm water fisheries, cold water fisheries, subsistence fishing (netting), primary contact recreation, secondary

contact recreation, cultural, wild rice areas, aesthetic waters, agriculture, navigation, and commercial.

- h. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the Fond du Lac Reservation. All spills must be reported to the appropriate emergency management agency (National Response Center AND the State Duty Officer), and measures shall be taken immediately to prevent the pollution of waters of the Fond du Lac Reservation, including groundwater. The Fond du Lac Office of Water Protection must also be notified immediately of any spill regardless of size.
- i. This certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for such listing.

9.3.1.2 Grand Portage Band of Lake Superior Chippewa. The following conditions apply only to discharges on the Grand Portage Band of Lake Superior Chippewa Reservation:

- a. The CGP authorization is for construction activities that may occur within the exterior boundaries of the Grand Portage Reservation in accordance to the Grand Portage Land Use Ordinance. The CGP regulates stormwater discharges associated with construction sites of one acre or more in size. Only those activities specifically authorized by the CGP are authorized by this certification (the "Certification"). This Certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for listing as such.
- b. All construction stormwater discharges authorized by the CGP must comply with the Water Quality Standards and Water Resources Ordinance, as well as Applicable Federal Standards (as defined in the Water Resources Ordinance). As such, appropriate steps must be taken to ensure that petroleum products or other chemical pollutants are prevented from entering the Waters of the Reservation (as defined in the Water Resources Ordinance). All spills must be reported to the appropriate emergency-management agency, and measures must be taken to prevent the pollution of the Waters of the Reservation, including groundwater.
- c. The 2017 CGP requires inspections and monitoring reports of the construction site stormwater discharges by a qualified person. Monitoring and inspection reports must comply with the minimum requirements contained in the 2017 CGP. The monitoring plan must be prepared and incorporated into the Stormwater Pollution Prevention Plan (the "SWPPP"). A copy of the SWPPP must be submitted to the Board at least 30 days in advance of sending the requisite Notice of Intent to EPA. The SWPPP should be sent to:

Grand Portage Environmental Resources Board
P.O. Box 428
Grand Portage, MN 55605

Copies of the Notice of Intent and Notice of Termination required under the CGP must be submitted to the Board at the address above at the same time they are submitted to the EPA.

- d. If requested by the Grand Portage Environmental Department, the permittee must provide additional information necessary for a case-by-case eligibility determination to assure compliance with the Water Quality Standards and any Applicable Federal Standards.

- e. Discharges that the Board has determined to be or that may reasonably be expected to be contributing to a violation of Water Quality Standards or Applicable Federal Standards are not authorized by this Certification.
- f. The Board retains full authority provided by the Water Resources Ordinance to ensure compliance with and to enforce the provisions of the Water Resource Ordinance and Water Quality Standards, Applicable Federal Standards, and these Certification conditions.
- g. Appeals related to Board actions taken in accordance with any of the preceding conditions may be heard by the Grand Portage Tribal Court.

9.3.2 WIR10I000 Indian country within the State of Wisconsin, except the Sokaogon Chippewa (Mole Lake) Community

9.3.2.1 Bad River Band of Lake Superior Tribe of Chippewa Indians: The following conditions apply only to discharges on the Bad River Band of the Lake Superior Tribe of Chippewa Indians Reservation:

- a. Only those activities specifically authorized by the CGP are authorized by this Certification. This Certification does not authorize impacts to cultural properties, or historical sites, or properties that may be eligible for listing as such.^{61, 62}
- b. All projects which are eligible for coverage under the CGP and are located within the exterior boundaries of the Bad River Reservation shall be implemented in such a manner that is consistent with the Tribe's Water Quality Standards (WQS) in order to protect Reservations waters that may be impacted by stormwater discharge including embankments, outlets, adjacent streambanks, slopes, and downstream waters.⁶³
- c. Operators are not eligible to obtain authorization under the CGP for all new discharges to an Outstanding Tribal Resource Water (or Tier 3 water).⁶⁴ Outstanding Tribal Resource Waters, or Tier 3 waters, include the following: Kakagon Slough and the lower wetland reaches of its tributaries that support wild rice, Kakagon River, Bad River Slough, Honest John Lake, Bog Lake, a portion of Bad River, from where it enters the Reservation through the confluence with the White River, and Potato River.⁶⁵
- d. An operator proposing to discharge to an Outstanding Resource Water (or Tier 2.5 water) under the CGP must comply with the antidegradation provisions of the Tribe's WQS. Outstanding Resource Waters, or Tier 2.5 waters, include the following: a portion of Bad River, from downstream the confluence with the White River to Lake Superior, White River, Marengo River, Graveyard Creek, Bear Trap Creek, Wood Creek, Brunsweller River, Tyler Forks, Bell Creek, and Vaughn Creek.⁶⁶ The antidegradation demonstration materials described in provision E.4.iii. must be submitted to the following address:

⁶¹ Bad River Band of Lake Superior Tribe of Chippewa Indians Water Quality Standards adopted by Resolution No. 7-6-11-441 (hereafter, Tribe's WQS).

⁶² 36 C.F.R. § 800.16(l)(2).

⁶³ See footnote 61.

⁶⁴ Tribe's WQS: See provisions E.3.ii. and E.4.iv.

⁶⁵ Tribe's WQS: See provision E.2.iii.

⁶⁶ Tribe's WQS: See provision E.2.ii.

Bad River Tribe's Natural Resources Department
Attn: Water Resources Specialist
P.O. Box 39
Odanah, WI 54861

- e. An operator proposing to discharge to an Exceptional Resource Water (or Tier 2 water) under the CGP must comply with the antidegradation provisions of the Tribe's WQS. Exceptional Resource Waters, or Tier 2 waters, include the following: any surface water within the exterior boundaries of the Reservation that is not specifically classified as an Outstanding Resource Water (Tier 2.5 water) or an Outstanding Tribal Resource Water (Tier 3 water).⁶⁷ The antidegradation demonstration materials described in provision E.4.ii. must be submitted to the following address:

Bad River Tribe's Natural Resources Department
Attn: Water Resources Specialist
P.O. Box 39
Odanah, WI 54861

- f. Projects utilizing cationic treatment chemicals⁶⁸ within the Bad River Reservation boundaries are not eligible for coverage under the CGP.⁶⁹
- g. A discharge to a surface water within the Bad River Reservation boundaries shall not cause or contribute to an exceedance of the turbidity criterion included in the Tribe's WQS, which states: Turbidity shall not exceed 5 NTU over natural background turbidity when the background turbidity is 50 NTU or less, or turbidity shall not increase more than 10% when the background turbidity is more than 50 NTU.⁷⁰
- h. All projects which are eligible for coverage under the CGP within the exterior boundaries of the Bad River Reservation must comply with the Bad River Reservation Wetland and Watercourse Protection Ordinance, or Chapter 323 of the Bad River Tribal Ordinances, including the erosion and sedimentation control, natural buffer, and stabilization requirements. Questions regarding Chapter 323 and requests for permit applications can be directed to the Wetlands Specialist in the Tribe's Natural Resources Department at (715) 682-7123 or wetlands@badriver-nsn.gov.
- i. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must notify the Tribe prior to the commencing earth-disturbing activities.^{71, 72} The operator must submit a copy of the Notice of Intent (NOI) to the following addresses at the same time it is submitted to the U.S. EPA:

⁶⁷ Tribe's WQS: See provision E.2.i.

⁶⁸ See definition of cationic treatment chemicals in Appendix A of the CGP.

⁶⁹ Tribe's WQS: See provisions E.6.ii.a. and E.6.ii.c.

⁷⁰ Tribe's WQS: See provision E.7.iii.

⁷¹ See footnote 61.

⁷² See footnote 62.

Bad River Tribe's Natural Resources Department
Attn: Water Resources Specialist
P.O. Box 39
Odanah, WI 54861

Bad River Tribe's Natural Resources Department
Attn: Tribal Historic Preservation Officer (THPO)
P.O. Box 39
Odanah, WI 54861

The operator must also submit a copy of the Notice of Termination (NOT) to the above addresses at the same time it is submitted to the U.S. EPA.

- j. The Tribal Historic Preservation Officer (THPO) must be provided 30 days to comment on the project.⁷³
- k. The operator must obtain THPO concurrence in writing. This written concurrence will outline measures to be taken to prevent or mitigate effects to historic properties. For more information regarding the specifics of the cultural resources process, see 36 CFR Part 800. A best practice for an operator is to consult with the THPO during the planning stages of an undertaking.⁷⁴
- l. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must submit a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the following address at the same time as submitting the NOI:⁷⁵

Bad River Tribe's Natural Resources Department
Attn: Water Resources Specialist
P.O. Box 39
Odanah, WI 54861

- m. Any corrective action reports that are required under the CGP must be submitted to the following address within one (1) working day of the report completion:⁷⁶

Bad River Tribe's Natural Resources Department
P.O. Box 39
Odanah, WI 54861

- n. An operator shall be responsible for meeting any additional permit requirements imposed by the U.S. EPA necessary to comply with the Tribe's antidegradation policies if the discharge point is located upstream of waters designated by the Tribe.⁷⁷

⁷³ 36 C.F.R. § 800.3(c)(4).

⁷⁴ 36 C.F.R. § 800.3(b).

⁷⁵ See footnote 61.

⁷⁶ See footnote 61.

⁷⁷ See footnote 61.

9.3.2.2 Lac du Flambeau Band of Lake Superior Tribe of Chippewa Indians: The following conditions apply only to discharges on the Lac du Flambeau Band of the Lake Superior Tribe of Chippewa Indians Reservation:

- a. A copy of the Stormwater Pollution Prevention Plan must be submitted to the following office, for the Tribal environmental review process, at least thirty (30) days in advance of sending the Notice of Intent (NOI) to EPA:

Lac du Flambeau
Tribal Land Management
P.O. Box 279
Lac du Flambeau, WI 54538

CGP applicants are encouraged to work with the LdF Water Resources Program in the identification of all proposed receiving waters.

- b. Copies of the NOI and the Notice of Termination (NOT) must be sent to the LdF Water Resources Program at the same time they are submitted to EPA.
- c. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in the Water Quality Standards of the Lac du Flambeau Reservation. This includes, but is not limited to, the prevention of any discharge that cause a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the Lac du Flambeau Reservation for any of the uses designated in the Water Quality Standards of the Lac du Flambeau Reservation.
- d. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the Lac du Flambeau Reservation. All spills must be reported to the appropriate emergency management agency, and measures shall be taken immediately to prevent the pollution of waters of the Lac du Flambeau reservation, including groundwater.
- e. This certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for such listing.
- f. Due to the significant ecological and cultural importance of the Lac du Flambeau Reservation, any operator requesting a permit for a point source discharge of pollutants (i.e., discharge) associated with the Stormwater Discharge will need a stormwater pollution prevention plan in place that does not violate Lac du Flambeau Water Quality Standards to protect Reservation Waters.

9.4 EPA Region 6

9.4.1 NMR100000 State of New Mexico, except Indian country

- a. If construction dewatering activities are anticipated at a site, permittees must complete the following steps:
 - i. Investigative information must be documented in the facility SWPPP.
 - ii. Refer to the GWQB Mapper at <https://gis.web.env.nm.gov/GWQB/> AND the PSTB Mapper (Go Mapper) at <https://gis.web.env.nm.gov/GoNM/>

and check if the following sources are located within the noted distance from your anticipated construct site groundwater dewatering activity:

Project Location Relative to a Source of Potential Groundwater Contamination	Constituents likely to be required for testing
<i>Within 0.5 mile of an open Leaking Underground Storage Tank (LUST) site</i>	<i>BTEX (Benzene, Toluene, Ethylbenzene, and Xylene) plus additional parameters depending on site conditions.*</i>
<i>Within 0.5 mile of an open Voluntary Remediation site</i>	<i>All parameters listed in Appendix A (or an alternate list approved by the NMED SWQB)**</i>
<i>Within 0.5 mile of an open RCRA Corrective Action Site</i>	
<i>Within 0.5 mile of an open Abatement Site</i>	
<i>Within 0.5 mile of an open Brownfield Site</i>	
<i>Within 1.0 mile or more of a Superfund site or National Priorities List (NPL) site with associated groundwater contamination.</i>	

*For further assistance determining whether dewatering may encounter impacted groundwater, the permittee may contact the NMED Ground Water Quality Bureau at: 505-827-2965.

**EPA approved-sufficiently sensitive methods must be used - approved methods are listed in 40 CFR Part 136.3.

- ii. Indicate on the NOI that dewatering activities are anticipated. Provide information on flow and potential to encounter impacted groundwater.
 - iii. Permittee must test the quality of the groundwater according to the chart above. Hardness and pH must also be measured.
 - iv. Permittee must send test result data to EPA Region 6 and the NMED Surface Water Quality Bureau. If the test data exceed standards, it cannot be discharged from the construction site into surface waters under this permit. Discharge to surface waters must be conducted under a separate NPDES individual permit to ensure proper treatment and disposal.
 - v. If disposal will be to the ground surface or in an unlined pond, the permittee must submit an NOI to the NMED Ground Water Quality Bureau.
- b. Operators are not eligible to obtain authorization under this permit for all new and existing storm water discharges to outstanding national resource waters (ONRWs) (also referred to as "Tier 3" waters.)
 - c. Operators who intend to obtain authorization under this permit for new and existing storm water discharges from construction sites must satisfy the following condition:
 - i. The SWPPP must include site-specific interim and permanent stabilization, managerial, and structural solids, erosion and sediment control best management practices (BMPs) and/or other controls that are designed to prevent to the maximum extent practicable an increase in the sediment yield and flow velocity from pre-construction, pre-development conditions to assure that applicable standards in 20.6.4.NMAC, including the antidegradation policy, or TMDL waste load allocations (WLAs) are met. This requirement applies to discharges both during construction and after construction operations have been completed. The SWPPP must identify

and document the rationale for selecting these BMPs and/or other controls. The SWPPP must also describe design specifications, construction specifications, maintenance schedules (including a long term maintenance plan), criteria for inspections, and expected performance and longevity of these BMPs. For sites greater than 5 acres in size, BMP selection must be made based on the use of appropriate soil loss prediction models (i.e. SEDCAD, RUSLE, SEDIMOT, MULTISED, etc.) OR equivalent generally accepted (by professional erosion control specialists) soil loss prediction tools.

- ii. For all sites, the operator(s) must demonstrate, and include documentation in the SWPPP, that implementation of the site-specific practices will assure that the applicable standards or TMDL WLAs are met, and will result in sediment yields and flow velocities that, to the maximum extent practicable, will not be greater than the sediment yield levels and flow velocities from preconstruction, pre-development conditions.
 - iii. All SWPPPs must be prepared in accordance with good engineering practices by qualified (e.g. CPESC certified, engineers with appropriate training) erosion control specialists familiar with the use of soil loss prediction models and design of erosion and sediment control systems based on these models (or equivalent soil loss prediction tools). Qualifications of the preparer (e.g., professional certifications, description of appropriate training) must be documented in the SWPPP. The operator(s) must design, implement, and maintain BMPs in the manner specified in the SWPPP.
- d. Permittees can call 505-827-9329 for emergencies at any time and 505-476-6000 for non-emergencies during business hours from 5am-5pm, Monday through Friday.

9.4.2 NMR10I000 Indian country within the State of New Mexico, except Navajo Reservation Lands that are covered under Arizona permit AZR10I000 and Ute Mountain Reservation Lands that are covered under Colorado permit COR10I000.

9.4.2.1 Pueblo of Isleta. The following conditions apply only to discharges on the Pueblo of Isleta Reservation:

- a. CGP at 1.3 Prohibited discharges: Stormwater discharges associated with construction activity that EPA or the Pueblo of Isleta, prior to authorization under this permit, determines will cause, have the reasonable potential to cause, or may reasonably be expected to contribute to a violation or excursion of any applicable water quality standard, including the antidegradation policy, or the impairment of a designated use of receiving waters are not authorized by this permit.
- b. CGP at 1.4.1 How to Submit Your NOI: The operator shall provide a copy of the Notice of Intent ("NOI") to the Pueblo of Isleta at the same time it is submitted to the U.S. Environmental Protection Agency, for projects occurring within the exterior boundaries of the Pueblo of Isleta. The operator shall also notify the Pueblo of Isleta when it has submitted the Notice of Termination ("NOT"). The NOI and NOT shall be sent to the Pueblo of Isleta at the following address:

Water Quality Control Officer
Pueblo of Isleta
Environment Department
PO Box 1270

Isleta, NM 87022
(505) 869-9819
E-mail: POI36871@isletapueblo.com

Overnight/Express Mail Delivery
Pueblo of Isleta
Environment Department
6 Sagebrush St.
Albuquerque, NM 87105

- c. CGP at 1.5 Requirement to post a notice of your permit coverage: Amend to read: "You must post a sign or other notice of your permit coverage at a safe, publicly accessible location in close proximity to the construction site. The notice must be located so that it is visible from the public road or tribal road that is nearest to the active part of the construction site..."
- d. CGP at 7.2.6 Description of stormwater controls: The SWPPP will be considered to be incomplete if the operator has not coordinated requirements under this Part with the Pueblo of Isleta Environment Department.
- e. CGP I.12.6.1 at pg.I-6 of 8. The Pueblo of Isleta requests notification within 10 hours (rather than 24 hrs.) if health or the environment become endangered.
- f. CGP at I.12.2 Anticipated noncompliance: Amend to read: "You must give advance notice to EPA and the Pueblo of Isleta at the address indicated in 1.4.1(a) of any planned changes in the permitted facility or activity which may results in noncompliance with permit requirements."
- g. CGP at I.12.6.1: Any noncompliance for projects within the exterior boundaries of the Pueblo of Isleta which may endanger health or the environment shall be reported directly to the EPA Regional Office [(see contacts at <https://www2.epa.gov/national-pollutant-discharge-elimination-system-npdes/contact-us-stormwater#regional>)] and to the Pueblo of Isleta Water Quality Control Officer. Any information must be provided orally with n 12 hours of the time you become aware of the circumstances. Other requirements of this Part for a written submission apply. Electronic communication (E-mail) shall be provided as soon as practical. Verbal notice shall be provided to:

Water Quality Control Officer
Pueblo of Isleta
E-mail: POI36871@isletapueblo.com
(505) 869-9819
(505) 917-8346 mobile
(505) 869-3030 Police Dispatch

- h. CGP at 2.2 Erosion and sediment control requirements: Erosion and sediment controls shall be designed to retain sediment on-site.
- i. CGP at 2.2 Under Sediment control requirements, Standard Permit Condition Duty to Mitigate Volumes of sediment at or over (five) 5 cubic yards must be removed and placed for disposal within a tribally approved sediment Disposal Site, located on Pueblo of Isleta lands. CGP 2.2 at pg. 8.
- j. Under Minimize erosion, a permittee must secure permission from the Pueblo or affected Pueblo of Isleta land assignment owner if a dissipation device needs to

be placed up- or down- elevation of a given construction site. CGP 2.2.11 at pg. 11.

- k. CGP at 2.3.6 Emergency spill notification requirements: You must notify the Pueblo of Isleta Water Quality Control Officer and National Response Center (NRC) [at (800) 424-8802 or, in the Washington, DC metropolitan area, call (202) 267-2675 in accordance with the requirements of 40 CFR 110, 40 CFR 117, and 40 CFR 302] as soon as you have knowledge of the release. Verbal and electronic notice shall be provided as specified in I.12.6.1
- l. CGP at C.3 Equivalent analysis waiver: Parties wishing to apply for an Equivalent Analysis Waiver (see Appendix D, Section C) must provide a copy of the waiver analysis to the Pueblo of Isleta Water Quality Control Officer at the address indicated in 1.4.1 (a).

9.4.2.2 Pueblo of Sandia. The following conditions apply only to discharges on the Pueblo of Sandia Reservation:

- a. Only those activities specifically authorized by the CGP are authorized by the Pueblo of Sandia's Water Quality certification. The Pueblo of Sandia's Water Quality Certification does not authorize impact to cultural properties, historical sites or properties that may be eligible as such.
- b. Copies of all Notices of Intent (NOI) submitted to the EPA must also be sent concurrently to the Pueblo of Sandia at the following address. Discharges are not authorized by this permit unless an accurate and complete NOI has been submitted to the Pueblo of Sandia, either by mail or electronically.

Regular U.S. Delivery Mail:

Pueblo of Sandia Environment Department
Attention: Scott Bulgrin, Water Quality Manager
481 Sandia Loop
Bernalillo, New Mexico 87004

Electronically:

sbulgrin@sandiapueblo.nsn.us

- c. Any correspondences between the applicant and EPA related to analytical data, written reports, corrective action, enforcement, monitoring, or an adverse incident written reports should likewise be routed to the Pueblo of Sandia at the above address.
- d. The Stormwater Pollution Prevention Plan (SWPPP) must be available to the Pueblo of Sandia Environment Department either electronically or hard copy upon request for review. The SWPPP must be made available at least fourteen (14) days before construction begins. The fourteen (14) day period will give Pueblo staff time to become familiar with the project site, prepare for construction site inspections, and determine compliance with the Pueblo of Sandia Water Quality Standards. Failure to provide a SWPPP to the Pueblo of Sandia may result in the delay or denial of the construction project.
- e. If requested by the Pueblo of Sandia Environment Department, the permittee must provide additional information necessary for a case-by-case eligibility determination to assure compliance with the Pueblo of Sandia Water Quality Standards and/or applicable Federal Standards not authorized by this certification.
- f. An "Authorization to Proceed Letter" with site specific mitigation requirements may

be sent out to the permittee when a review of the NOI and SWPPP, on a case-by-case basis is completed by the Pueblo of Sandia Environment Department. This approval will allow the application to proceed if all mitigation requirements are met.

- g. The Pueblo of Sandia will not allow Small construction Waivers (Appendix C) or the Rainfall Erosivity Waiver (Appendix C.1) to be granted for any small construction activities.
- h. Before submitting a Notice of Termination (NOT) to the EPA, permittees must clearly demonstrate to the Pueblo of Sandia Environment Department through a site visit or documentation that requirements for site stabilization have been met and any temporary erosion control structures have been removed. A short letter stating the NOT is acceptable and all requirements have been met will be sent to the permittee to add to the permittee's NOT submission to EPA.
- i. Copies of all NOT submitted to the EPA must also be sent concurrently to the Pueblo of Sandia through the mail or electronically.

Regular U.S. Delivery Mail:

Pueblo of Sandia Environment Department
Attention: Scott Bulgrin, Water Quality Manager
481 Sandia Loop
Bernalillo, New Mexico 87004

Electronically:

sbulgrin@sandiapueblo.nsn.us

- j. The Pueblo of Sandia may require the permittee to perform water quality monitoring for pH, turbidity, and total suspended solids (TSS) during the permit term if the discharge is to a surface water leading to the Rio Grande for the protection of public health and the environment.

9.4.2.3 Pueblo of Santa Ana. The following conditions apply only to discharges on the Pueblo of Santa Ana Reservation:

- a. The permittee shall provide a copy of the Notice of Intent (NOI) to the Pueblo of Santa Ana (the Pueblo), at the same time it is submitted to the U.S. Environmental Protection Agency (EPA), for projects with discharges onto the lands of the Pueblo as defined in the Pueblo's antidegradation policy within the Pueblo of Santa Ana Water Quality Standards.
- b. The permittee shall provide a final copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Pueblo that is associated with any project identified in the NOI, at the same time that an NOI is submitted to the EPA. The SWPPP should include any projects with discharges onto the lands of the Pueblo as defined in

the antidegradation policy within the Pueblo of Santa Ana Water Quality Standards.

- c. The operator shall provide copies of inspections reports and of corrective action reports to the Pueblo at the address below for review, upon request.
- d. Upon completion of the project identified in the NOI, the permittee will submit a Notice of Termination (NOT) to the Pueblo.
- e. All required or requested permittee specific information identified above shall be submitted to the following address:

Pueblo of Santa Ana Department of Natural Resources,
Attention: Water Resources Division
2 Dove Road
Santa Ana Pueblo, NM 87004

- f. Discharges are not authorized by permittee unless an accurate and complete NOI and SWPPP have been submitted to the Pueblo. Failure to provide an accurate and complete NOI and SWPPP may result in a denial of the discharge permit or a delay in groundbreaking or construction.
- g. The permittee will not proceed with site work until authorized by the Pueblo. The Pueblo requires review of the complete and final SWPPP before authorization to proceed. The Pueblo will provide an "Authorization to Process" notice after review and approval of the SWPPP.
- h. The permittee could be required to perform water quality monitoring, sampling or analysis during the active permit dates for constituents determined by the Pueblo.
- i. Before submitting a NOT, permittees must certify to the Pueblo's Department of Natural Resources in writing that requirements for site stabilization have been met, and any temporary erosion control structures have been removed. Documentation of the Pueblo's review that such requirements have been reviewed and met will be provided for the permittee to add to the permittee's NOT submission to EPA. Copies of all NOT submitted to the EPA must also be sent to the Pueblo at the address provided above.

9.4.2.4 Pueblo of Santa Clara. The following conditions apply only to discharges on the Pueblo of Santa Clara Reservation:

- a. The operator must provide a copy of the Notice of Intent (NOI) and Notice of Termination (NOT) to the Santa Clara Pueblo Governor's Office at the same time it is provided to the US Environmental Protection Agency.
- b. A copy of the Storm water Pollution Prevention Plan shall be made available to the Pueblo of Santa Clara staff upon request.

9.4.2.5 Pueblo of Tesuque. The following conditions apply only to discharges on the Pueblo of Tesuque Reservation:

- a. Based on the Section 401 Certification provisions within the CWA, no discharges that will exceed or cause the exceedance of the Pueblo of Tesuque Water Quality Standards will be allowed within the boundaries of the Pueblo of Tesuque.
- b. The operator shall provide a copy of the Notice of Intent (NOI) to the Pueblo of Tesuque Governor's Office in care of the Department of Environmental and Natural Resources (DENR) at the same time it is submitted to the Environmental

Protection Agency, for projects occurring within the boundaries of Tesuque tribal lands. The operator shall also notify the Pueblo of Tesuque Governor's Office in care of the DENR when it submits the Notice of Termination (NOT), but not before the DENR post-construction inspection has been completed as described below. The NOI and NOT shall be sent to the following address:

Pueblo of Tesuque
Office of the Governor
Attn: DENR
20 TP828 Administration Bldg.
Santa Fe, NM 87506-5512

Alternatively, the operator may arrange with DENR to email the documents.

- c. The operator shall also provide a copy of the Stormwater Pollution Prevention Plan, copies of inspection reports, and copies of corrective action reports to the DENR.
- d. Construction requiring this permit will not commence until the above document submissions have been made and DENR provides the operator with notice to proceed. Operators will not demobilize until DENR personnel inspect the site for completion of stabilization. Once the inspection has taken place and all SWPPP-related work has been completed to the satisfaction of DENR, the operator will submit its NOT as described above and then demobilize.

9.4.2.6 Taos Pueblo. The following conditions apply only to discharges on the Taos Pueblo Reservation:

- a. The operator shall provide a copy of the Notice of Intent (NOI) to the Taos Pueblo Governor's Office, War Chief's Office and Environmental Office, at the same time it is submitted to the U.S. Environmental Protection Agency, for projects occurring within the exterior boundaries of Taos Pueblo. The operator shall also notify Taos Pueblo when it has submitted the Notice of Termination (NOT). The NOI and NOT shall be sent to the Taos Pueblo at the following addresses:
 - i. Taos Pueblo Governor's Office
P.O. Box 1846
Taos NM 87571
 - ii. Taos Pueblo War Chief's Office
P.O. Box 2596
Taos NM 87571
 - iii. Environmental Office
Attn: Program Manager
P.O. Box 1846
Taos NM 87571

- b. Taos Pueblo requests that in the event Indian artifacts or human remains are inadvertently discovered on projects occurring near or on Taos Pueblo lands that consultation with the tribal Governor's Office occur at the earliest possible time.
- c. The operator shall provide a copy of the Stormwater Pollution Prevention Plan, copies of inspections reports, and copies of corrective action reports to staff in the Taos Pueblo Environmental Office for review and copy, upon request.

9.4.2.7 Ohkay Owingeh. The following conditions apply only to discharges on the Ohkay Owingeh Reservation:

- a. Prior to commencement of any construction activity on Ohkay Owingeh Lands requiring permit coverage under EPA's Construction General Permit, the operator(s) shall submit to Ohkay Owingeh Office of Environmental Affairs, a copy of the electronic "Notice of Intent," submitted to the Environmental Protection Agency, immediately following EPA's electronic notification that the NOI has been received. A copy of the Stormwater Pollution Prevention Plan(s) must be made available to the Ohkay Owingeh Office of Environmental Affairs upon the tribe's request either electronically or hard copy. Operator(s) shall also submit to Ohkay Owingeh Office of Environmental Affairs a copy of the electronic Notice of Termination (NOT) submitted to the Environmental Protection Agency. Documents shall be submitted to Ohkay Owingeh at the following address:

Ohkay Owingeh Office of Environment Affairs
Attention: Environmental Programs Manager
P.O. Box 717
Ohkay Owingeh, New Mexico 87566
Office # 505.852.4212
Fax # 505.852.1432
Electronic mail: naomi.archuleta@ohkay.org

- b. Ohkay Owingeh will not allow the Rainfall Erosivity Waivers (see Appendix C) to be granted for any small construction activities.
- c. All vegetation used to prevent soil loss, seeding or planting of the disturbed area(s) to meet the vegetative stabilization requirements must utilize native seeds/vegetation commonly known to the area. All temporary erosion control structures, such as silt fences must be removed as soon as stabilization requirements are met.

9.4.2.8 Pueblo of Laguna. The following conditions apply only to discharges on the Pueblo of Laguna Reservation:

- a. The operator must provide a paper and electronic copy of the Notice of Intent (NOI) and Notice of Termination (NOT) to the Pueblo of Laguna at the same time it is provided to the U.S. Environmental Protection Agency. The NOI and NOT should be provided to the following address:

Pueblo of Laguna, Office of the Governor
Attn: Environmental & Natural Resources Department
P.O. Box 194
Laguna, NM 87026
Email: setter@pol-nsn.gov

- b. The operator must provide an electronic copy of the Storm Water Pollution

Prevention Plan to the Pueblo of Laguna Environmental Program at the same time the NOI is submitted to the above listed email addresses. Any correspondences between the applicant and EPA related to analytical data, written reports, corrective action, enforcement, monitoring, or an adverse incident written reports threshold likewise be routed to the Pueblo of Laguna Environmental Program.

- c. Immediate initiation of consultation with the Pueblo of Laguna is required should any human remains or artifacts be unearthed during the project that fall under the Native American Graves Protection and Repatriation Act guidelines. If human remains are unearthed, contact the Pueblo of Laguna Police Department at 505.552.6666. If artifacts are unearthed, contact the Pueblo of Laguna Tribal Historic Preservation Office at 505.552.5033.

9.4.2.9 Picuris Pueblo. The following conditions apply only to discharges on the Picuris Pueblo Reservation:

- a. The operator, landowner and construction operators doing earth-disturbance work must meet the definition of "operator" under the Construction General Permit (CGP), and must provide an electronic and paper copy of the Notice of Intent (NOI) and Notice of Termination (NOT) to **both** The Office of the Picuris Pueblo Governor and the Picuris Pueblo Environmental Department at the same time it is provided to the U.S. Environmental Protection Agency (USEPA). The NOI and NOT should be provided to the following address:

Picuris Pueblo
The Office of the Governor
PO BOX 127
Penasco, NM 87553
575-587-2519
575-587-1071 (Fax)
Governor: governor@picurispueblo.org

Picuris Pueblo Environmental Department
PO BOX 158
Penasco, NM 87553
575-587-0110
575-587-0223 (Fax)
Environmental Director: environment@picurispueblo.org

- b. The operator must provide an electronic copy of the Storm Water Pollution Prevention Plan to the Picuris Pueblo Environmental Department at least 30 days prior to submitting the NOI to USEPA and the Picuris Pueblo by email to Picuris Pueblo Environmental Department: environment@picurispueblo.org.

9.4.2.10 Pueblo of Pojoaque. The following conditions apply only to discharges on the Pueblo of Pojoaque Reservation:

- a. The operator, landowner and construction operators doing earth-disturbance work must meet the definition of "operator" under the CGP and must provide a copy of the Notice of Intent (NOI) to the Pueblo of Pojoaque Governor's Office and Environmental Department within 3 days following U.S. Environmental Protection Agency's electronic confirmation that the NOI was certified and submitted and is undergoing its 14-day review period. Additionally, a copy of the Notice of Termination (NOT) must be provided the same day electronic confirmation is

received from the U.S. Environmental Protection Agency that the NOT has been accepted. The NOI and NOT should be provided to the following address:

Pueblo of Pojoaque
Office of the Governor
78 Cities of Gold Road
Santa Fe, NM 87506

Pueblo of Pojoaque
Environmental Department
39 Camino Del Rincon
Santa Fe, NM 87506

- b. The operator must provide an electronic copy of the Stormwater Pollution Prevention Plans to the Pueblo of Pojoaque Environmental Department by email to Adam L Duran (aduran@pojoaque.org) at least 30 days prior to submitting the NOI to EPA and the Pueblo of Pojoaque.

9.4.2.11 Nambe Pueblo. The following conditions apply only to discharges on Nambe Pueblo:

- a. The operator must provide a copy of the Notice of Intent (NOI) and Notice of Termination (NOT) to the Nambe Pueblo Governor's Office at the same time it is provided to the US Environmental Protection Agency. The NOI and NOT should be provided to the following address:

Office of the Governor
Nambe Pueblo
15A NP102 WEST
Nambe Pueblo, NM 87506

- b. The operator must provide a copy of the Stormwater Pollution Prevention Plan to Nambe Pueblo at the same time it is submitted to the EPA, either by email to srydeen@nambepueblo.org or mailed to the above address.

9.4.3 OKR10I000 Indian country within the State of Oklahoma

9.4.3.1 Pawnee Nation. The following conditions apply only to discharges within Pawnee Indian country:

- a. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Pawnee Nation at the same time it is submitted to the Environmental Protection Agency to the following address:

Pawnee Nation Department of Environmental Conservation and Safety
P.O. Box 470
Pawnee, OK 74058
Or email to mmatlock@pawneenation.org

- b. The Storm Water Pollution Prevention Plan must be available to Departmental inspectors upon request.
- c. The Department must be notified at 918-762-3655 immediately upon discovery of any noncompliance with any provision of the permit conditions.

9.4.4 OKR10F000 Discharges in the State of Oklahoma that are not under the authority of the Oklahoma Department of Environmental Quality, including activities associated with oil and gas exploration, drilling, operations, and pipelines (includes SIC Groups 13 and 46, and SIC codes 492 and 5171), and point source discharges associated with agricultural production, services, and silviculture (includes SIC Groups 01, 02, 07, 08, 09).

- a. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Lee Creek or any water or watershed designated "ORW" in Oklahoma's Water Quality Standards, this permit may only be used to authorize discharges from temporary construction activities. Certification is denied for any on-going activities such as sand and gravel mining or any other mineral mining.
- b. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Lee Creek or any water or watershed designated "ORW" in Oklahoma's Water Quality Standards, certification is denied for any discharges originating from support activities, including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, or borrow areas.
- c. In order to comply with Oklahoma's Water Quality Standards, these conditions and restrictions also apply to any construction projects located wholly or partially on Indian Country lands within the State of Oklahoma.

9.5 EPA Region 8

9.5.1 COR10I000 Indian country within the State of Colorado, as well as the portion of the Ute Mountain Reservation located in New Mexico.

9.5.1.1 The Ute Mountain Ute Tribe. The following conditions apply only to discharges on the Ute Mountain Ute Reservation.

- a. Permittees must send the Stormwater Pollution Prevention Plan (SWPPP) to the Tribal Environmental Department for review and approval at least 30 days before construction starts.
- b. Before submitting the Notice of Termination (NOT), permittees must clearly demonstrate to the Tribal Environmental Department during an on-site inspection that requirements for site stabilization have been met.
- c. The permittee must send a copy of the Notice of Intent (NOI) and the Tribal Environmental Department.
- d. Permittees may submit their SWPPPs and NOI and NOT requests electronically to: clarrick@utemountain.org.
- e. Written NOIs, SWPPPs, and NOTs may be mailed to:

Colin Larrick, Water Quality Program Manager
Ute Mountain Ute Tribe
Environmental Department
P.O. Box 448
Towaoc, CO 81334

9.5.2 MTR10I000 Indian country within the State of Montana

9.5.2.1 The Confederated Salish and Kootenai Tribes of the Flathead Nation. The following conditions apply only to discharges on the Confederated Salish and Kootenai Tribes of the Flathead Nation Reservation:

- a. Permittees must submit the Stormwater Pollution Prevention Plan (SWPPP) to the Confederated Salish and Kootenai Tribes at least 30 days before construction starts.
- b. Before submitting the Notice of Termination (NOT), permittees must clearly demonstrate to an appointed Tribal staff person during an onsite inspection that requirements for site stabilization have been met.
- c. The permittee must send a copy of the Notice of Intent (NOI) and the NOT to CSKT.
- d. Permittees may submit their SWPPPs, NOIs and NOTs electronically to:
clintf@cskt.org.
- e. Written SWPPPs, NOIs and NOTs may be mailed to:

Clint Folden, Water Quality Regulatory Specialist
Confederated Salish and Kootenai Tribes
Natural Resources Department
P.O. Box 278
Pablo, MT 59855

9.6 EPA Region 9

9.6.1 AZR10I000 Indian Country within the state of Arizona, as well as Navajo Nation lands in New Mexico and Utah

9.6.1.1 Navajo Nation. The following conditions apply only to discharges on the Navajo Nation reservation:

- a. Courtesy copies of Notice of Intent and stormwater pollution prevention plans shall be made available to Navajo EPA.
- b. Copies of all monitoring reports must be provided to Navajo EPA.
- c. Facilities covered under the CGP will be subject to compliance inspections by Navajo EPA staff with active Federal Inspector Credentials under the authority of the Clean Water Act.
- d. Specific awareness and adherence to Sections 201 – Anti-degradation Policy, 203 – Narrative WQS, and 207.H – Turbidity.

9.6.2 CAR10I000 Indian country within the State of California

9.6.2.1 Twenty-Nine Palms Band of Mission Indians. The following conditions apply only to discharges on the Twenty-Nine Palms Band of Mission Indians Reservation:

- a. At the time the applicant submits its Notice of Intent (NOI) to the EPA, the applicant must concurrently submit written notification of the NOI and a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Twenty-Nine Palms Band of Mission Indians at the address below:

Tribal Environmental Coordinator
Twenty-Nine Palms Band of Mission Indians
46-200 Harrison Place

Coachella, CA 92236

- b. The applicant must also concurrently submit to the Tribal Environmental Coordinator written notification of any other forms or information submitted to the EPA, including waivers, reporting, and Notice of Termination (NOT).
- c. Permitted entities under the CGP must keep the Tribal EPA informed of authorized discharges under the CGP by submitting written information about the type, quantity, frequency and location, intended purpose, and potential human health and/or environmental effects of their activities. These requirements are pursuant to Section 4 of the Twenty-Nine Palms Band of Mission Indians Water Pollution Control Ordinance (022405A). This information may be submitted to Tribal EPA in the form of Stormwater Pollution Prevention Plans (SWPPPs), monitoring reports, or other reports as required under the CGP. Spills, leaks, or unpermitted discharges must be reported in writing to Tribal EPA within 24 hours of the incident.

9.6.2.2 Morongo Band of Mission Indians. The following conditions apply only to discharges on the Morongo Band of Mission Indians Reservation:

- a. This certification does not exempt, and is provisional upon compliance with, other applicable statutes and codes administered by federal and tribal agencies. Pursuant to the Morongo Band of Mission Indians Surface Water Quality Protection Ordinance (Ordinance 39), all unpermitted discharges must be reported to the Morongo Band of Mission Indians Environmental Protection Department (Morongo EPD) within 24 hours of the incident.
- b. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) and stormwater pollution prevention plan (SWPPP) to the Morongo EPD at the same time it is submitted electronically to the EPA.
- c. The operator shall allow the Morongo EPD or its designee to inspect and sample at the construction site as needed.

Correspondence should be submitted to:

Morongo Band of Mission Indians
Environmental Protection Department
12700 Pumarra Road
Banning, CA 92220
Phone: (951) 755-5128
Email: epd@morongo-nsn.gov

9.6.3 GUR100000 Island of Guam. The following conditions apply only to discharges on the Island of Guam:

- a. Any earth-moving operations which require a permit must be obtained from the Department of Public Works (DPW) with clearance approval from various Government of Guam Agencies including Guam EPA prior to the start of any earth-moving activity.
- b. In the event that the construction sites are within the Guam Sole Source Aquifer, the construction site owner and operator must consider opportunities to facilitate groundwater recharge for construction and post-construction implementing infiltration Best Management Practices. Stormwater disposal systems shall be designed and operated within the boundaries of the project. Stormwater systems shall not be permitted within any Wellhead Protection Zone unless the discharge meets the Guam Water Quality Standards within the zone. Waters discharged

within the identified category G-2 recharge zone shall receive treatment to the degree required to protect the drinking water quality prior to it entering the category G-1 resource zone.

- c. All conditions and requirements set forth in the 22 Guam Administrative Rules and Regulations (GARR), Division II, Water Control, Chapter 10, Guam Soil Erosion and Sediment Control Regulations (GSESCR) that are more protective than the CGP regarding construction activities must be complied with.
- d. All standards and requirements set forth in the 22 GARR, Division II, Water Control, Chapter 5, *Guam Water Quality Standards (GWQS) 2001 Revisions*, must be complied with to include reporting GWQS exceedance to Guam EPA.
- e. All operators/owners of any property development or earth moving activities shall comply with the erosion control pre-construction and post-construction BMP design performance standards and criteria set forth in the 2006 CNMI and Guam Stormwater Management Manual.
- f. All conditions and requirements regarding dewatering activities set forth in 22 Guam Administrative Rules and Regulations Chapter 7, Water Resources Development and Operating Regulations must be complied with to include securing permits with Guam EPA prior to the start of any dewatering activities.
- g. If a project to be developed is covered under the Federal Stormwater Regulations (40 CFR Parts 122 & 123), a Notice of Intent (NOI) to discharge stormwater to the surface and marine waters of Guam must be submitted to the U.S. EPA and a copy furnished to Guam EPA, pursuant to Section 10, 104(B)(5)(d) 22GAR, Division II, Chapter 10.
- h. Guam EPA shall apply the Buffer Requirements listed in Appendix G of the CGP NPDES Permit for construction activities as it pertains to Waters of the U.S. in Guam. Guam EPA shall also apply the same buffer requirements for sinkholes in Guam.
- i. When Guam EPA, through its permit review process, identifies that the proposed construction activity is close proximity to marine waters, contractors and owners will be informed that any activity that may impair water quality are required to stop during peak coral spawning periods as per the Guam Coral Spawning Construction Moratoriums.
- j. The Proposed Construction General Permit must set appropriate measures and conditions to protect Guam's Threatened and Endangered Species and Outstanding Resource Waters of exceptional recreational or ecological significance as determined by the Guam EPA Administrator as per *Guam Water Quality Standards 2001 Revisions*, §5102, Categories of Waters, D. Outstanding Resource Waters.
- k. When Guam EPA through its permit review process identifies that proposed construction activity is in close proximity to any Section 303d impaired waters, which includes marine waters and surface waters, shall ensure that construction activity does not increase the impaired water's ambient parameters.
- l. When Rainfall Erosivity and TMDL Waivers reflected in the CGP, Appendix C, are submitted to the U.S. EPA, Guam EPA will review waivers on a project by project basis.
- m. Prior to submission of the Notice of Termination (NOT) to the U.S. EPA, permittees must clearly demonstrate to Guam EPA that the project site has met all soil

stabilization requirements and removal of any temporary erosion control as outlined in the GSESCR.

9.7 EPA Region 10

9.7.1 IDR100000 State of Idaho, except Indian country

a. Idaho's Antidegradation Policy. The WQS contain an antidegradation policy providing three levels of protection to water bodies in Idaho (IDAPA 58.01.02.051).

1. Tier I Protection. The first level of protection applies to all water bodies subject to Clean Water Act jurisdiction and ensures that existing uses of a water body and the level of water quality necessary to protect those existing uses will be maintained and protected (IDAPA 58.01.02.051.01; 58.01.02.052.01). Additionally, a Tier 1 review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.05).
2. Tier II Protection. The second level of protection applies to those water bodies considered high quality and ensures that no lowering of water quality will be allowed unless deemed necessary to accommodate important economic or social development (IDAPA 58.01.02.051.02; 58.01.02.052.08).
3. Tier III Protection. The third level of protection applies to water bodies that have been designated outstanding resource waters and requires that activities not cause a lowering of water quality (IDAPA 58.01.02.051.03; 58.01.02.052.09).

DEQ is employing a water body by water body approach to implementing Idaho's antidegradation policy. This approach means that any water body fully supporting its beneficial uses will be considered high quality (IDAPA 58.01.02.052.05.a). Any water body not fully supporting its beneficial uses will be provided Tier I protection for that use, unless specific circumstances warranting Tier II protection are met (IDAPA 58.01.02.052.05.c). The most recent federally approved Integrated Report and supporting data are used to determine support status and the tier of protection (IDAPA 58.01.02.052.05).

b. Pollutants of Concern. The primary pollutants of concern associated with stormwater discharges from construction activities are sediment, typically measured as total suspended solids and turbidity. Other potential pollutants include the following: phosphorus, nitrogen, pesticides, organics, metals, PCBs, petroleum products, construction chemicals, and solid wastes.

c. Receiving Water Body Level of Protection. The CGP provides coverage to construction activities throughout the entire State of Idaho. Because of the statewide applicability, all of the jurisdictional waters within Idaho could potentially receive discharges either directly or indirectly from activities covered under the CGP. DEQ applies a water body by water body approach to determine the level of antidegradation a water body will receive.

All waters in Idaho that receive discharges from activities authorized under the CGP will receive, at minimum Tier I antidegradation protection because Idaho's antidegradation policy applies to all waters of the state. Water bodies that fully support their aquatic life or recreational uses are considered to be *high quality waters* and will receive Tier II antidegradation protection.

Although Idaho does not currently have any Tier III designated outstanding resource waters (ORWs) designated, it is possible for a water body to be designated as an ORW during the life of the CGP. Because of this potential, the antidegradation review also assesses whether the permit complies with the

outstanding resource water requirements of Idaho's antidegradation policy.

To determine the support status of the receiving water body, persons filing a Notice of Intent (NOI) for coverage under this general permit must use the most recent EPA-approved Integrated Report, available on Idaho DEQ's website:

<http://www.deq.idaho.gov/water-quality/surface-water/monitoring-assessment/integrated-report/>.

High quality waters are identified in Categories 1 and 2 of the Integrated Report. If a water body is in either Category 1 or 2, it is a Tier II water body.

Unassessed waters are identified as Category 3 of DEQ's Integrated Report. These waters require a case-by-case determination to be made by DEQ based on available information at the time of the application for permit coverage. If a water body is unassessed, the applicant is directed to contact DEQ for assistance in filing the NOI.

Impaired waters are identified in Categories 4 and 5 of the Integrated Report. Category 4(a) contains impaired waters for which a TMDL has been approved by EPA. Category 4(b) contains impaired waters for which controls other than a TMDL have been approved by EPA. Category 5 contains waters which have been identified as "impaired," for which a TMDL is needed. These waters are Tier I waters, for the use which is impaired. With the exception, if the aquatic life uses are impaired for any of these three pollutants—dissolved oxygen, pH, or temperature—and the biological or aquatic habitat parameters show a health, balanced biological community, then the water body shall receive Tier II protection, in addition to Tier I protection, for aquatic life uses (IDAPA 58.01.02.052.05.c.i.).

DEQ's webpage also has a link to the state's map-based Integrated Report which presents information from the Integrated Report in a searchable, map-based format: <http://www.deq.idaho.gov/assistance-resources/maps-data/>.

Water bodies can be in multiple categories for different causes. If assistance is needed in using these tools, or if additional information/clarification regarding the support status of the receiving water body is desired, the operator is directed to make contact with the appropriate DEQ regional office of the State office in the table below:

Regional and State Office	Address	Phone Number	Email
Boise	1445 N. Orchard Rd., Boise 83706	208-373-0550	Kati.carberry@deq.idaho.gov
Coeur d'Alene	2110 Ironwood Parkway, Coeur D'Alene 83814	208-769-1422	June.bergquist@deq.idaho.gov
Idaho Falls	900 N. Skyline, Suite B., Idaho Falls 83402	208-528-2650	Troy.saffie@deq.idaho.gov

Lewiston	1118 "F" St., Lewiston 83501	208-799- 4370	Mark.sellet@deq.idaho.gov
Pocatello	444 Hospital way, #300 Pocatello 83201	208-236- 6160	Lynn.vanevery@deq.idaho.gov
Twin Falls	650 Addison Ave., W., Suite 110, Twin Falls 83301	208-736- 2190	Balthasar.buhidar@deq.idaho.gov
State Office	1410 N. Hilton Rd., Boise 83706	208-373- 0502	Nicole.deinarowicz@deq.idaho.gov

- d. *Turbidity Monitoring.* The permittee must conduct turbidity monitoring during construction activities and thereafter on days where there is a direct discharge of pollutants from an unstabilized portion of the site which is causing a visible plume to a water of the U.S.

A properly and regularly calibrated turbidimeter is required for measurements analyzed in the field (preferred method), but grab samples may be collected and taken to a laboratory for analysis. If the permittee can demonstrate that there will be no direct discharge from the construction site, then turbidity monitoring is not required. When monitoring is required, a sample must be taken at an undisturbed area immediately upstream of the project area to establish background turbidity levels for the monitoring event. Background turbidity, location, date and time must be recorded prior to monitoring downstream of the project area. A sample must also be taken immediately downstream from any point of discharge and *within* any visible plume. The turbidity, location, date and time must be recorded. The downstream sample must be taken immediately following the upstream sample in order to obtain meaningful and representative results.

Results from the compliance point sampling or observation⁷⁸ must be compared to the background levels to determine whether project activities are causing an exceedance of state WQS. If the downstream turbidity is 50 NTUs or more than the upstream turbidity, then the project is causing an exceedance of WQS. Any exceedance of the turbidity standard must be reporting to the appropriate DEQ regional office within 24 hours. The following six (6) steps should be followed to ensure compliance with the turbidity standard:

1. If a visible plume is observed, quantify the plume by collecting turbidity measurements from within the plume and compare the results to Idaho's instantaneous numeric turbidity criterion (50 NTU over the background).

⁷⁸ A visual observation is only acceptable to determine whether BMPs are functioning properly. If a plume is observed, the project may be causing an exceedance of WQS and the permittee must collect turbidity data and inspect the condition of the projects BMPs. If the BMPs appear to be functioning to their fullest capability and the turbidity is 50 NTUs or more than the upstream turbidity, then the permittee must modify the activity or implement additional BMPs (this may also include modifying existing BMPs).

2. If turbidity is less than 50 NTU instantaneously over the background turbidity; continue monitoring as long as the plume is visible. If turbidity exceeds background turbidity by more than 50 NTU instantaneously then stop all earth disturbing construction activities and proceed to step 3.
3. Take immediate action to address the cause of the exceedance. That may include inspection the condition of project BMPs. If the BMPs are functioning to their fullest capability, then the permittee must modify project activities and/or BMPs to correct the exceedance.
4. Notify the appropriate DEQ regional office within 24 hours.
5. Possibly increase monitoring frequency until state water quality standards are met.
6. Continue earth disturbing construction activities once turbidity readings return to within 50 NTU instantaneously and 25 NTU for more than ten consecutive days over the background turbidity.

Copies of daily logs for turbidity monitoring must be available to DEQ upon request. The report must describe all exceedances and subsequent actions taken, including the effectiveness of the action.

- e. Reporting of Discharges Containing Hazardous Materials or Petroleum Products. All spills of hazardous material, deleterious material or petroleum products which may impact waters (ground and surface) of the state shall be immediately reported. Call 911 if immediate assistance is required to control, contain or clean up the spill. If no assistance is needed in cleaning up the spill, contact the appropriate DEQ regional office in the table below during normal working hours or Idaho State Communications Center after normal working hours. If the spilled volume is above federal reportable quantities, contact the National Repose Center.

For immediate assistance: Call 911

National Response Center: (800) 424-8802

Idaho State Communications Center: (208) 632-8000

Regional office	Toll Free Phone Number	Phone Number
Boise	888-800-3480	208-373-0321
Coeur d'Alene	877-370-0017	208-769-1422
Idaho Falls	800-232-4635	208-528-2650
Lewiston	977-547-3304	208-799-4370
Pocatello	888-655-6160	208-236-6160
Twin Falls	800-270-1663	208-736-2190

9.7.2 IDR10I000 Indian country within the State of Idaho, except Duck Valley Reservation lands (see Region 9)

9.7.2.1 Shoshone-Bannock Tribes. The following conditions apply only to discharges on the Shoshone-Bannock Reservation:

- f. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the Shoshone-Bannock Tribes Water Resources Department at the same time it is

submitted electronically to the Environmental Protection Agency (EPA) and shall provide the Shoshone-Bannock Tribes Water Resources Department the acknowledgement of receipt of the NOI from the EPA within 7 calendar days of receipt from the EPA.

9.7.3 WAR10F000 Areas in the State of Washington, except those located on Indian country, subject to construction activity by a Federal Operator. The following conditions apply only to discharges on federal facilities in the State of Washington:

- a. Discharges shall not cause or contribute to a violation of surface water quality standards (Chapter 173-201A WAC), groundwater quality standards (Chapter 173-200 WAC), sediment management standards (Chapter 173-204 WAC), and human health-based criteria in the National Toxics Rule (40 CFR Part 131.36). Discharges that are not in compliance with these standards are not authorized.
- b. Prior to the discharge of stormwater and non-storm water to waters of the State, the Permittee must apply all known, available, and reasonable methods of prevention, control, and treatment (AKART). This includes the preparation and implementation of an adequate SWPPP, with all appropriate BMPs installed and maintained in accordance with the SWPPP and the terms and conditions of this permit.
- c. Permittees who discharge to segments of waterbodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, phosphorus, or pH must comply with the following numeric effluent limits:

Parameter Identified in 303(d) Listing	Parameter Sampled	Unit	Analytical Method	Numeric Effluent Limit
<ul style="list-style-type: none"> • Turbidity • Fine Sediment • Phosphorus 	Turbidity	NTU	SM2130 or EPA 180.1	25 NTUs at the point where the stormwater is discharged from the site.
High pH	pH	Su	pH meter	In the range of 6.5 – 8.5

- d. All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current EPA approved listing of impaired waters that exists on February 16, 2017, or the date when the operator's complete permit application is received by EPA, whichever is later.
- e. Discharges to waterbodies subject to an applicable Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus, shall be consistent with the assumptions and requirements of the TMDL.
 - i. Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges shall be consistent with any specific waste load allocations or requirements establish by the applicable TMDL.
 - ii. Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but no specific requirements have been identified, compliance with this permit will be assumed to be consistent with the approved TMDL.

- iii. Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with this permit will be assumed to be consistent with the approved TMDL.
- iv. Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.
- v. Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus, which has been completed and approved by EPA prior to February 16, 2017, or prior to the date the operator's complete NOI is received by EPA, whichever is later.

9.7.4 WAR10I000 Indian country within the State of Washington

9.7.4.1 Confederated Tribes of the Colville Reservation. The following conditions apply only to discharges on the Colville Indian Reservation (CIR) and on other Tribal trust lands or allotments of the Confederated Tribes of the Colville Reservation:

- a. A copy of the Stormwater Pollution Prevention Plan must be submitted to the following office at least thirty (30) days in advance of sending the Notice of Intent (NOI) to EPA:

Environmental Trust Department
Confederated Tribes of the Colville Reservation
PO Box 150
Nespelem, WA 99155

- b. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be sent to the ETD at the same time they are submitted to EPA.
- c. Discharges to Omak Creek, the Okanogan River, and Columbia River downstream of Chief Joseph Dam may affect threatened or endangered species, and shall only be permitted in adherence with Appendix D of the CGP.
- d. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in Chapter 4-8 Water Quality Standards of the Colville Law and Order Code, as amended.
- e. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the CIR. All spills must be reported to the appropriate emergency management agency and the ETD, and measures shall be taken immediately to prevent the pollution of waters of the CIR, including groundwater.
- f. Stormwater site inspections shall be conducted at least once every 7 calendar days, within 24-hours of the occurrence of a rain event of 0.25 inches or greater in a 24-hour period, and daily during periods of saturated ground surface or snowmelt with accompanying surface runoff.
- g. Results of discharge sampling must be reported to the ETD within 7 days of sample collection. All sample reporting must include the date and time, location, and individual performing the sampling.
- h. Any corrective action reports that are required under the CGP must be submitted to the ETD at the above address within one (1) working day of the report completion.

- i. This certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for such listing.

9.7.4.2 Lummi Nation. The following conditions apply only to discharges on the Lummi Reservation:

- a. The Lummi Nation reserves the right to modify this 401 certification if the final version of the NPDES General Permit for Storm Water Discharges Associated with Construction Activity (CGP) on tribal lands in the State of Washington (Permit No. WAR10I000) is substantively different than the draft version of the proposed permit that was made available for public comments during April 2016. The Lummi Nation will determine if the final version of the NPDES CGP is substantively different than the draft version following review of the final version once the EPA makes it available.
- b. This certification does not exempt and is provisional upon compliance with other applicable statutes and codes administered by federal and Lummi tribal agencies. Pursuant to Lummi Code of Laws (LCL) 17.05.020(a), the operator must also obtain a land use permit from the Lummi Planning Department as provided in Title 15 of the Lummi Code of Laws and regulations adopted thereunder.
- c. Pursuant to LCL 17.05.020(a), each operator shall develop and submit a Storm Water Pollution Prevention Plan to the Lummi Water Resources Division for review and approval by the Water Resources Manager prior to beginning any discharge activities.
- d. Pursuant to LCL Title 17, each operator shall be responsible for achieving compliance with the Water Quality Standards for Surface Waters of the Lummi Indian Reservation (Lummi Administrative Regulations [LAR] 17 LAR 07.010 through 17 LAR 07.210 together with supplements and amendments thereto).
- e. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the Lummi Water Resources Division at the same time it is submitted electronically to the Environmental Protection Agency (EPA) and shall provide the Lummi Water Resources Division the acknowledgement of receipt of the NOI from the EPA and the associated NPDES tracking number provided by the EPA within 7 calendar days of receipt from the EPA.
- f. Each operator shall submit a signed hard copy of the Notice of Termination (NOT) to the Lummi Water Resources Division at the same time it is submitted electronically to the EPA and shall provide the Lummi Water Resources Division the EPA acknowledgement of receipt of the NOT.
- g. Storm Water Pollution Prevention Plans, Notice of Intent, Notice of Termination and associated correspondence with the EPA shall be submitted to:

Lummi Natural Resources Department
ATTN: Water Resources Manager
2665 Kwina Road
Bellingham, WA 98226-9298

9.7.4.3 Makah Tribe. The following conditions apply only to discharges on the Makah Reservation:

- a. The operator shall be responsible for achieving compliance with the Makah Tribe's Water Quality Standards.

- b. The operator shall submit a Storm Water Pollution Prevention Plan to the Makah Tribe Water Quality Program and Makah Fisheries Habitat Division for review and approval at least thirty (30) days prior to beginning any discharge activities.
- c. The operator shall submit a copy of the Notice of Intent to the Makah Tribe Water Quality Program and Makah Fisheries Habitat Division at the same time it is submitted to EPA.
- d. Storm Water Pollution Prevention Plans and Notices of Intent shall be submitted to:

Aaron Parker
Makah Fisheries Management Water Quality Specialist
(360) 645-3162
Cell 206-356-0319
Aaron.parker@makah.com
PO Box 115
Neah Bay WA 98357

9.7.4.4 Puyallup Tribe of Indians. The following conditions apply only to discharges on the Puyallup Tribe of Indians Reservation:

- a. Each permittee shall be responsible for achieving compliance with the Puyallup Tribe's Water Quality Standards, including antidegradation provisions. The Puyallup Natural Resources Department will conduct an antidegradation review for permitted activities that have the potential to lower water quality. The antidegradation review will be consistent with the Tribe's Antidegradation Implementation Procedures. The Tribe may also impose additional controls on a site-specific basis, or request EPA to require the operator obtain coverage under an individual permit, if information in the NOI or from other sources indicates that the operator's discharges are not controlled as necessary to meet applicable water quality standards.
- b. The permittee shall be responsible for meeting any additional permit requirements imposed by EPA necessary to comply with the Puyallup Tribe's antidegradation policies if the discharge point is located within 1 linear mile upstream of waters designated by the Tribe.
- c. Each permittee shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to Char Naylor (char.naylor@puyalluptribe.com) and Russ Ladley (russ.ladley@puyalluptribe.com) by email or at the address listed below at the same time it is submitted to EPA.

Puyallup Tribe of Indians
3009 E. Portland Avenue
Tacoma, WA 98404
ATTN: Russ Ladley and Char Naylor

- d. All supporting documentation and certifications in the NOI related to coverage under the general permit for Endangered Species Act purposes shall be submitted to the Tribe's Resource Protection Manager (russ.ladley@puyalluptribe.com) and Char Naylor (char.naylor@puyalluptribe.com) for review.
- e. If EPA requires coverage under an individual or alternative permit, the permittee shall submit a copy of the permit to Russ Ladley and Char Naylor at the address listed above.

- f. The permittee shall submit all stormwater pollution prevention plans to Char Naylor for review and approval prior to beginning any activities resulting in a discharge to tribal waters.
- g. The permittee shall conduct benchmark monitoring for turbidity (or transparency) and, in the event of significant concrete work or engineered soils, pH monitoring as well. Monitoring, benchmarks, and reporting requirements contained in Condition S.4. (pp.13-20) of the Washington State Construction Stormwater General Permit, effective January 1, 2016, shall apply, as applicable.
- h. The permittee shall notify Char Naylor (253-680-5520) and Russ Ladley (253-680-5560) prior to conducting inspections at construction sites generating storm water discharged to tribal waters.
- i. Treat dewatering discharges with controls necessary to minimize discharges of pollutants in order to minimize the discharge of pollutants to groundwater or surface waters from stormwater that is removed from excavations, trenches, foundations, vaults, or other storage areas. Examples of appropriate controls include sediment basins or sediment traps, sediment socks, dewatering tanks, tube settlers, weir tanks, and filtration systems (e.g., bag or sand filters) that are designed to remove sediment.

To the extent feasible, utilize vegetated, upland areas of the site to infiltrate dewatering water before discharge. At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 2.2.11 of EPA's 2016 General Construction Stormwater Permit. Examples of velocity dissipation devices include check dams, sediment traps, riprap, and grouted riprap at outlets.
- j. The permittee shall provide and maintain natural buffers to the maximum extent possible (and/or equivalent erosion and sediment controls) when tribal waters are located within 100 feet of the site's earth disturbances. If infeasible to provide and maintain an undisturbed 100 foot natural buffer, erosion and sediment controls to achieve the sediment load reduction equivalent to a 100-foot undisturbed natural buffer shall be required.

9.7.4.5 Spokane Tribe of Indians. The following conditions apply only to discharges on the Spokane Tribe Reservation:

- a. Pursuant to Tribal Law and Order Code (TLOC) Chapter 30 each operator shall be responsible for achieving compliance with the Surface Water Quality Standards of the Spokane Tribe. The operator shall notify the Spokane Tribe, Water Control Board (WCB) of any spills of hazardous material and;
- b. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the WCB at the same time it is submitted to EPA.
- c. The permittee shall allow the Tribal Water Control Board or its designee to inspect and sample at the construction site as needed.
- d. Each operator shall submit a signed copy of the Notice of Termination (NOT) to the WCB at the same time it is submitted to EPA.

The correspondence address for the Spokane Tribe Water Control Board is:

Water Control Board
c/o. Brian Crossley
PO Box 480
Wellpinit WA 99040

(509)626-4409
crossley@spokanetribe.com

9.7.4.6 Swinomish Indian Tribal Community. The following conditions apply only to discharges on the Swinomish Reservation:

- a. Owners and operators seeking coverage under this permit who intend to discharge to Regulated Surface Waters must submit a copy of the Notice of Intent (NOI) to the DEP at the same time the NOI is submitted to EPA.
- b. Owners and operators seeking coverage under this permit must also submit a Stormwater Pollution Prevention Plan to the DEP for review and approval by DEP prior to beginning any discharge activities.
- c. Owners and operators must also submit to the DEP Changes in NOI and/or Notices of Termination at the same time they are submitted to EPA.

9.7.4.7 Tulalip Tribes. The following conditions apply only to discharges on the Tulalip Reservation:

- a. This certification does not exempt and is provisional upon compliance with other applicable statutes and codes administered by federal and Tulalip tribal agencies. Pursuant to Tulalip Tribes code of law, the operator must also obtain a land use permit from the Tulalip Tribes Planning Department as provided in Title 7 of the Tulalip Tribal Code (<http://www.codepublishing.com/WA/Tulalip/?Tulalip02/Tulalip0205.html>).
- b. Each CGP operator shall be responsible for achieving compliance with Tulalip Tribes Water Quality Standards.
- c. Each CGP operator shall submit their Stormwater Pollution Prevention Plan (SWPPP) to the:

Tulalip Natural & Cultural Resources Department
Tulalip Tribes
6406 Marine Drive
Tulalip, WA 98271

Attachment C – NOI and EPA Authorization e-mail

Attachment D – Inspection Form

2017 Construction General Permit Inspection Report Template – Field Version

Purpose

This Inspection Report Template (or “template”) is to assist you in preparing inspection reports for EPA's 2017 Construction General Permit (CGP). If you are covered under the 2017 CGP, you can use this template to create an inspection report form that is customized to the specific circumstances of your site and that complies with the minimum reporting requirements of Part 4.7 of the permit. Note that the use of this form is optional; you may use your own inspection report form provided it includes the minimum information required in Part 4.7 of the CGP.

If you are covered under a state CGP, this template may be helpful in developing a form that can be used for that permit; however, it will need to be modified to meet the specific requirements of that permit. If your permitting authority requires you to use a specific inspection report form, you should not use this form.

Notes:

While EPA has made every effort to ensure the accuracy of all instructions contained in the Inspection Report Template, it is the permit, not the template, that determines the actual obligations of regulated construction stormwater discharges. In the event of a conflict between the Inspection Report Template and any corresponding provision of the 2017 CGP, you must abide by the requirements in the permit. EPA welcomes comments on the Inspection Report Template at any time and will consider those comments in any future revision of this document. You may contact EPA for CGP-related inquiries at cgp@epa.gov.

Overview of Inspection Requirements (see CGP Part 4)

Construction operators covered under the 2017 CGP are subject to the following inspection requirements:

Person(s) Responsible for Inspecting the Site (see Part 4.1)

The person(s) inspecting your site must be a “qualified person” who may be either on your staff or a third party you hire to conduct such inspections.

- A “qualified person” is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

Inspection Frequency (see Part 4.2)

You are required to conduct inspections either:

- Once every 7 calendar days; or
- Once every 14 calendar days and within 24 hours of a storm event of 0.25 inches or greater or the occurrence of runoff from snowmelt sufficient to cause a discharge.

Your inspection frequency is increased if the site discharges to a sensitive water. See Part 4.3. Your inspection frequency may be decreased to account for stabilized areas, or for arid, semi-arid, or drought-stricken conditions, or for frozen conditions. See Part 4.4.

Areas That Need to Be Inspected (see Part 4.5)

During each inspection, you must inspect the following areas of your site:

- Cleared, graded, or excavated areas of the site;
- Stormwater controls (e.g., perimeter controls, sediment basins, inlets, exit points etc.) and pollution prevention practices (e.g., pollution prevention practices for vehicle fueling/maintenance and washing, construction product storage, handling, and disposal, etc.) at the site;
- Material, waste, or borrow areas covered by the permit, and equipment storage and maintenance areas;
- Areas where stormwater flows within the site;
- Stormwater discharge points; and
- Areas where stabilization has been implemented.

What to Check For During Your Inspection (see Part 4.6)

During your site inspection, you are required to check:

- Whether stormwater controls or pollution prevention practices are properly installed, require maintenance or corrective action, or whether new or modified controls are required;
- For the presence of conditions that could lead to spills, leaks, or other pollutant accumulations and discharges;
- For locations where new or modified stormwater controls are necessary to meet requirements of the permit;

- Whether there are visible signs of erosion and sediment accumulation at points of discharge and to the channels and streambanks that are in the immediate vicinity of the discharge;
- If a stormwater discharge is occurring at the time of the inspection, whether there are obvious, visual signs of pollutant discharges; and
- If any permit violations have occurred on the site.

Inspection Reports (see Part 4.7)

Within 24 hours of completing each inspection, you are required to complete an inspection report that includes:

- Date of inspection;
- Names and titles of person(s) conducting the inspection;
- Summary of inspection findings;
- Rain gauge or weather station readings if your inspection is triggered by the 0.25-inch storm threshold; and
- If you determine that a portion of your site is unsafe to access for the inspection, documentation of what conditions prevented the inspection and where these conditions occurred on the site

Instructions for Using This Template

This Field Version of the Inspection Report Template is intended to be used in the field and filled out by hand. If you will be filling out the Inspection Report Template electronically (i.e., you will be typing in your findings), please use the Electronic Version of the Inspection Report Template available at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. The Electronic Version includes text fields with instructions for what to enter.

Keep in mind that this document is a template and not an "off-the-shelf" inspection report that is ready to use without some modification. You must first customize this form to include the specifics of your project in order for it to be useable for your inspection reports. Once you have entered all of your site-specific information into these fields, you may print out this form for use in the field to complete inspection reports.

The following tips for using this template will help you ensure that the minimum permit requirements are met:

- **Review the inspection requirements.** Before you start developing your inspection report form, read the CGP's Part 4 inspection requirements. This will ensure that you have a working understanding of the permit's underlying inspection requirements.
- **Complete all required text fields.** Fill out all text fields. Only by filling out all fields will the template be compliant with the requirements of the permit. (Note: Where you do not need the number of rows provided in the template form for your inspection, you may leave those rows blank. Or, if you need more space to document your findings, you may add an additional sheet.)
- **Use your site map to document inspection findings.** In several places in the template, you are directed to specify the location of certain features of your site, including where stormwater controls are installed and where you will be stabilizing exposed soil. You are also asked to fill in location information for unsafe conditions and the locations of any discharges occurring during your inspections. Where you are asked for location information, EPA encourages you to reference the point on your SWPPP site map that corresponds to the requested location on the inspection form. Using the site map as a tool in this way will help you conduct efficient inspections, will assist you in evaluating problems found, and will ensure proper documentation.
- **Sign and certify each inspection report.** The operator or a duly authorized representative (see Appendix I, Part I.11.2) must sign and certify each inspection report for it to be considered complete. Where a contractor or subcontractor carries out your inspections, it is recommended that you also have the inspector sign and certify the form, in addition to the signature and certification required of the permitted operator. The template includes a signature block for both parties.
- **Include the inspection form with your SWPPP.** Once your form is complete, make sure to include a copy of the inspection form in your SWPPP in accordance with Part 7.2.7.e of the CGP.
- **Retain copies of all inspection reports with your records.** You must also retain in your records copies of all inspection reports in accordance with the requirements in Part 4.7.3 of the 2017 CGP. These reports must be retained for at least 3 years from the date your permit coverage expires or is terminated.

Section-by-Section Instructions

You will find specific instructions corresponding to each section of the report form on the reverse side of each page. These instructions provide you with more details in terms of what EPA expects to be documented in these reports.

General Information (see reverse for instructions)					
Name of Project		NPDES ID No.		Inspection Date	
Weather conditions during inspection		Inspection start time		Inspection end time	
Inspector Name, Title & Contact Information					
Present Phase of Construction					
Inspection Location (if multiple inspections are required, specify location where this inspection is being conducted)					
Inspection Frequency <i>(Note: you may be subject to different inspection frequencies in different areas of the site. Check all that apply)</i> Standard Frequency: <input type="checkbox"/> Every 7 days <input type="checkbox"/> Every 14 days and within 24 hours of a 0.25" rain or the occurrence of runoff from snowmelt sufficient to cause a discharge Increased Frequency: <input type="checkbox"/> Every 7 days and within 24 hours of a 0.25" rain (for areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3) Reduced Frequency: <input type="checkbox"/> Twice during first month, no more than 14 calendar days apart; then once per month after first month; (for stabilized areas) <input type="checkbox"/> Twice during first month, no more than 14 calendar days apart; then once more within 24 hours of a 0.25" rain (for stabilized areas on "linear construction sites") <input type="checkbox"/> Once per month and within 24 hours of a 0.25" rain (for arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought) <input type="checkbox"/> Once per month (for frozen conditions where earth-disturbing activities are being conducted)					
Was this inspection triggered by a 0.25" storm event? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, how did you determined whether a 0.25" storm event has occurred? <input type="checkbox"/> Rain gauge on site <input type="checkbox"/> Weather station representative of site. Specify weather station source: Total rainfall amount that triggered the inspection (in inches):					
Was this inspection triggered by the occurrence of runoff from snowmelt sufficient to cause a discharge? <input type="checkbox"/> Yes <input type="checkbox"/> No					
Unsafe Conditions for Inspection Did you determine that any portion of your site was unsafe for inspection per CGP Part 4.5? <input type="checkbox"/> Yes <input type="checkbox"/> No If "yes", complete the following: <div style="margin-left: 20px;"> - Describe the conditions that prevented you from conducting the inspection in this location: - Location(s) where conditions were found: </div>					

Instructions for Filling Out “General Information” Section

Name of Project

Enter the name for the project.

NPDES ID No.

Enter the NPDES ID number that was assigned to your NOI for permit coverage.

Inspection Date

Enter the date you conducted the inspection.

Weather Conditions During Inspection

Enter the weather conditions occurring during the inspection, e.g., sunny, overcast, light rain, heavy rain, snowing, icy, windy.

Inspection start and end times

Enter the time you started and ended the inspection.

Inspector Name, Title & Contact Information

Provide the name of the person(s) (either a member of your company's staff or a contractor or subcontractor) that conducted this inspection. Provide the inspector's name, title, and contact information as directed in the form.

Present Phase of Construction

If this project is being completed in more than one phase, indicate which phase it is currently in.

Inspection Location

If your project has multiple locations where you conduct separate inspections, specify the location where this inspection is being conducted. If only one inspection is conducted for your entire project, enter “Entire Site.” If necessary, complete additional inspection report forms for each separate inspection location.

Inspection Frequency

Check the box that describes the inspection frequency that applies to you. Note that you may be subject to different inspection frequencies in different areas of your site. If your project does not discharge to a “sensitive water” (i.e., a water impaired for sediment or nutrients, or listed as Tier 2, 2.5, or 3 by your state or tribe) and you are not affected by any of the circumstances described in CGP Part 4.4, then you can choose your frequency based on CGP Part 4.2 – either every 7 calendar days, or every 14 calendar days and within 24 hours of a 0.25-inch storm event. For any portion of your site that discharges to a sensitive water, your inspection frequency for that area is fixed under CGP Part 4.3 at every 7calendar days and within 24 hours of a 0.25-inch storm event. If portions of your site are stabilized, are located in arid, semi-arid, or drought-stricken areas, or are subject to frozen conditions, consult CGP Part 4.4 for the applicable inspection frequency. Check all the inspection frequencies that apply to your project.

Was This Inspection Triggered by a 0.25 Inch Storm Event or the occurrence of runoff from snowmelt sufficient to cause a discharge?

If you were required to conduct this inspection because of a 0.25-inch (or greater) rain event, indicate whether you relied on an on-site rain gauge or a nearby weather station (and where the weather station is located). Also, specify the total amount of rainfall for this specific storm event. If you were required to conduct this inspection because of the occurrence of runoff from snowmelt, then check the appropriate box.

Unsafe Conditions for Inspection

Inspections are not required where a portion of the site or the entire site is subject to unsafe conditions. See CGP Part 4.5. These conditions should not regularly occur, and should not be consistently present on a site. Generally, unsafe conditions are those that render the site (or a portion of it) inaccessible or that would pose a significant probability of injury to applicable personnel. Examples could include severe storm or flood conditions, high winds, and downed electrical wires.

If your site, or a portion of it, is affected by unsafe conditions during the time of your inspection, provide a description of the conditions that prevented you from conducting the inspection and what parts of the site were affected. If the entire site was considered unsafe, specify the location as “Entire site”

Condition and Effectiveness of Erosion and Sediment (E&S) Controls (CGP Part 2.2)				
(see reverse for instructions)				
Type/Location of E&S Control [Add an additional sheet if necessary]	Maintenance Needed?*	Corrective Action Required?*	Date on Which Maintenance or Corrective Action First Identified?	Notes
1.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
2.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
3.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
4.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
5.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
6.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
7.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
8.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
9.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
10.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		

* **Note:** The permit differentiates between conditions requiring routine maintenance, and those requiring corrective action. The permit requires maintenance in order to keep controls in effective operating condition. Corrective actions are triggered only for specific conditions, which include: 1) A stormwater control needs repair or replacement (beyond routine maintenance) if it is not operating as intended; 2) A stormwater control necessary to comply with the permit was never installed or was installed incorrectly; 3) You become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1; 4) One of the prohibited discharges in Part 1.3 is occurring or has occurred; or 5) EPA requires corrective actions as a result of a permit violation found during an inspection carried out under Part 4.8. If a condition on your site requires a corrective action, you must also fill out a corrective action form found at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. See Part 5 of the permit for more information.

Instructions for Filling Out the "Erosion and Sediment Control" Table

Type and Location of E&S Controls

Provide a list of all erosion and sediment (E&S) controls that your SWPPP indicates will be installed and implemented at your site. This list must include at a minimum all E&S controls required by CGP Part 2.2. Include also any natural buffers established under CGP Part 2.2.1. Buffer requirements apply if your project's earth-disturbing activities will occur within 50 feet of a water of the U.S. You may group your E&S controls on your form if you have several of the same type of controls (e.g., you may group "Inlet Protection Measures", "Perimeter Controls", and "Stockpile Controls" together on one line), but if there are any problems with a specific control, you must separately identify the location of the control, whether maintenance or corrective action is necessary, and in the notes section you must describe the specifics about the problem you observed.

Maintenance Needed?

Answer "yes" if the E&S control requires maintenance due to normal wear and tear in order for the control to continue operating effectively. At a minimum, maintenance is required in the following specific instances: (1) for perimeter controls, whenever sediment has accumulated to half or more the above-ground height of the control (CGP Part 2.2.3.a); (2) where sediment has been tracked-out onto the surface of off-site streets or other paved areas (CGP Part 2.2.4); (3) for inlet protection measures, when sediment accumulates, the filter becomes clogged, and/or performance is compromised (CGP Part 2.2.10); and (4) for sediment basins, as necessary to maintain at least half of the design capacity of the basin (CGP Part 2.2.12.f). Note: In many cases, "yes" answers are expected and indicate a project with an active operation and maintenance program. You should also answer "yes" if work to fix the problem is still ongoing from the previous inspection.

Corrective Action Needed?

Answer "yes" if during your inspection you found any of the following conditions to be present (CGP, Part 5.1): (1) a required E&S control needs repair or replacement (beyond routine maintenance required under Part 2.1.4); (2) a required E&S control was never installed or was installed incorrectly; (3) you become aware that the inadequacy of the E&S control has led to an exceedance of an applicable water quality standard; (4) one of the prohibited discharges in Part 1.3 is occurring or has occurred; or (5) EPA requires corrective action for an E&S control as a result of a permit violation found during an inspection carried out under Part 4.8. If you answer "yes", you must take corrective action and complete a corrective action report, found at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. Note: You should answer "yes" if work to fix the problem from a previous inspection is still ongoing.

Date on Which Maintenance or Corrective Action First Identified?

Provide the date on which the condition that triggered the need for maintenance or corrective action was first identified. If the condition was just discovered during this inspection, enter the inspection date. If the condition is a carryover from a previous inspection, enter the original date of the condition's discovery.

Notes

For each E&S control and the area immediately surrounding it, note whether the control is properly installed and whether it appears to be working to minimize sediment discharge. Describe any problem conditions you observed such as the following, and why you think they occurred as well as actions (e.g., maintenance or corrective action) you will take or have taken to fix the problem:

1. Failure to install or to properly install a required E&S control
2. Damage or destruction to an E&S control caused by vehicles, equipment, or personnel, a storm event, or other event
3. Mud or sediment deposits found downslope from E&S controls
4. Sediment tracked out onto paved areas by vehicles leaving construction site
5. Noticeable erosion at discharge outlets or at adjacent streambanks or channels
6. Erosion of the site's sloped areas (e.g., formation of rills or gullies)
7. E&S control is no longer working due to lack of maintenance

For buffer areas, make note of whether they are marked off as required, whether there are signs of construction disturbance within the buffer, which is prohibited under the CGP, and whether there are visible signs of erosion resulting from discharges through the area.

If maintenance or corrective action is required, briefly note the reason. If maintenance or corrective action have been completed, make a note of the date it was completed and what was done. *If corrective action is required, note that you will need to complete a separate corrective action report describing the condition and your work to fix the problem.*

Condition and Effectiveness of Pollution Prevention (P2) Practices (CGP Part 2.3)				
(see reverse for instructions)				
Type/Location of P2 Practices [Add an additional sheet if necessary]	Maintenance Needed?*	Corrective Action Required?*	Date on Which Maintenance or Corrective Action First Identified?	Notes
1.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
2.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
3.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
4.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
5.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
6.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
7.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
8.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
9.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
10.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		

* **Note:** The permit differentiates between conditions requiring routine maintenance, and those requiring corrective action. The permit requires maintenance in order to keep controls in effective operating condition. Corrective actions are triggered only for specific conditions, which include: 1) A stormwater control needs repair or replacement (beyond routine maintenance) if it is not operating as intended; 2) A stormwater control necessary to comply with the permit was never installed or was installed incorrectly; 3) You become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1; 4) One of the prohibited discharges in Part 1.3 is occurring or has occurred; or 5) EPA requires corrective actions as a result of a permit violation found during an inspection carried out under Part 4.8. If a condition on your site requires a corrective action, you must also fill out a corrective action form found at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. See Part 5 of the permit for more information.

Instructions for Filling Out the "Pollution Prevention (P2) Practice" Table

Type and Location of P2 Controls

Provide a list of all pollution prevention (P2) practices that are implemented at your site. This list must include all P2 practices required by Part 2.3, and those that are described in your SWPPP.

Maintenance Needed?

Answer "yes" if the P2 practice requires maintenance due to normal wear and tear in order for the control to continue operating effectively. Note: In many cases, "yes" answers are expected and indicate a project with an active operation and maintenance program.

Corrective Action Needed?

Answer "yes" if during your inspection you found any of the following conditions to be present (CGP, Part 5.1): (1) a required P2 practice needs repair or replacement (beyond routine maintenance required under Part 2.1.4); (2) a required P2 practice was never installed or was installed incorrectly; (3) you become aware that the inadequacy of the P2 practice has led to an exceedance of an applicable water quality standard; (4) one of the "prohibited discharges" listed in CGP Part 1.3 is occurring or has occurred, or (5) EPA requires corrective action for a P2 practice as a result of a permit violation found during an inspection carried out under Part 4.8. If you answer "yes", you must take corrective action and complete a corrective action report (see <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>). Note: You should answer "yes" if work to fix the problem from a previous inspection is still ongoing.

Date on Which Maintenance or Corrective Action First Identified?

Provide the date on which the condition that triggered the need for maintenance or corrective action was first identified. If the condition was just discovered during this inspection, enter the inspection date. If the condition is a carryover from a previous inspection, enter the original date of the condition's discovery.

Notes

For each P2 control and the area immediately surrounding it, note whether the control is properly installed, whether it appears to be working to minimize or eliminate pollutant discharges, and whether maintenance or corrective action is required. Describe problem conditions you observed such as the following, and why you think they occurred, as well as actions you will take or have taken to fix the problem:

1. Failure to install or to properly install a required P2 control
2. Damage or destruction to a P2 control caused by vehicles, equipment, or personnel, or a storm event
3. Evidence of a spill, leak, or other type of pollutant discharge, or failure to have properly cleaned up a previous spill, leak, or other type of pollutant discharge
4. Spill response supplies are absent, insufficient, or not where they are supposed to be located
5. Improper storage, handling, or disposal of chemicals, building materials or products, fuels, or wastes
6. P2 practice is no longer working due to lack of maintenance

If maintenance or corrective action is required, briefly note the reason. If maintenance or corrective action have been completed, make a note of the date it was completed and what was done. *If corrective action is required, note that you will need to complete a separate corrective action report describing the condition and your work to fix the problem.*

Stabilization of Exposed Soil (CGP Part 2.2.14)			
(see reverse for instructions)			
Stabilization Area [Add an additional sheet if necessary]	Stabilization Method	Have You Initiated Stabilization?	Notes
1.		<input type="checkbox"/> YES <input type="checkbox"/> NO If yes, provide date:	
2.		<input type="checkbox"/> YES <input type="checkbox"/> NO If yes, provide date:	
3.		<input type="checkbox"/> YES <input type="checkbox"/> NO If yes, provide date:	
4.		<input type="checkbox"/> YES <input type="checkbox"/> NO If yes, provide date:	
5.		<input type="checkbox"/> YES <input type="checkbox"/> NO If yes, provide date:	

Description of Discharges (CGP Part 4.6.6)	
(see reverse for instructions)	
Was a stormwater discharge or other discharge occurring from any part of your site at the time of the inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If "yes", provide the following information for each point of discharge:	
Discharge Location [Add an additional sheet if necessary]	Observations
1.	Describe the discharge: At points of discharge and the channels and banks of waters of the U.S. in the immediate vicinity, are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:
2.	Describe the discharge: At points of discharge and the channels and banks of waters of the U.S. in the immediate vicinity, are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:

Instructions for Filling Out the “Stabilization of Exposed Soil” Table

Stabilization Area

List all areas where soil stabilization is required to begin because construction work in that area has permanently stopped or temporarily stopped (i.e., work will stop for 14 or more days), and all areas where stabilization has been implemented.

Stabilization Method

For each area, specify the method of stabilization (e.g., hydroseed, sod, planted vegetation, erosion control blanket, mulch, rock).

Have You Initiated Stabilization

For each area, indicate whether stabilization has been initiated.

Notes

For each area where stabilization has been initiated, describe the progress that has been made, and what additional actions are necessary to complete stabilization. Note the effectiveness of stabilization in preventing erosion. If stabilization has been initiated but not completed, make a note of the date it is to be completed. If stabilization has been completed, make a note of the date it was completed. If stabilization has not yet been initiated, make a note of the date it is to be initiated, and the date it is to be completed.

Instructions for Filling Out the “Description of Discharges” Table

You are only required to complete this section if a discharge is occurring at the time of the inspection.

Was a Stormwater Discharge Occurring From Any Part of Your Site At The Time of the Inspection?

During your inspection, examine all points of discharge from your site, and determine whether a discharge is occurring. If there is a discharge, answer “yes” and complete the questions below regarding the specific discharge. If there is not a discharge, answer “no” and skip to the next page.

Discharge Location (repeat as necessary if there are multiple points of discharge)

Location of discharge. Specify the location on your site where the discharge is occurring. The location may be an outlet from a stormwater control or constructed stormwater channel, a discharge into a storm sewer inlet, or a specific point on the site. Be as specific as possible; it is recommended that you refer to a precise point on your site map.

Describe the discharge. Include a specific description of any noteworthy characteristics of the discharge such as color; odor; floating, settled, or suspended solids; foam; oil sheen; and other obvious pollution indicators.

Are there visible signs of erosion or sediment accumulation? At each point of discharge and the channel and streambank in the immediate vicinity, visually assess whether there are any obvious signs of erosion and/or sediment accumulation that can be attributed to your discharge. If you answer “yes”, include a description in the space provided of the erosion and sediment deposition that you have found, specify where on the site or in the water of the U.S. it is found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue.

Contractor or Subcontractor Signature and Certification

(see reverse for instructions)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Contractor or Subcontractor: _____ **Date:** _____

Printed Name and Affiliation: _____

Operator Signature and Certification

(see reverse for instructions)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Operator or "Duly Authorized Representative": _____ **Date:** _____

Printed Name and Affiliation: _____

Instructions for Signature/Certification

Each inspection report must be signed and certified to be considered complete.

Contractor or Subcontractor Signature and Certification

Where you rely on a contractor or subcontractor to carry out the inspection and complete the inspection report, you should require the inspector to sign and certify each report. Note that this does not relieve you, the permitted operator, of the requirement to sign and certify the inspection report as well.

Operator Signature and Certification

At a minimum, the inspection report must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply to scenarios (1) and (2):

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation:* A responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship:* A general partner or the proprietor, respectively.
- *For a municipality, state, federal, or other public agency:* Either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

Attachment E – Corrective Action Form

2017 Construction General Permit Corrective Action Report Form – Field Version

Purpose

This Corrective Action Report Form is to assist you in preparing corrective action reports for EPA's 2017 Construction General Permit (CGP). If you are covered under EPA's 2017 CGP, you can use this form to create a corrective action report that complies with the minimum reporting requirements of Part 5.4 of the permit.

You are only required to fill out this form if one of the conditions triggering corrective action in Part 5.1 or 5.3 occurs on your site. Routine maintenance is generally not considered to trigger corrective action. Corrective actions are triggered only for specific conditions that are identified below in the "Overview of Corrective Action Requirements."

If you are covered under a state CGP, this form may be helpful in developing a report that can be used for that permit; however, it will need to be modified to meet the specific requirements of the permit. If your permitting authority requires you to use a specific corrective action report form, you should not use this form.

Notes

While EPA has made every effort to ensure the accuracy of all instructions contained in the Corrective Action Report Form, it is the permit, not the form, that determines the actual obligations of regulated construction stormwater discharges. In the event of a conflict between the Corrective Action Report Form and any corresponding provision of the 2017 CGP, you must abide by the requirements in the permit. EPA welcomes comments on the Corrective Action Report Form at any time and will consider those comments in any future revision of this document. You may contact EPA for CGP-related inquiries at cgp@epa.gov.

Overview of Corrective Action Requirements

Construction operators covered under the 2017 CGP are required to conduct corrective actions and report on progress made in correcting the problem condition(s) in accordance with the following requirements:

Conditions Triggering Corrective Action (Parts 5.1 and 5.3)

Corrective action is required whenever any of the following conditions occur at your site:

- A stormwater control needs repair or replacement (beyond routine maintenance required under Part 2.1.4); or
- A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly; or
- Discharges are causing an exceedance of applicable water quality standards; or
- A Part 1.3 prohibited discharge has occurred; or
- EPA requires corrective action as a result of permit violations found during an inspection carried out under Part 4.8.

Deadlines for Completing Corrective Actions (Part 5.2)

For any condition triggering corrective action:

- You must immediately take all reasonable steps to address the condition (e.g. cleaning up contaminated surfaces so the material(s) is not discharged in subsequent storm events);
- If the problem does not require a new or replacement control or significant repair, you must complete the corrective action by the close of the next business day
- If the problem does require a new or replacement control or significant repair, you must complete corrective action (e.g., installing and making operational any new or modified control, completing repairs) by no later than 7 calendar days from the time of discovery of the condition. If infeasible to complete the installation or repair within 7 calendar days, you must document why it is infeasible and document your schedule for completing the corrective action as soon as practicable. If any of these actions result in changes to the stormwater controls documented in your SWPPP, you must modify your SWPPP within 7 calendar days.

Deadlines for Documenting Corrective Actions in a Report (Part 5.4)

You are required to complete a corrective action report for each corrective action you take in accordance with the following deadlines.

- Within 24 hours of identifying the corrective action condition, you must document the following:
 - The condition identified at your site; and
 - The date and time you identified the condition
- Within 24 hours of completing the corrective action, you must document the following:
 - The actions you took to address the condition, and
 - Whether any SWPPP modifications are required.

Instructions for Using This Report Form

This Field Version of the Corrective Action Report Form is intended to be used in the field and filled out by hand. If you will be filling out the Corrective Action Report Form electronically (i.e., you will be typing in your findings), please use the Electronic Version of the Corrective Action Report Form available at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. The Electronic Version includes text fields with instructions for what to enter.

The following tips for using this form will help you ensure that the minimum permit requirements are met:

- **Review the corrective action requirements.** Before you fill out this corrective action report form, read the CGP's Part 5 corrective action requirements. This will ensure that you have a working understanding of the permit's underlying corrective action requirements.
- **Complete a separate report for each condition that triggers corrective action.** For each triggering condition on your site, you will need to fill out a separate corrective action report form.
- **Complete all required text fields.** Fill out all text fields. Only by filling out all fields will the form be compliant with the requirements of the permit. (Note: Where you do not need the number of rows provided in the corrective action report form, you may leave those rows blank. Or, if you need more space to document your findings, you may add an additional sheet.)
- **Sign and certify each corrective action report.** The operator or a duly authorized representative (see Appendix I, Part I.11.2) must sign and certify each corrective action report form for it to be considered complete. Where a contractor or subcontractor carries out your corrective actions, it is recommended that you also have that individual sign and certify the form, in addition to the signature and certification required of the permitted operator. The form includes a signature block for both parties.
- **Include the corrective action report form with your SWPPP.** Once your form is complete, make sure to include a copy of the corrective action report form in your SWPPP in accordance with Part 7.2.7.e of the CGP.
- **Retain copies of all corrective action reports with your records.** You must retain copies of your corrective action reports in your records in accordance with the requirements in Part 5.4.4 of the 2017 CGP. These reports must be retained for at least 3 years from the date your permit coverage expires or is terminated.

Section-by-Section Instructions

You will find specific instructions corresponding to each section of the report form on the reverse side of each page. These instructions were written in order to provide you with more details in terms of what EPA expects to be documented in these reports

Section A – Initial Report (CGP Part 5.4.1) (Complete this section within 24 hours of identifying the condition that triggered corrective action)				
Name of Project		NPDES ID No.		Today's Date
Date Problem First Discovered		Time Problem First Discovered		
Name and Contact Information of Individual Completing this Form				
What site conditions triggered the requirement to conduct corrective action <i>(check the box that applies)</i> : <input type="checkbox"/> A stormwater control needs repair or replacement (beyond routine maintenance required under Part 2.1.4) <input type="checkbox"/> A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly <input type="checkbox"/> A discharge is causing an exceedance of applicable water quality standards <input type="checkbox"/> A Part 1.3 prohibited discharge has occurred <input type="checkbox"/> EPA requires corrective action as a result of permit violations found during an EPA inspection carried out under Part 4.8 Provide a description of the problem: Deadline for completing corrective action <i>(check the box that applies)</i> : <input type="checkbox"/> Immediately take all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events <input type="checkbox"/> Complete by close of the next business day when problem does not require a new or replacement control or significant repair <input type="checkbox"/> No later than 7 calendar days from the time of discovery for problems that require a new or replacement control or significant repair <input type="checkbox"/> Infeasible to complete the installation or repair within 7 calendar days. Explain why it is infeasible and document schedule for installing control: Enter date of corrective action completion: _____				
Section B – Corrective Action Completion (CGP Part 5.4.2) (Complete this section <u>no later than 24 hours</u> after completing the corrective action)				
Section B.1 – Why the Problem Occurred				
Cause(s) of Problem <i>(Add an additional sheet if necessary)</i>	How You Determined the Cause and the Date You Determined the Cause			
1. 2.	1. 2.			
Section B.2 – Stormwater Control Modifications Implemented to Correct the Problem				
List of Stormwater Control Modification(s) Needed to Correct Problem <i>(Add an additional sheet if necessary)</i>	Date of Completion	SWPPP Update Necessary? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, provide date SWPPP modified:	Notes	
1. 2.		<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, provide date SWPPP modified:		

Instructions for Filling Out the Initial Report (Section A)

You must complete Section A of the report form within 24 hours of discovering the condition that triggered corrective action

Name of Project

Enter the name for the project.

NPDES ID No.

Enter the NPDES ID number that was assigned to your NOI for permit coverage.

Today's Date

Enter the date you completed this form.

Date/Time Problem First Discovered

Specify the date on which the triggering condition was first discovered. Also specify the time of the discovery.

Name/Contact Information

Provide the individual's name, title, and contact information as directed in the form.

Site Condition That Triggered Corrective Action

Under the CGP, corrective action is required when one of 4 triggering conditions occurs at your site or when EPA requires a corrective action as a result of a permit violation found during an EPA inspection. See CGP Parts 5.1 and 5.3. Check the box that corresponds to the condition that triggered this corrective action.

Description of the Site Condition

Provide a summary description of the condition you found that triggered corrective action under CGP Part 5.1 and the specific location where it was found. Be as specific as possible about the location; it is recommended that you refer to a precise point on your site map. If you have already provided this explanation in an inspection report, you can refer to that report.

Deadline for Completing Corrective Action

This deadline is fixed in CGP Part 5.2. For all projects, the deadlines are: (1) immediately take all reasonable steps; (2) by the close of the next business day when the problem does not require significant repair or replacement; (3) no more than 7 calendar days after the date you discovered the problem when the problem does require significant repair or replacement, or (4) if it is infeasible to complete work within the first 7 days, as soon as practicable following the 7th day. If your estimated date of completion falls after the 7-day deadline consistent with (3), above, explain (a) why you believe it is infeasible to complete work within 7 days, and (b) why the date you have established for making the new or modified stormwater control operational is the soonest practicable timeframe.

Instructions for Filling Out the Corrective Action Completion Table (Section B)

You must complete Section B of the report form no later than 24 hours after completing the correction action.

Section B.1 – Why the Problem Occurred

After you have had the opportunity to examine the problem more closely, provide details as to what you believe to be the cause of the problem, and specify the follow-up actions you took (along with the dates of such actions) to diagnose the problem. This is consistent with CGP Part 5.4.2.

Section B.2 – Stormwater Control Modifications Implemented

Provide a list of modifications you made to your stormwater controls to correct the problem and the date you completed such work. Keep in mind that your work must be completed within the timeline specified in Section A for the completion of corrective action work.

Also, if a SWPPP modification is necessary consistent with Part 7.4.1.a in order to reflect changes implemented at your site, indicate the date you modified your SWPPP. Keep in mind that SWPPP changes must be made within 7 days of discovering the problem that triggered this corrective action.

Space is provided for you to include additional notes or observations regarding the change that you implemented at your site to correct the problem.

Section C –Signature and Certification (CGP Part 5.4.3)

Section C.1 – Contractor or Subcontractor Signature and Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Contractor or Subcontractor: _____

Date:

Printed Name and Affiliation: _____

Section C.2 – Operator Signature and Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Operator or "Duly Authorized Representative": _____

Date:

Printed Name and Affiliation: _____

Instructions for Signature and Certification (Section C)

Each corrective action report must be signed and certified to be considered complete.

Section C.1 – Contractor or Subcontractor Signature and Certification

Where you rely on a contractor or subcontractor to complete this report and the associated corrective action, you should require the individual(s) to sign and certify each report. Note that this does not relieve you, the permitted operator, of the requirement to sign and certify the report as well.

Section C.2 – Operator Signature and Certification

At a minimum, the corrective action report form must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply to scenarios (1) and (2):

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation:* A responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship:* A general partner or the proprietor, respectively.
- *For a municipality, state, federal, or other public agency:* Either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

Attachment F – SWPPP Amendment Log

[illegible]

Attachment G –Subcontractor Certifications/Agreements

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: _____

Project Title: _____

Operator(s): _____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform onsite. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: _____

Address: _____

Telephone Number: _____

Type of construction service to be provided: _____

Signature: _____

Title: _____

Date: _____

Attachment H – Grading and Stabilization Activities Log

[illegible]

Attachment I – SWPPP Training Log

Stormwater Pollution Prevention Training Log

Project Name:

Project Location:

Instructor's Name(s):

Instructor's Title(s):

Course Location: _____ Date: _____

Course Length (hours): _____

Stormwater Training Topic: *(check as appropriate)*

☐ **Sediment and Erosion Controls**

☐ **Emergency Procedures**

☐ **Stabilization Controls**

☐ **Inspections/Corrective Actions**

☐ **Pollution Prevention Measures**

Specific Training Objective: _____

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Company
1		
2		
3		
4		
5		
6		
7		
8		

Attachment J – Delegation of Authority Form

Delegation of Authority

I, _____ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the Construction General Permit, at the _____ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

_____ (name of person or position)
_____ (company)
_____ (address)
_____ (city, state, zip)
_____ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in Appendix I of EPA's Construction General Permit (CGP), and that the designee above meets the definition of a "duly authorized representative" as set forth in Appendix I.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____

Company: _____

Title: _____

Signature: _____

Date: _____

Attachment K – Endangered Species Documentation

2017 Construction General Permit Corrective Action Report Form – Field Version

Purpose

This Corrective Action Report Form is to assist you in preparing corrective action reports for EPA's 2017 Construction General Permit (CGP). If you are covered under EPA's 2017 CGP, you can use this form to create a corrective action report that complies with the minimum reporting requirements of Part 5.4 of the permit.

You are only required to fill out this form if one of the conditions triggering corrective action in Part 5.1 or 5.3 occurs on your site. Routine maintenance is generally not considered to trigger corrective action. Corrective actions are triggered only for specific conditions that are identified below in the "Overview of Corrective Action Requirements."

If you are covered under a state CGP, this form may be helpful in developing a report that can be used for that permit; however, it will need to be modified to meet the specific requirements of the permit. If your permitting authority requires you to use a specific corrective action report form, you should not use this form.

Notes

While EPA has made every effort to ensure the accuracy of all instructions contained in the Corrective Action Report Form, it is the permit, not the form, that determines the actual obligations of regulated construction stormwater discharges. In the event of a conflict between the Corrective Action Report Form and any corresponding provision of the 2017 CGP, you must abide by the requirements in the permit. EPA welcomes comments on the Corrective Action Report Form at any time and will consider those comments in any future revision of this document. You may contact EPA for CGP-related inquiries at cgp@epa.gov.

Overview of Corrective Action Requirements

Construction operators covered under the 2017 CGP are required to conduct corrective actions and report on progress made in correcting the problem condition(s) in accordance with the following requirements:

Conditions Triggering Corrective Action (Parts 5.1 and 5.3)

Corrective action is required whenever any of the following conditions occur at your site:

- A stormwater control needs repair or replacement (beyond routine maintenance required under Part 2.1.4); or
- A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly; or
- Discharges are causing an exceedance of applicable water quality standards; or
- A Part 1.3 prohibited discharge has occurred; or
- EPA requires corrective action as a result of permit violations found during an inspection carried out under Part 4.8.

Deadlines for Completing Corrective Actions (Part 5.2)

For any condition triggering corrective action:

- You must immediately take all reasonable steps to address the condition (e.g. cleaning up contaminated surfaces so the material(s) is not discharged in subsequent storm events);
- If the problem does not require a new or replacement control or significant repair, you must complete the corrective action by the close of the next business day
- If the problem does require a new or replacement control or significant repair, you must complete corrective action (e.g., installing and making operational any new or modified control, completing repairs) by no later than 7 calendar days from the time of discovery of the condition. If infeasible to complete the installation or repair within 7 calendar days, you must document why it is infeasible and document your schedule for completing the corrective action as soon as practicable. If any of these actions result in changes to the stormwater controls documented in your SWPPP, you must modify your SWPPP within 7 calendar days.

Deadlines for Documenting Corrective Actions in a Report (Part 5.4)

You are required to complete a corrective action report for each corrective action you take in accordance with the following deadlines.

- Within 24 hours of identifying the corrective action condition, you must document the following:
 - The condition identified at your site; and
 - The date and time you identified the condition
- Within 24 hours of completing the corrective action, you must document the following:
 - The actions you took to address the condition, and
 - Whether any SWPPP modifications are required.

Instructions for Using This Report Form

This Field Version of the Corrective Action Report Form is intended to be used in the field and filled out by hand. If you will be filling out the Corrective Action Report Form electronically (i.e., you will be typing in your findings), please use the Electronic Version of the Corrective Action Report Form available at <https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources>. The Electronic Version includes text fields with instructions for what to enter.

The following tips for using this form will help you ensure that the minimum permit requirements are met:

- **Review the corrective action requirements.** Before you fill out this corrective action report form, read the CGP's Part 5 corrective action requirements. This will ensure that you have a working understanding of the permit's underlying corrective action requirements.
- **Complete a separate report for each condition that triggers corrective action.** For each triggering condition on your site, you will need to fill out a separate corrective action report form.
- **Complete all required text fields.** Fill out all text fields. Only by filling out all fields will the form be compliant with the requirements of the permit. (Note: Where you do not need the number of rows provided in the corrective action report form, you may leave those rows blank. Or, if you need more space to document your findings, you may add an additional sheet.)
- **Sign and certify each corrective action report.** The operator or a duly authorized representative (see Appendix I, Part I.11.2) must sign and certify each corrective action report form for it to be considered complete. Where a contractor or subcontractor carries out your corrective actions, it is recommended that you also have that individual sign and certify the form, in addition to the signature and certification required of the permitted operator. The form includes a signature block for both parties.
- **Include the corrective action report form with your SWPPP.** Once your form is complete, make sure to include a copy of the corrective action report form in your SWPPP in accordance with Part 7.2.7.e of the CGP.
- **Retain copies of all corrective action reports with your records.** You must retain copies of your corrective action reports in your records in accordance with the requirements in Part 5.4.4 of the 2017 CGP. These reports must be retained for at least 3 years from the date your permit coverage expires or is terminated.

Section-by-Section Instructions

You will find specific instructions corresponding to each section of the report form on the reverse side of each page. These instructions were written in order to provide you with more details in terms of what EPA expects to be documented in these reports

Section A – Initial Report (CGP Part 5.4.1) (Complete this section within 24 hours of identifying the condition that triggered corrective action)				
Name of Project		NPDES ID No.		Today's Date
Date Problem First Discovered		Time Problem First Discovered		
Name and Contact Information of Individual Completing this Form				
What site conditions triggered the requirement to conduct corrective action <i>(check the box that applies)</i> : <input type="checkbox"/> A stormwater control needs repair or replacement (beyond routine maintenance required under Part 2.1.4) <input type="checkbox"/> A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly <input type="checkbox"/> A discharge is causing an exceedance of applicable water quality standards <input type="checkbox"/> A Part 1.3 prohibited discharge has occurred <input type="checkbox"/> EPA requires corrective action as a result of permit violations found during an EPA inspection carried out under Part 4.8 Provide a description of the problem: Deadline for completing corrective action <i>(check the box that applies)</i> : <input type="checkbox"/> Immediately take all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events <input type="checkbox"/> Complete by close of the next business day when problem does not require a new or replacement control or significant repair <input type="checkbox"/> No later than 7 calendar days from the time of discovery for problems that require a new or replacement control or significant repair <input type="checkbox"/> Infeasible to complete the installation or repair within 7 calendar days. Explain why it is infeasible and document schedule for installing control: Enter date of corrective action completion: _____				
Section B – Corrective Action Completion (CGP Part 5.4.2) (Complete this section <u>no later than 24 hours</u> after completing the corrective action)				
Section B.1 – Why the Problem Occurred				
Cause(s) of Problem <i>(Add an additional sheet if necessary)</i>	How You Determined the Cause and the Date You Determined the Cause			
1. 2.	1. 2.			
Section B.2 – Stormwater Control Modifications Implemented to Correct the Problem				
List of Stormwater Control Modification(s) Needed to Correct Problem <i>(Add an additional sheet if necessary)</i>	Date of Completion	SWPPP Update Necessary?	Notes	
1.		<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, provide date SWPPP modified:		
2.		<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, provide date SWPPP modified:		

Instructions for Filling Out the Initial Report (Section A)

You must complete Section A of the report form within 24 hours of discovering the condition that triggered corrective action

Name of Project

Enter the name for the project.

NPDES ID No.

Enter the NPDES ID number that was assigned to your NOI for permit coverage.

Today's Date

Enter the date you completed this form.

Date/Time Problem First Discovered

Specify the date on which the triggering condition was first discovered. Also specify the time of the discovery.

Name/Contact Information

Provide the individual's name, title, and contact information as directed in the form.

Site Condition That Triggered Corrective Action

Under the CGP, corrective action is required when one of 4 triggering conditions occurs at your site or when EPA requires a corrective action as a result of a permit violation found during an EPA inspection. See CGP Parts 5.1 and 5.3. Check the box that corresponds to the condition that triggered this corrective action.

Description of the Site Condition

Provide a summary description of the condition you found that triggered corrective action under CGP Part 5.1 and the specific location where it was found. Be as specific as possible about the location; it is recommended that you refer to a precise point on your site map. If you have already provided this explanation in an inspection report, you can refer to that report.

Deadline for Completing Corrective Action

This deadline is fixed in CGP Part 5.2. For all projects, the deadlines are: (1) immediately take all reasonable steps; (2) by the close of the next business day when the problem does not require significant repair or replacement; (3) no more than 7 calendar days after the date you discovered the problem when the problem does require significant repair or replacement, or (4) if it is infeasible to complete work within the first 7 days, as soon as practicable following the 7th day. If your estimated date of completion falls after the 7-day deadline consistent with (3), above, explain (a) why you believe it is infeasible to complete work within 7 days, and (b) why the date you have established for making the new or modified stormwater control operational is the soonest practicable timeframe.

Instructions for Filling Out the Corrective Action Completion Table (Section B)

You must complete Section B of the report form no later than 24 hours after completing the correction action.

Section B.1 – Why the Problem Occurred

After you have had the opportunity to examine the problem more closely, provide details as to what you believe to be the cause of the problem, and specify the follow-up actions you took (along with the dates of such actions) to diagnose the problem. This is consistent with CGP Part 5.4.2.

Section B.2 – Stormwater Control Modifications Implemented

Provide a list of modifications you made to your stormwater controls to correct the problem and the date you completed such work. Keep in mind that your work must be completed within the timeline specified in Section A for the completion of corrective action work.

Also, if a SWPPP modification is necessary consistent with Part 7.4.1.a in order to reflect changes implemented at your site, indicate the date you modified your SWPPP. Keep in mind that SWPPP changes must be made within 7 days of discovering the problem that triggered this corrective action.

Space is provided for you to include additional notes or observations regarding the change that you implemented at your site to correct the problem.

Section C –Signature and Certification (CGP Part 5.4.3)

Section C.1 – Contractor or Subcontractor Signature and Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Contractor or Subcontractor: _____

Date:

Printed Name and Affiliation: _____

Section C.2 – Operator Signature and Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Operator or "Duly Authorized Representative": _____

Date:

Printed Name and Affiliation: _____

Instructions for Signature and Certification (Section C)

Each corrective action report must be signed and certified to be considered complete.

Section C.1 – Contractor or Subcontractor Signature and Certification

Where you rely on a contractor or subcontractor to complete this report and the associated corrective action, you should require the individual(s) to sign and certify each report. Note that this does not relieve you, the permitted operator, of the requirement to sign and certify the report as well.

Section C.2 – Operator Signature and Certification

At a minimum, the corrective action report form must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply to scenarios (1) and (2):

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation:* A responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship:* A general partner or the proprietor, respectively.
- *For a municipality, state, federal, or other public agency:* Either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

Attachment L – Historic Preservation Documentation

Attachment M – Rainfall Gauge Recording

Use the table below to record the rainfall gauge readings at the beginning and end of each work day. An example table follows.

Month/Year			Month/Year			Month/Year		
Day	Start time	End time	Day	Start time	End time	Day	Start time	End time
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
6			6			6		
7			7			7		
8			8			8		
9			9			9		
10			10			10		
11			11			11		
12			12			12		
13			13			13		
14			14			14		
15			15			15		
16			16			16		
17			17			17		
18			18			18		
19			19			19		
20			20			20		
21			21			21		
22			22			22		
23			23			23		
24			24			24		
25			25			25		
26			26			26		
27			27			27		
28			28			28		
29			29			29		
30			30			30		
31			31			31		

Attachment N – Order of Conditions

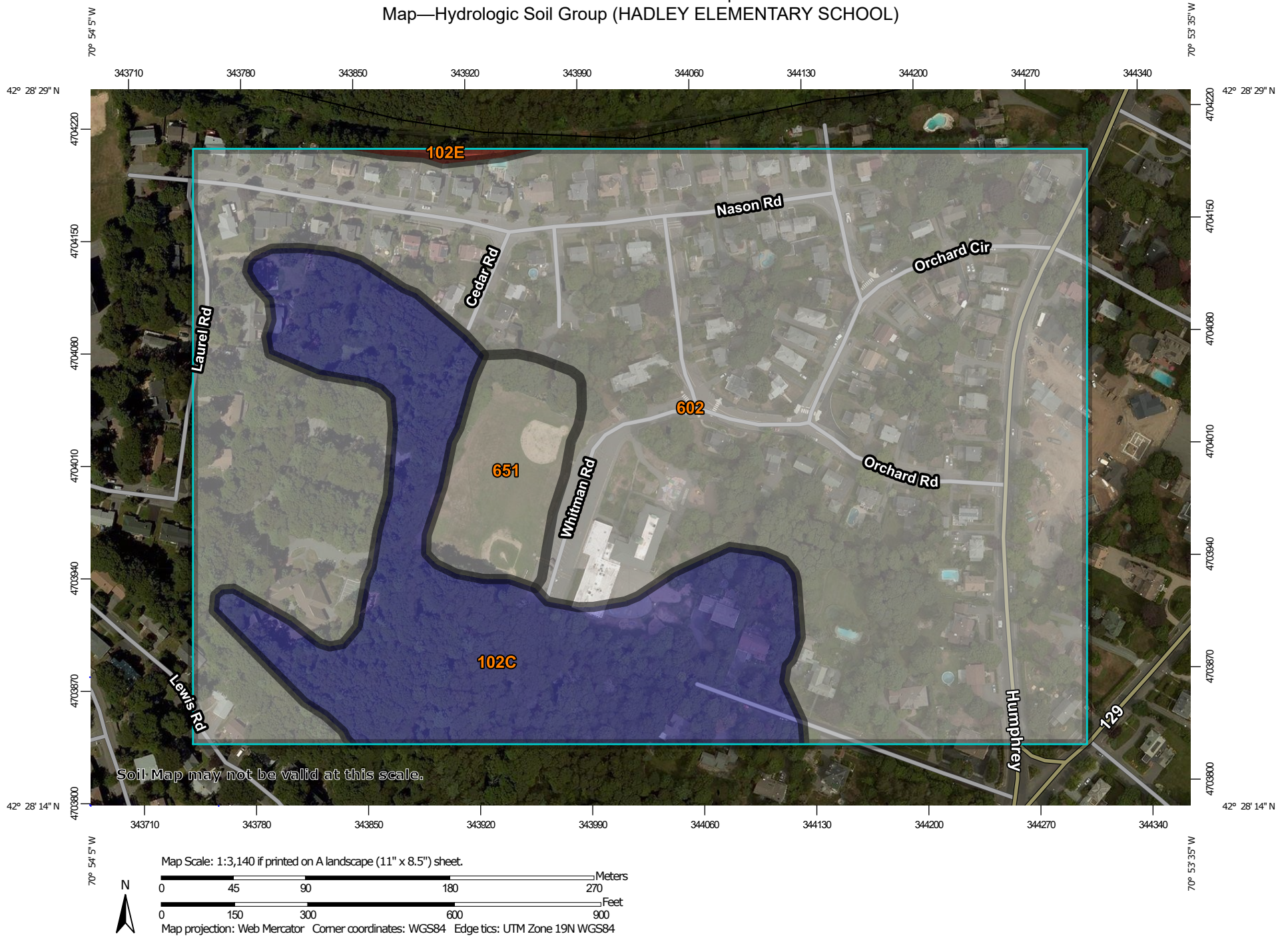
APPENDIX G

Soil Investigations

NRCS Soil Maps and Descriptions
Soil Test Pit Logs

Custom Soil Resource Report


Map—Hydrologic Soil Group (HADLEY ELEMENTARY SCHOOL)



Custom Soil Resource Report





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 1:15,800.

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: Essex County, Massachusetts, Southern Part
Survey Area Data: Version 18, Sep 2, 2021

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

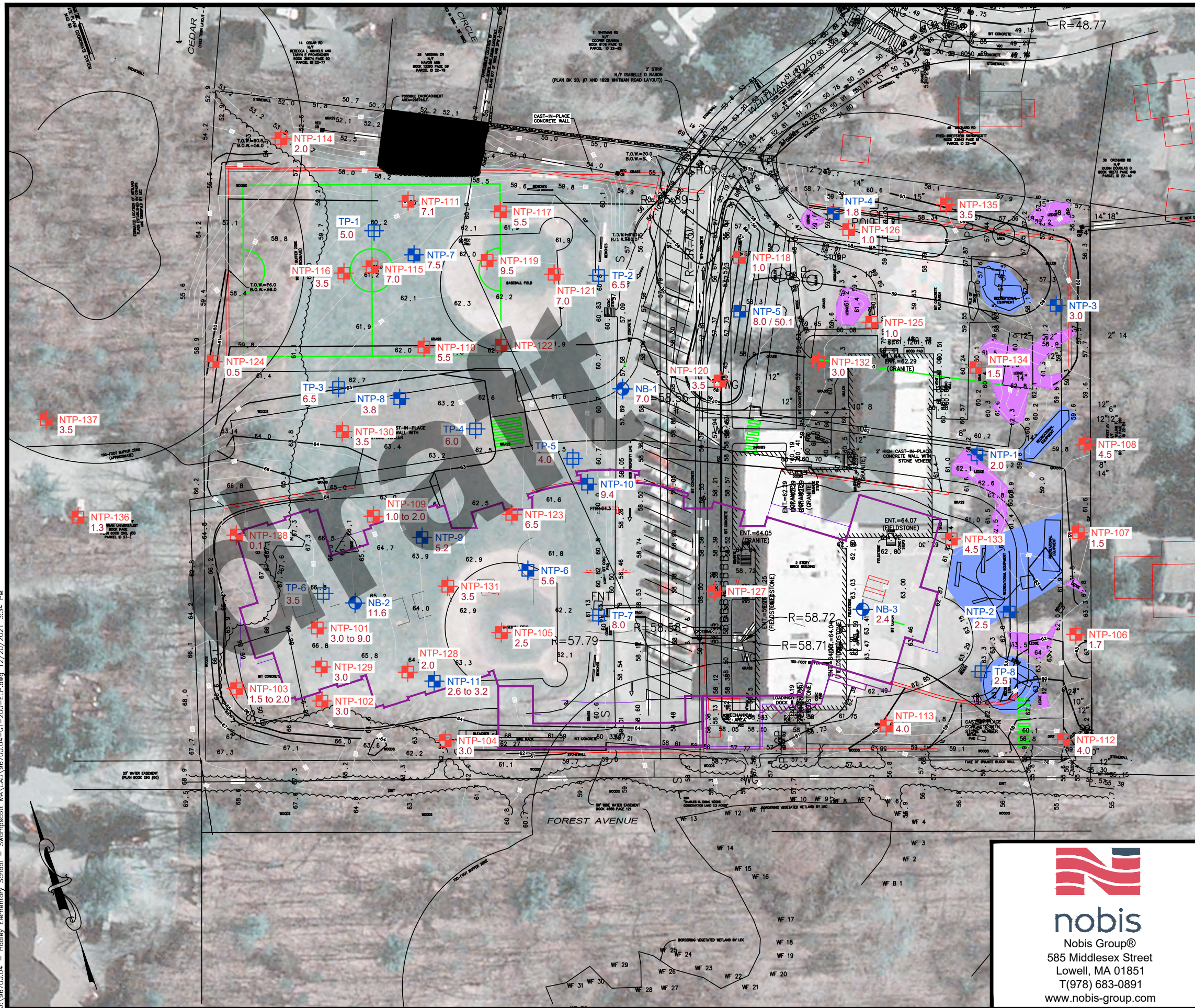
Date(s) aerial images were photographed: Mar 30, 2011—Aug 25, 2014

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

Table—Hydrologic Soil Group (HADLEY ELEMENTARY SCHOOL)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	B	11.1	21.6%
102E	Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes	D	0.1	0.3%
602	Urban land		37.7	73.4%
651	Udorthents, smoothed		2.4	4.7%
Totals for Area of Interest			51.4	100.0%

Rating Options—Hydrologic Soil Group (HADLEY ELEMENTARY SCHOOL)*Aggregation Method:* Dominant Condition*Component Percent Cutoff:* None Specified*Tie-break Rule:* Higher



NOTES

1. THIS PLAN WAS DEVELOPED USING 2008/2009 ORTHOIMAGERY OBTAINED FROM THE MASSGIS WEBSITE AND AN AUTOCAD SURVEY DRAWING PREPARED BY NITSCH ENGINEERING AND PROVIDED BY LAVALLEE BRENSINGER ARCHITECTS ON NOVEMBER 22, 2021.
2. LOCATIONS AND SITE FEATURES DEPICTED ARE APPROXIMATE AND GIVEN FOR ILLUSTRATIVE PURPOSES.
3. ELEVATIONS REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
4. REFER TO FIGURE 5 FOR SUBSURFACE PROFILE A-A'.

LEGEND



NTP-101



NTP-1



NB-1



TP-1

4.0

APPROXIMATE LOCATION OF TEST PIT EXCAVATED BY THE SWAMPSCOTT DPW AND OBSERVED BY NOBIS BETWEEN DECEMBER 1 AND DECEMBER 7, 2021.

APPROXIMATE LOCATION OF TEST PIT EXCAVATED BY SWAMPSCOTT DPW AND OBSERVED BY NOBIS ON MARCH 4, 2021

APPROXIMATE LOCATION OF TEST BORING DRILLED BY NEW ENGLAND BORING CONTRACTORS OF DERRY, NEW HAMPSHIRE AND OBSERVED BY NOBIS ON MARCH 3, 2021

APPROXIMATE LOCATION OF TEST PITS EXCAVATED BY SWAMPSCOTT DPW AND OBSERVED BY LAHLAF GEOTECHNICAL CONSULTING, INC (LGC). ON AUGUST 12, 2013.

APPROXIMATE DEPTH TO BEDROCK

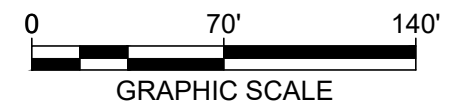


FIGURE 2

SUBSURFACE EXPLORATION PLAN
PROPOSED AND EXISTING
HADLEY ELEMENTARY SCHOOL
10 WHITMAN ROAD
SWAMPSCOTT, MASSACHUSETTS

DRAWN BY: SNP / PCC / SAK

CHECKED BY: XX

PROJECT NO. 96700.04

DATE: DECEMBER 2021



nobis
Nobis Group®
585 Middlesex Street
Lowell, MA 01851
T(978) 683-0891
www.nobis-group.com

TABLE 1
96700.04 - Hadley Elementary School
SUMMARY OF SUBSURFACE CONDITIONS

	NTP-101	NTP-102	NTP-103	NTP-104	NTP-105	NTP-106	NTP-107	NTP-108	NTP-109	NTP-110	NTP-111	NTP-112	NTP-113
Depth (ft) to Top of:	T	T	T	T	T	T	T	T	T	T	T	F	T
Asphalt/Topsoil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NE	0.0
Fill	0.3	0.9	0.9	0.5 to 1.0	0.7	NE	0.5	1.3	1.0 to 1.5	1.3	1.0	0.0	0.5
Organic Soils	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Native	4.0	NE	NE	NE	NE	NE	NE	3.0	NE	NE	NE	NE	NE
Weathered/Fractured Bedrock	NE	2.0	NE	NE	1.5 to 2.0	NE	NE	NE	NE	4.5	4.0	NE	NE
Competent Bedrock	3.0 / NE	3.0	1.5 to 2.0	3.0	2.5	1.7	1.5	4.5	1.0 to 2.5	5.5	7.1	4.0	4.0
Bottom of Exploration	9.0	3.0	1.5 to 2.0	3.0	2.5	1.7	1.5	4.5	1.0 to 2.5	5.5	7.1	4.0	4.0
Thickness (ft) of:													
Asphalt/Topsoil	0.3	0.9	0.9	0.5 to 1.0	0.7	1.7	0.5	1.3	1.0 to 1.5	1.3	1.0	NE	0.5
Fill	3.7	1.1	0.6 to 1.1	2.0 to 2.5	0.8 to 1.3	NE	1.0	1.7	NE to 1.0	3.2	3.0	4.0	3.5
Organic Soils	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Native	0.0 to 5.0	NE	NE	NE	NE	NE	NE	1.5	NE	NE	NE	NE	NE
Weathered/Fractured Bedrock	NE	1.0	NE	NE	0.5 to 1.0	NE	NE	NE	NE	1.0	3.1	NE	NE
Elev. (ft) top of:													
Asphalt/Topsoil	66.5	66.0	67.0	63.0	62.5	63.5	61.5	60.0	65.0	62.5	59.5	NE	61.0
Fill	66.2	65.1	66.1	62.0 to 62.5	61.8	NE	61.0	58.7	63.5 to 64.0	61.2	58.5	59.5	60.5
Organic Soils	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Native	62.5 / NE	NE	NE	NE	NE	NE	NE	57.0	NE	NE	NE	NE	NE
Weathered/Fractured Bedrock	NE	64.0	NE	NE	60.5 to 61.0	NE	NE	NE	NE	58.0	55.5	NE	NE
Competent Bedrock	63.5 / NE	63.0	65.0 to 65.5	60.0	60.0	61.8	60.0	55.5	62.5 to 64.0	57.0	52.4	55.5	57.0
Bottom of Exploration	57.5 to 63.5	63.0	65.0 to 65.5	60.0	60.0	61.8	60.0	55.5	62.5 to 64.0	57.0	52.4	55.5	57.0

- Notes:
- 1.) NE = Not Encountered; NM = Not Measured; NP = Not Provided; NC=Not Cored
 - 2.) Topsoil thicknesses noted above sometimes include fill and subsoil thicknesses and should not be used to estimate topsoil quantities.
 - 3.) Competent bedrock is reported as the depth at which the rock core recovery began or excavator refusal was encountered.
 - 4.) Fills with organic content noted on the exploration logs are reported as organic soils.
 - 5.) All elevations referenced to the North American Vertical Datum (NAVD88).
 - 6.) Depths and elevations of strata should be considered approximate.

TABLE 1
96700.04 - Hadley Elementary School
SUMMARY OF SUBSURFACE CONDITIONS

	NTP-114	NTP-115	NTP-116	NTP-117	NTP-118	NTP-119	NTP-120	NTP-121	NTP-122	NTP-123	NTP-124	NTP-125	NTP-126
Depth (ft) to Top of:	T	T	T	T	T	T	T	T	T	T	T	T	T
Asphalt/Topsoil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fill	NE	0.8	1.0	1.5	NE	0.5	1.0	1.0	1.3	1.0	NE	NE	NE
Organic Soils	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Native	NE	NE	NE	NE	NE	NE	2.1	NE	NE	NE	NE	NE	NE
Weathered/Fractured Bedrock	NE	2.8	NE	4.0	1.0	5.5	3.0	4.0	4.0	4.0	NE	NE	NE
Competent Bedrock	2.0	7.0	4.0	5.5	1.8	9.5	3.5	7.0	7.5	6.5	0.5	1.0	0.9
Bottom of Exploration	2.0	7.0	4.0	5.5	1.8	9.5	3.5	7.0	7.5	6.5	0.5	1.0	0.9
Thickness (ft) of:													
Asphalt/Topsoil	2.0	0.8	1.0	1.5	1.0	0.5	1.0	1.0	1.3	1.0	0.5	1.0	0.9
Fill	NE	2.0	3.0	2.5	NE	5.0	2.0	3.0	2.7	3.0	NE	NE	NE
Organic Soils	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Native	NE	NE	NE	NE	NE	NE	0.9	NE	NE	NE	NE	NE	NE
Weathered/Fractured Bedrock	NE	4.2	NE	1.5	0.8	4.0	0.5	3.0	3.5	2.5	NE	NE	NE
Elev. (ft) top of:													
Asphalt/Topsoil	54.5	61.0	60.5	61.0	57.5	62.0	58.0	62.0	62.5	62.0	59.5	60.5	59.0
Fill	NE	60.2	59.5	59.5	NE	61.5	57.0	61.0	61.2	61.0	NE	NE	NE
Organic Soils	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Native	NE	NE	NE	NE	NE	NE	55.9	NE	NE	NE	NE	NE	NE
Weathered/Fractured Bedrock	NE	58.2	NE	57.0	56.5	56.5	55.0	58.0	58.5	58.0	NE	NE	NE
Competent Bedrock	52.5	54.0	56.5	55.5	55.7	52.5	54.5	55.0	55.0	55.5	59.0	59.5	58.1
Bottom of Exploration	52.5	54.0	56.5	55.5	55.7	52.5	54.5	55.0	55.0	55.5	59.0	59.5	58.1

- Notes:
- 1.) NE = Not Encountered; NM = Not Measured; NP = Not Provided; NC=Not Cored
 - 2.) Topsoil thicknesses noted above sometimes include fill and subsoil thicknesses and should not be used to estimate topsoil quantities.
 - 3.) Competent bedrock is reported as the depth at which the rock core recovery began or excavator refusal was encountered.
 - 4.) Fills with organic content noted on the exploration logs are reported as organic soils.
 - 5.) All elevations referenced to the North American Vertical Datum (NAVD88).
 - 6.) Depths and elevations of strata should be considered approximate.

TABLE 1
96700.04 - Hadley Elementary School
SUMMARY OF SUBSURFACE CONDITIONS

	NTP-127	NTP-128	NTP-129	NTP-130	NTP-131	NTP-132	NTP-133	NTP-134	NTP-135	NTP-136	NTP-137	NTP-138	NB-1
Depth (ft) to Top of:	A	T	T	T	T	T	T	T	T	T	T	T	A
<i>Asphalt/Topsoil</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Fill</i>	0.5	NE	1.0	NE	1.0	1.0	1.0	NE	1.0	NE	NE	NE	0.3
<i>Organic Soils</i>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<i>Native</i>	NE	NE	NE	NE	NE	NE	NE	NE	2.5	NE	NE	NE	NE
<i>Weathered/Fractured Bedrock</i>	NE	NE	NE	NE	1.5	2.1	4.0	NE	3.4	NE	NE	NE	3.5
<i>Competent Bedrock</i>	NE	2.0	3.0	3.0	2.5	3.0	4.5	1.5	3.5	1.3	3.5	0.1	7.0
<i>Bottom of Exploration</i>	5.0	2.0	3.0	3.0	2.5	3.0	4.5	1.5	3.5	1.3	3.5	0.1	10.0
Thickness (ft) of:													
<i>Asphalt/Topsoil</i>	0.5	2.0	1.0	3.0	1.0	1.0	1.0	1.5	1.0	1.3	3.5	0.1	0.3
<i>Fill</i>	4.5	NE	2.0	NE	0.5	1.1	3.0	NE	2.4	NE	NE	NE	3.2
<i>Organic Soils</i>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<i>Native</i>	NE	NE	NE	NE	NE	NE	NE	NE	0.9	NE	NE	NE	NE
<i>Weathered/Fractured Bedrock</i>	NE	NE	NE	NE	1.0	0.9	0.5	NE	0.1	NE	NE	NE	3.5
Elev. (ft) top of:													
<i>Asphalt/Topsoil</i>	58.5	64.5	66.5	66.5	63.5	60.0	62.0	60.0	58.0	NP	NP	66.5	57.9
<i>Fill</i>	58.0	NE	65.5	NE	62.5	59.0	61.0	NE	57.0	NP	NP	NE	57.6
<i>Organic Soils</i>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NP	NP	NE	NE
<i>Native</i>	NE	NE	NE	NE	NE	NE	NE	NE	55.5	NP	NP	NE	NE
<i>Weathered/Fractured Bedrock</i>	NE	NE	NE	NE	62.0	57.9	58.0	NE	54.6	NP	NP	NE	54.4
<i>Competent Bedrock</i>	NE	62.5	63.5	63.5	61.0	57.0	57.5	58.5	54.5	NP	NP	66.4	50.9
<i>Bottom of Exploration</i>	53.5	62.5	63.5	63.5	61.0	57.0	57.5	58.5	54.5	NP	NP	66.4	47.9

Notes:

- 1.) NE = Not Encountered; NM = Not Measured; NP = Not Provided; NC=Not Cored
- 2.) Topsoil thicknesses noted above sometimes include fill and subsoil thicknesses and should not be used to estimate topsoil quantities.
- 3.) Competent bedrock is reported as the depth at which the rock core recovery began or excavator refusal was encountered.
- 4.) Fills with organic content noted on the exploration logs are reported as organic soils.
- 5.) All elevations referenced to the North American Vertical Datum (NAVD88).
- 6.) Depths and elevations of strata should be considered approximate.

TABLE 1
96700.04 - Hadley Elementary School
SUMMARY OF SUBSURFACE CONDITIONS

	NB-2	NB-3	NTP-1	NTP-2	NTP-3	NTP-4	NTP-5	NTP-6	NTP-7	NTP-8	NTP-9	NTP-10	NTP-11
Depth (ft) to Top of:	T	A	T	T	T	T	T	T	T	T	T	T	T
Asphalt/Topsoil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fill	1.0	0.3	NE	1.0	0.5	NE	3.0	1.8	0.5	1.5	1.0	1.5	NE
Organic Soils	NE	0.9	NE	NE	1.5	NE	NE	NE	NE	NE	NE	NE	NE
Native	NE	NE	NE	NE	2.0	1.4	4.4	NE	NE	2.0	3.3	7.5	1.0
Weathered/Fractured Bedrock	7.2	NE	1.5	NE	NE	NE	NE	NE	5.5	NE	NE	NE	NE
Competent Bedrock	11.6	2.4	2.0	2.5	3.0	1.8	8.0	5.6	7.5	3.8	5.2	9.4	2.6 to 3.2
Bottom of Exploration	11.6	7.2	2.0	2.5	3.0	1.8	8.0	5.6	7.5	3.8	5.2	9.4	2.6 to 3.2
Thickness (ft) of:													
Asphalt/Topsoil	1.0	0.3	1.5	1.0	0.5	1.4	3.0	1.8	0.5	1.5	1.0	1.5	1.0
Fill	6.2	0.6	NE	1.5	1.0	NE	1.4	3.8	5.0	0.5	2.3	6.0	NE
Organic Soils	NE	1.5	NE	NE	0.5	NE	NE	NE	NE	NE	NE	NE	NE
Native	NE	NE	NE	NE	1.0	0.4	3.6	NE	NE	1.8	1.9	1.9	1.6 to 2.2
Weathered/Fractured Bedrock	4.4	NE	0.5	NE	NE	NE	NE	NE	2.0	NE	NE	NE	NE
Elev. (ft) top of:													
Asphalt/Topsoil	66.0	63.2	61.2	62.8	57.7	59.3	58.1	62.2	61.2	63.2	63.7	61.5	64.1
Fill	65.0	62.9	NE	61.8	57.2	NE	NE	60.4	60.7	61.7	62.7	60.0	NE
Organic Soils	NE	62.3	NE	NE	56.2	NE	NE	NE	NE	NE	NE	NE	NE
Native	NE	NE	NE	NE	55.7	57.9	53.7	NE	NE	61.2	60.4	54.0	63.1
Weathered/Fractured Bedrock	58.8	NE	59.7	NE	NE	NE	NE	NE	55.7	NE	NE	NE	NE
Competent Bedrock	54.4	60.8	59.2	60.3	54.7	57.5	50.1	56.6	53.7	59.4	58.5	52.1	60.9 to 61.5
Bottom of Exploration	54.4	56.0	59.2	60.3	54.7	57.5	50.1	56.6	53.7	59.4	58.5	52.1	60.9 to 61.5

- Notes:
- 1.) NE = Not Encountered; NM = Not Measured; NP = Not Provided; NC=Not Cored
 - 2.) Topsoil thicknesses noted above sometimes include fill and subsoil thicknesses and should not be used to estimate topsoil quantities.
 - 3.) Competent bedrock is reported as the depth at which the rock core recovery began or excavator refusal was encountered.
 - 4.) Fills with organic content noted on the exploration logs are reported as organic soils.
 - 5.) All elevations referenced to the North American Vertical Datum (NAVD88).
 - 6.) Depths and elevations of strata should be considered approximate.

TABLE 1
96700.04 - Hadley Elementary School
SUMMARY OF SUBSURFACE CONDITIONS

	TP-1	TP-2	TP-3	TP-4	TP-5	TP-6	TP-7	TP-8
Depth (ft) to Top of:	T	T	T	T	T	T	T	T
<i>Asphalt/Topsoil</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Fill</i>	0.9	0.8	1.0	1.0	0.8	1.0	0.5	0.5
<i>Organic Soils</i>	NE	1.5	NE	NE	NE	2.0	4.5	NE
<i>Native</i>	NE	NE	4.0	NE	1.6	NE	7.0	NE
<i>Weathered/Fractured Bedrock</i>	3.5	5.5	NE	5.0	3.0	3.0	NE	NE
<i>Competent Bedrock</i>	5.0	6.5	6.5	6.0	4.0	3.5	8.3	2.5
<i>Bottom of Exploration</i>	5.0	6.5	6.5	6.0	4.0	3.5	8.3	2.5
Thickness (ft) of:								
<i>Asphalt/Topsoil</i>	0.9	0.8	1.0	1.0	0.8	1.0	0.5	0.5
<i>Fill</i>	2.6	0.8	3.0	4.0	0.9	1.0	4.0	2.0
<i>Organic Soils</i>	NE	4.0	NE	NE	NE	1.0	2.5	NE
<i>Native</i>	NE	NE	2.5	NE	1.4	NE	1.3	NE
<i>Weathered/Fractured Bedrock</i>	1.5	1.0	NE	1.0	1.0	0.5	NE	NE
Elev. (ft) top of:								
<i>Asphalt/Topsoil</i>	60.0	61.0	62.5	62.5	61.5	67.0	61.0	63.5
<i>Fill</i>	59.1	60.3	61.5	61.5	60.8	66.0	60.5	63.0
<i>Organic Soils</i>	NE	59.5	NE	NE	NE	65.0	56.5	NE
<i>Native</i>	NE	NE	58.5	NE	59.9	NE	54.0	NE
<i>Weathered/Fractured Bedrock</i>	56.5	55.5	NE	57.5	58.5	64.0	NE	NE
<i>Competent Bedrock</i>	55.0	54.5	56.0	56.5	57.5	63.5	52.7	61.0
<i>Bottom of Exploration</i>	55.0	54.5	56.0	56.5	57.5	63.5	52.7	61.0

Notes:

- 1.) NE = Not Encountered; NM = Not Measured; NP = Not Provided; NC=Not Cored
- 2.) Topsoil thicknesses noted above sometimes include fill and subsoil thicknesses and should not be used to estimate topsoil quantities.
- 3.) Competent bedrock is reported as the depth at which the rock core recovery began or excavator refusal was encountered.
- 4.) Fills with organic content noted on the exploration logs are reported as organic soils.
- 5.) All elevations referenced to the North American Vertical Datum (NAVD88).
- 6.) Depths and elevations of strata should be considered approximate.

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-101

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 66.5 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

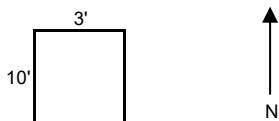
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 0.3'±	Dark brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 3.0 - 4.0'	Brown, fine to coarse SAND, some fine to coarse Gravel, some Silt. Very few bricks and few cobbles. Moist. (FILL)	E	5A, 2B	Sandy Loam
3					
4					
5	ROCK NATIVE 9.0'±	Tan, fine to coarse SAND, some Silt, little fine to coarse Gravel. Very few cobbles. Moist.	E	1B	Sand
6					
7					
8					
9					
10		Test pit terminated at approximately 3.0' bgs to north side of exploration on probable bedrock. Test pit terminated at approximately 9.0' bgs due to reach of bucket.			
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-101

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 66.5 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

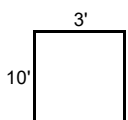


Notes: 1.) Photo of NTP-101 in progress.

WATER SYMBOLS

▼ Groundwater

▬ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-102

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

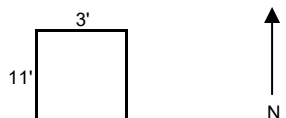
Ground El. 66.0 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL	Dark brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 0.9'± 2.0'±	Brown, fine to coarse SAND and Silt, some fine to coarse Gravel. Several cobbles. Moist. (FILL)	M-D	3A, 1B	Sandy Loam
3	FRACTURED ROCK	Chunks of rock that appear to be fractured bedrock.	D	1B	-
4	3.0'±	Test pit terminated at approximately 3.0' bgs on probable fractured bedrock/bedrock.			
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.
3.) Laboratory Grain Size Analysis 0-3': 39.1% Gravel, 42.2 % Sand, 18.5% Fines.

WATER SYMBOLS

▼ Groundwater
≡ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-102

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 66.0 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

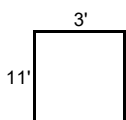


Notes: 1.) Photo of NTP-102 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-103

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 67.0 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 0.9'±	Dark brown, fine to coarse SAND, some Silt, trace fine Gravel. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 1.5 - 2.0'	Brown, fine to coarse SAND and Silt, some fine to coarse Gravel. Very few cobbles. Moist. (FILL)	M-D	2A	Sandy Loam
3		Test pit terminated between approximately 1.5 and 2.0' bgs on probable bedrock.			
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

		<u>BOULDER</u> 12" - 24" A 24" - 36" B >36" C	<u>CLASS</u> A B C	<u>PROPORTIONS USED</u> 0-10% Trace 10-20% Little 20-35% Some 35-50% And	<u>EXCAVATION EFFORT</u> E = Easy M = Moderate D = Difficult
--	--	--	-----------------------------	--	---

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-103

SHEET 2 of 2

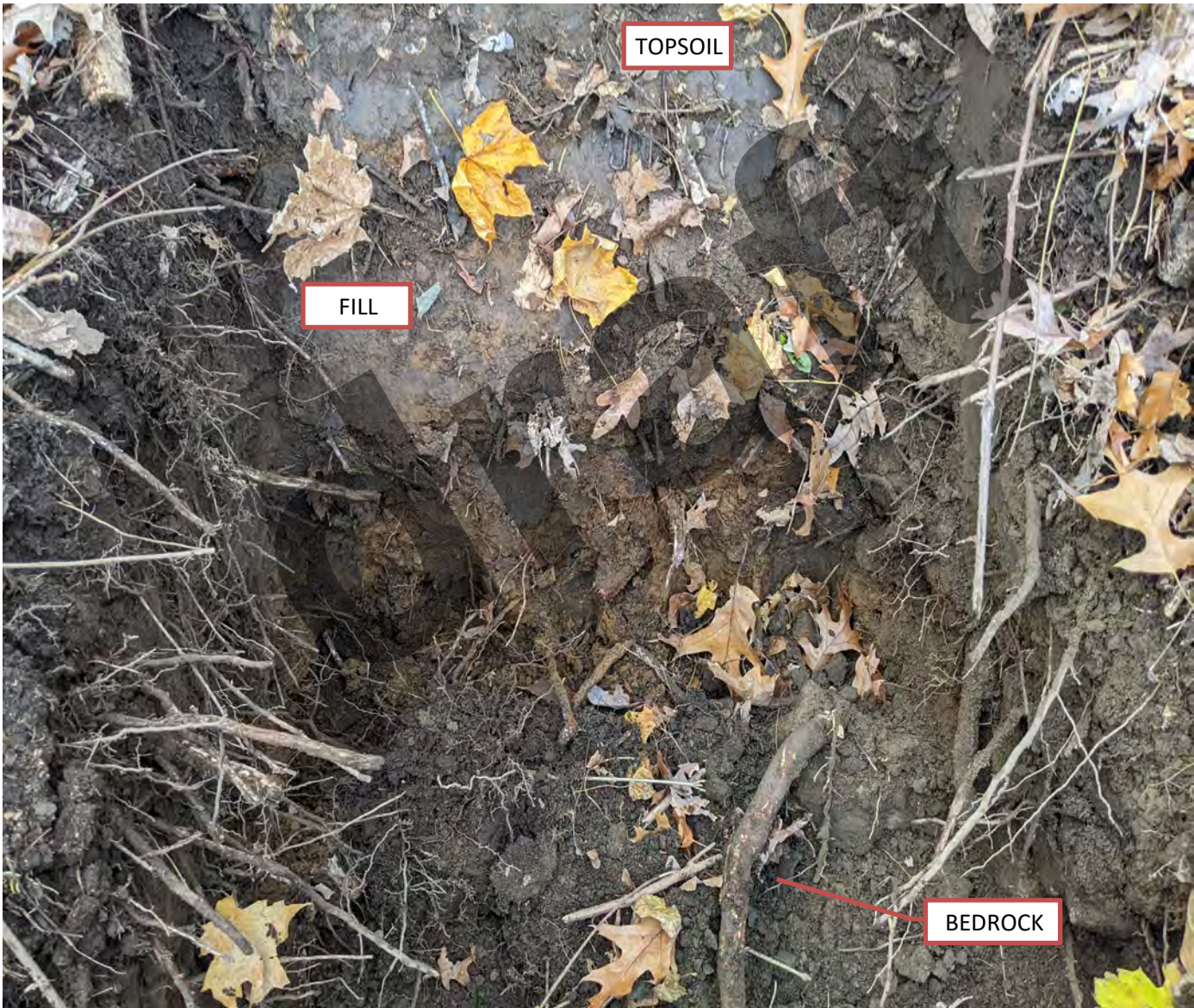
FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 67.0 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

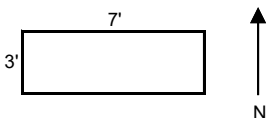


Notes: 1.) Photo of NTP-103 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-104

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

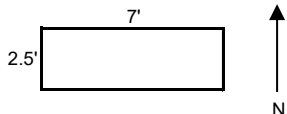
Ground El. 63.0 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL	Dark brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 3.0'±	Brown, fine to coarse SAND and Silt, some fine to coarse Gravel. Few cobbles. Occasional roots and branches. Moist. (FILL)	M-D	4A, 3B	Sandy Loam
3					
4		Test pit terminated at approximately 3.0' bgs on probable bedrock.			
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED	
0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-104
SHEET 2 of 2
FILE NO. 96700.04
CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

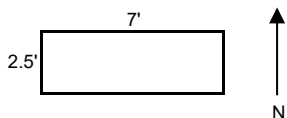
Ground El. 63.0 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021



Notes: 1.) Photo of NTP-104 in progress.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-105

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

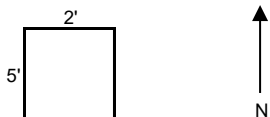
Ground El. 62.5 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 0.7'±	Dark brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 0.9'± 1.5' 2.0'	Gray, fine to coarse SAND, some Silt. Moist (FILL) Tan, fine to coarse SAND, little Silt, little fine to coarse Gravel. Moist (FILL)	E M	- -	Sandy Loam Loamy Sand
3	FRACTURED BR 2.5'±	Chunks of rock that appear to be fractured bedrock. Test pit terminated at approximately 2.5' bgs on probable bedrock.	D	-	-
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.
3.) Laboratory Grain Size Analysis 0-2': 45.1% Gravel, 30.1 % Sand, 24.8% Fines.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED
0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-105

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 62.5 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

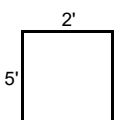


Notes: 1.) Photo of NTP-105 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-106

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

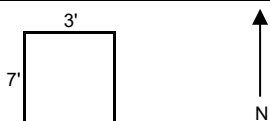
Ground El. 63.5 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL/FILL 1.7'±	Dark brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Very few bricks. Moist. (TOPSOIL/FILL)	E - M	-	Sandy Loam
2					
3		Test pit terminated at approximately 1.7' bgs on probable fractured bedrock/bedrock.			
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED
0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-106

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 63.5 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

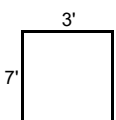


Notes: 1.) Photo of NTP-106 in progress.

WATER SYMBOLS

▼ Groundwater

▬ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-107

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer

Contractor Swampscott DPW

Operator Scot

Weather 40s, Overcast

Make John Deere

Model 310 SL HL

Capacity ~1/4 CY

Reach 15 Feet

Ground El. 61.5 FT

Datum NAVD88

Date Start 12/1/2021

Date Finish 12/1/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 0.5'±	Dark brown, fine to coarse SAND and Silt. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL/SUBSOIL 1.5'±	Brown, fine to coarse SAND and Silt, little fine to coarse Gravel. Moist. (FILL/SUBSOIL)	E - D	-	Sandy Loam
3		Test pit terminated at approximately 1.5' bgs on probable slightly fractured bedrock/bedrock.			
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater

<div>2.5'</div> <div>5'</div> <div>↑</div> <div>N</div>	<div>BOULDER</div> <div>12" - 24"</div> <div>24" - 36"</div> <div>>36"</div>	<div>CLASS</div> <div>A</div> <div>B</div> <div>C</div>	<div>PROPORTIONS USED</div> <div>0-10% Trace</div> <div>10-20% Little</div> <div>20-35% Some</div> <div>35-50% And</div>	<div>EXCAVATION EFFORT</div> <div>E = Easy</div> <div>M = Moderate</div> <div>D = Difficult</div>
---	---	---	--	---

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-107

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 61.5 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

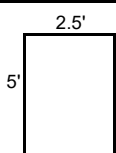


Notes: 1.) Photo of NTP-107 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-108

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 60.0 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021

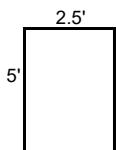
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.3'±	Dark brown, fine to coarse SAND and Silt. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 3.0'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (FILL)	E - M	-	Sandy Loam
3					
4	NATIVE 4.5'±	Tan, fine to coarse SAND, little Silt, little fine to coarse Gravel. Moist.	M	-	Loamy Sand
5		Test pit terminated at approximately 4.5' bgs on probable bedrock.			
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-108

SHEET 2 of 2

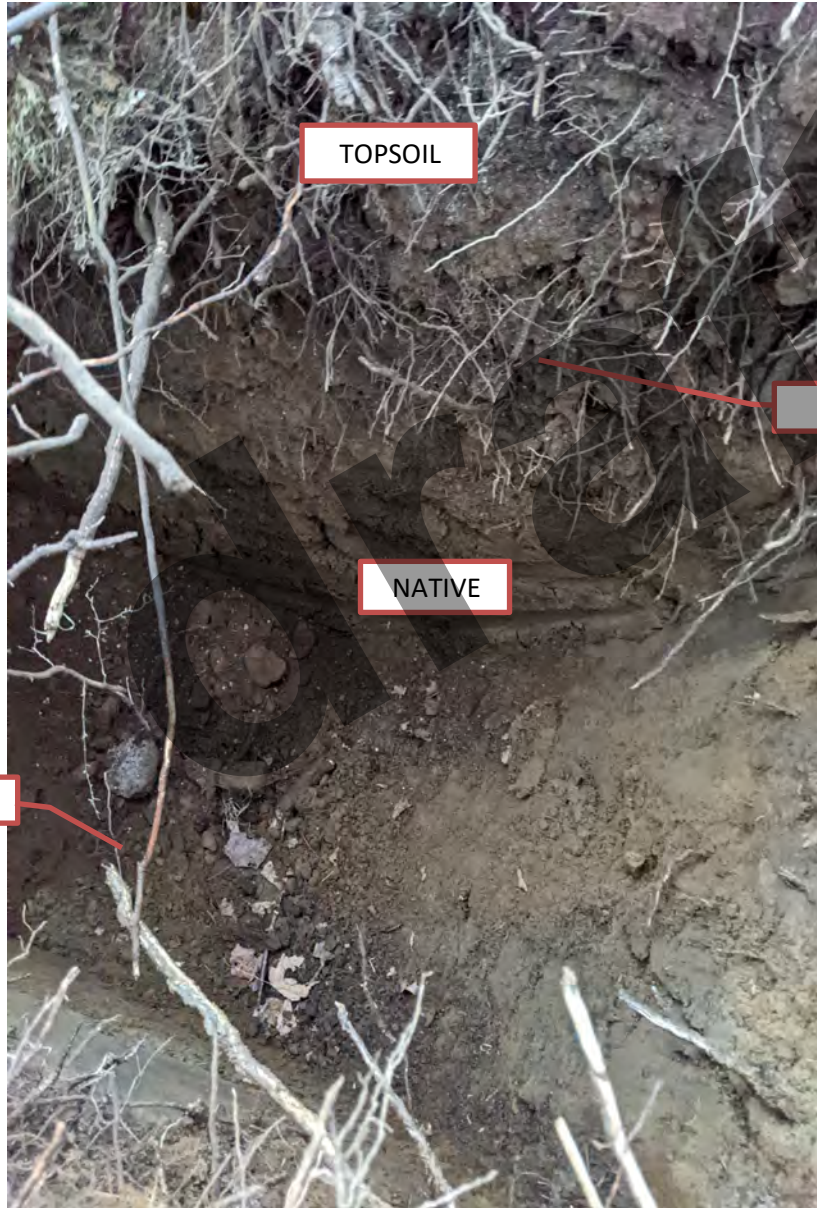
FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 60.0 FT
Datum NAVD88
Date Start 12/1/2021
Date Finish 12/1/2021



TOPSOIL

FILL

NATIVE

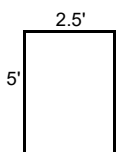
BEDROCK

Notes: 1.) Photo of NTP-108 in progress.

WATER SYMBOLS

Groundwater

Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-109
SHEET 1 of 2
FILE NO. 96700.04
CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

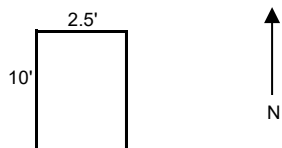
Ground El. 65.0 FT
Datum NAVD88
Date Start 12/2/2021
Date Finish 12/2/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0 - 1.5'	Dark brown, fine to coarse SAND, some Silt. Several roots. Very few cobbles. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Very few cobbles. Moist. (FILL)	E	1A	Sandy Loam
3	2.5'±	Test pit terminated between approximately 1.0 and 2.5' bgs on probable bedrock.			
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER CLASS
12" - 24" A
24" - 36" B
>36" C

PROPORTIONS USED
0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-109

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 65.0 FT
Datum NAVD88
Date Start 12/2/2021
Date Finish 12/2/2021

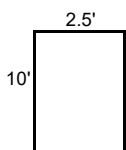


Notes: 1.) Photo of NTP-109 in progress.

WATER SYMBOLS

Groundwater

Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-110

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer

Contractor Swampscott DPW

Operator Scot

Weather 40s, Overcast

Make John Deere

Model 310 SL HL

Capacity ~1/4 CY

Reach 15 Feet

Ground El. 62.5 FT

Datum NAVD88

Date Start 12/2/2021

Date Finish 12/2/2021

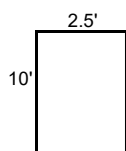
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL/FILL 1.3'±	Dark brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (TOPSOIL/FILL)	E	-	Sandy Loam
2	1.9'±	Gray, fine to coarse SAND, little Silt. Moist (FILL)			
3	2.3'±	Orangish brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. Moist (FILL)	E	-	Loamy Sand
4	4.5'±	Grayish brown, fine to coarse SAND, some fine to coarse Gravel some Silt. Moist (FILL)			Sandy Loam
5	FRACTURED BEDROCK 5.5'±	Chunks of rock that appear to be fractured bedrock mixed with fine to coarse sand and silt.	D	3A, 2B, 2C	-
6		Test pit terminated at approximately 5.5' bgs on probable bedrock.			
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.
3.) Laboratory Grain Size Analysis 2.3-4": 29.7% Gravel, 50.1 % Sand, 20.2% Fines.

WATER SYMBOLS

Groundwater

Estimated Seasonal High Groundwater



BOULDER

12" - 24"

24" - 36"

>36"

CLASS

A

B

C

PROPORTIONS USED

0-10% Trace

10-20% Little

20-35% Some

35-50% And

EXCAVATION EFFORT

E = Easy

M = Moderate

D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-110

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

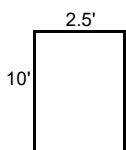
Ground El. 62.5 FT
Datum NAVD88
Date Start 12/2/2021
Date Finish 12/2/2021



Notes: 1.) Photo of NTP-110 in progress.

WATER SYMBOLS

Groundwater
Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-111

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 59.5 FT
Datum NAVD88
Date Start 12/2/2021
Date Finish 12/2/2021

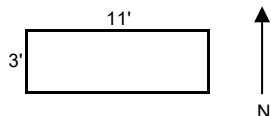
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Dark brown, fine to coarse SAND and Silt, little fine to coarse Gravel. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 4.0'±	Brown, fine to coarse SAND, some fine to coarse Gravel, some Silt. Moist. (FILL)	E	4A. 3B, 2C	Sandy Loam
3					
4					
5	DECOMPOSED/ FRACTURED BEDROCK 7.1'±	Tan, fine to coarse GRAVEL and fine to coarse Sand, little Silt. Moist. Chunks of rock that appear to be fractured bedrock.	D	1B	Loamy Sand
6					
7					
8		Test pit terminated at approximately 7.1' bgs on probable bedrock.			
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.
3.) Laboratory Grain Size Analysis 1-4": 31.2% Gravel, 46.7 % Sand, 22.1% Fines.

WATER SYMBOLS

▼ Groundwater

≡ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-111

SHEET 2 of 2

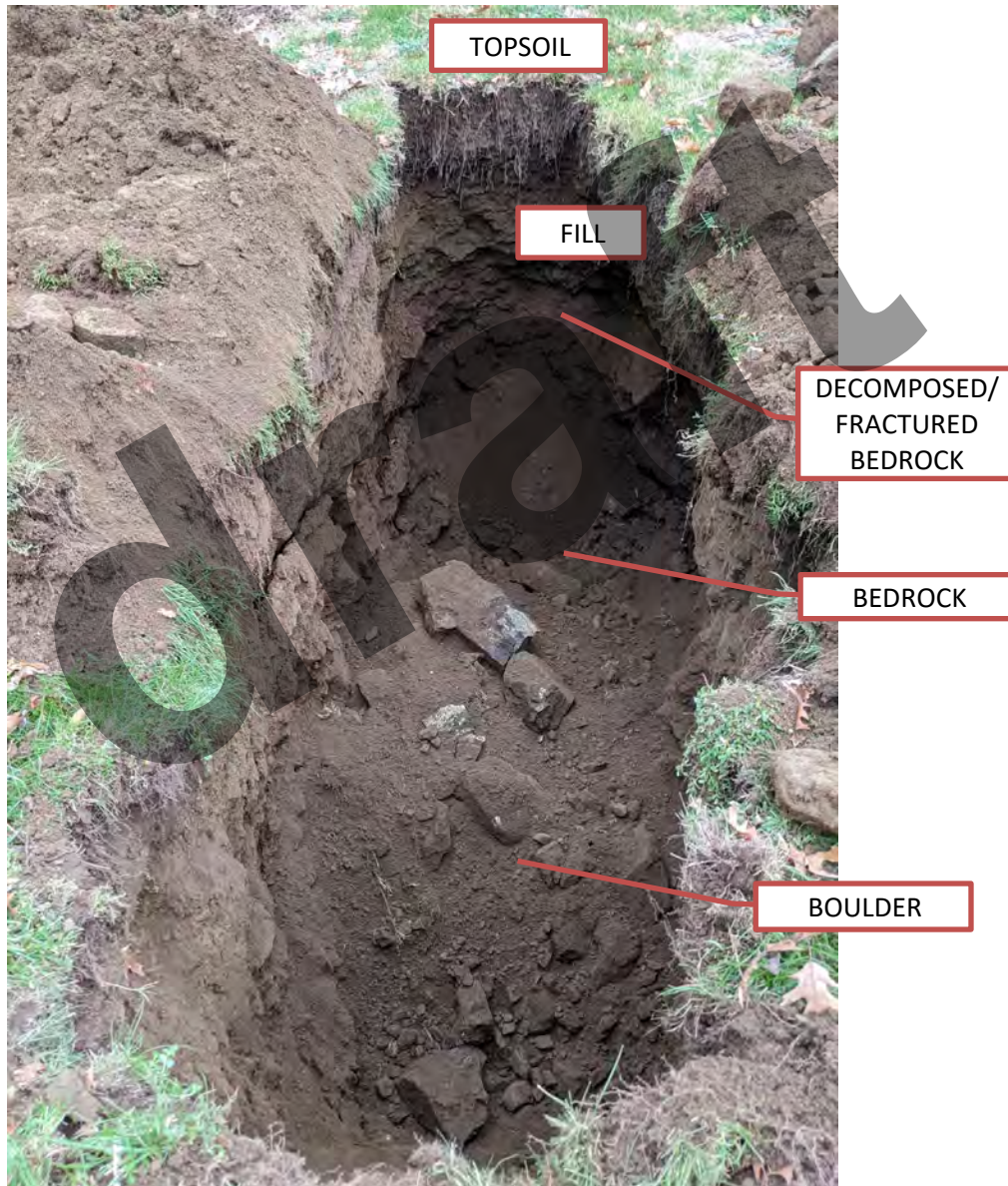
FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 59.5 FT
Datum NAVD88
Date Start 12/2/2021
Date Finish 12/2/2021

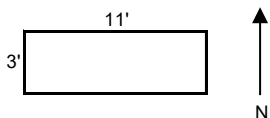


Notes: 1.) Photo of NTP-111 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-112

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 59.5 FT
Datum NAVD88
Date Start 12/2/2021
Date Finish 12/2/2021

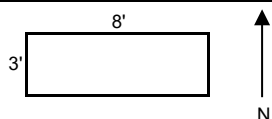
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	URBAN FILL 4.0' ±	Dark brown, fine to coarse SAND and Silt, some fine to coarse Gravel. Few cobbles. Contains metal, glass, plastic, ash, and other debris. Moist.	E	1A	Loam
2					
3					
4					
5		Test pit terminated at approximately 4.0' bgs on probable bedrock.			
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

≡ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-112

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 59.5 FT
Datum NAVD88
Date Start 12/2/2021
Date Finish 12/2/2021

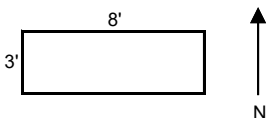


Notes: 1.) Photo of NTP-112 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-113

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

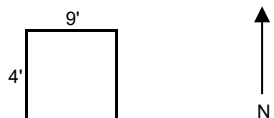
Ground El. 61.0 FT
Datum NAVD88
Date Start 12/2/2021
Date Finish 12/2/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 0.5'±	Dark brown, fine to coarse SAND and Silt, little fine to coarse Gravel. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 4.0'±	Brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt. Very few bricks and masonry pieces (more debris on northern side of exploration). Moist.	E	1A	Loamy Sand
3					
4					
5		Test pit terminated at approximately 4.0' bgs on probable bedrock.			
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.
3) Laboratory Grain Size Analysis 0-4": 23.4% Gravel, 68.2 % Sand, 8.4% Fines.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-113

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 61.0 FT
Datum NAVD88
Date Start 12/2/2021
Date Finish 12/2/2021

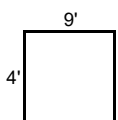


Notes: 1.) Photo of NTP-113 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-114

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 54.5 FT
Datum NAVD88
Date Start 12/3/2021
Date Finish 12/3/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Dark brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (TOPSOIL)	E	-	Sandy Loam
2	SUBSOIL 2.0'±	Orangish brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (SUBSOIL)	E	3A	Sandy Loam
3		Test pit terminated at approximately 2.0' bgs on probable bedrock.			
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

<div>6'</div> <div>2.5'</div> <div> N </div>	<div>BOULDER</div> <div>12" - 24"</div> <div>24" - 36"</div> <div>>36"</div>	<div>CLASS</div> <div>A</div> <div>B</div> <div>C</div>	<div>PROPORTIONS USED</div> <div>0-10% Trace</div> <div>10-20% Little</div> <div>20-35% Some</div> <div>35-50% And</div>	<div>EXCAVATION EFFORT</div> <div>E = Easy</div> <div>M = Moderate</div> <div>D = Difficult</div>
---	---	---	--	---

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-114

SHEET 2 of 2

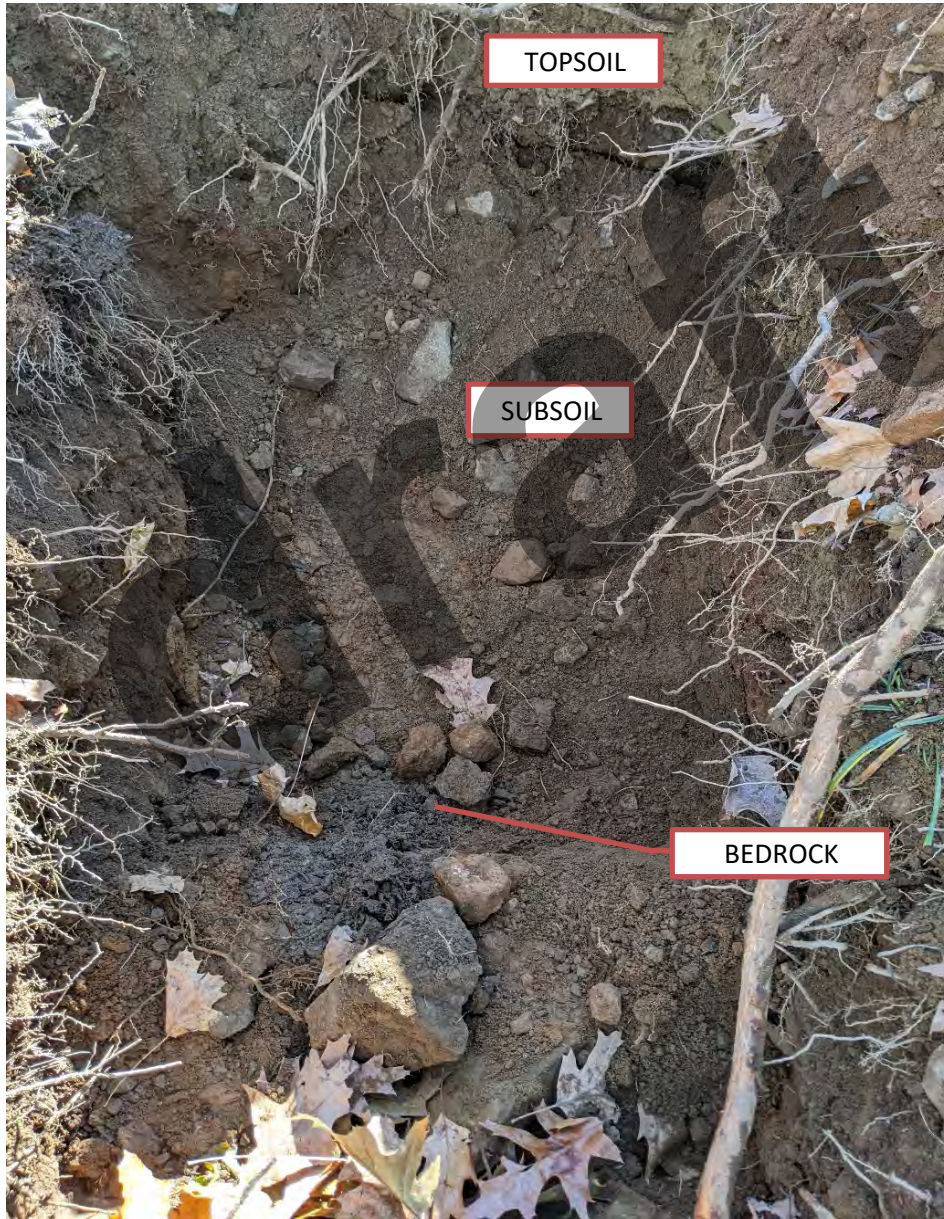
FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 54.5 FT
Datum NAVD88
Date Start 12/3/2021
Date Finish 12/3/2021

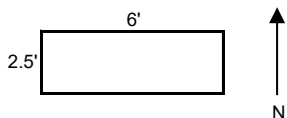


Notes: 1.) Photo of NTP-114 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-115

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

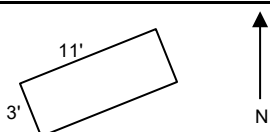
Ground El. 61.0 FT
Datum NAVD88
Date Start 12/3/2021
Date Finish 12/3/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL	Dark brown, fine to coarse SAND and Silt, little fine to coarse Gravel. Few roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (FILL)	E	-	Sandy Loam
3	FILL	Gray, fine to coarse SAND, little Silt. Moist. (FILL)	E	-	Sand
4	FILL	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (FILL)	E	-	Sandy Loam
5	DECOMPOSED/ FRACTURED BEDROCK	Dark brown, fine to coarse SAND and fine to coarse Gravel, some Silt. Several Cobbles. Moist.	M - D	3A, 2B, 1C	Sandy Loam
6					
7	7.0'±				
8		Test pit terminated at approximately 7.0' bgs on probable bedrock.			
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER

12" - 24"
24" - 36"
>36"

CLASS

A
B
C

PROPORTIONS USED

0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-115

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 61.0 FT
Datum NAVD88
Date Start 12/3/2021
Date Finish 12/3/2021

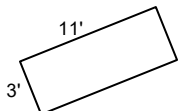


Notes: 1.) Photo of NTP-115 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-116

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

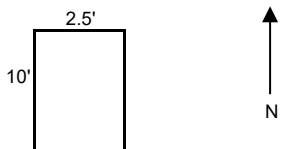
Ground El. 60.5 FT
Datum NAVD88
Date Start 12/3/2021
Date Finish 12/3/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Dark brown, fine to coarse SAND and Silt, trace fine Gravel. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	1.5'±	Brown, fine to coarse SAND, little Silt, little fine to coarse Gravel. Moist. (FILL)	E	-	Loamy Sand
3	2.0'±	Gray, fine to coarse SAND, little Silt. Moist. (FILL)	E	-	Sand
4	4.0'±	Brown, fine to coarse SAND, little Silt, little fine to coarse Gravel. Moist. (FILL)	E	2A	Loamy Sand
5		Test pit terminated at approximately 4.0' bgs on probable bedrock.			
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.
3.) Laboratory Grain Size Analysis 1-4': 25.8% Gravel, 50.7 % Sand, 23.5% Fines.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-116

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 60.5 FT
Datum NAVD88
Date Start 12/3/2021
Date Finish 12/3/2021

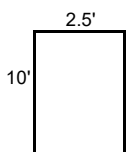


Notes: 1.) Photo of NTP-116 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-117

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 61.0 FT
Datum NAVD88
Date Start 12/3/2021
Date Finish 12/3/2021

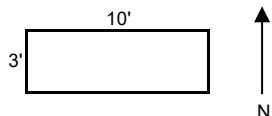
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.5'±	Dark brown, fine to coarse SAND and Silt, trace fine Gravel. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	2.0'± 2.1'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (FILL)	E	-	Sandy Loam
3	FILL	Gray, fine to coarse SAND, little Silt. Moist. (FILL)	E	-	Sand
4	4.0'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (FILL)	E	4A, 3B	Sandy Loam
5	VERY WEATHERED BEDROCK	Brown, fine to coarse SAND and fine to coarse Gravel, some Silt. Moist.	M - D	-	-
6	5.5'±	Test pit terminated at approximately 5.5' bgs on probable bedrock.			
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-117

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 61.0 FT
Datum NAVD88
Date Start 12/3/2021
Date Finish 12/3/2021

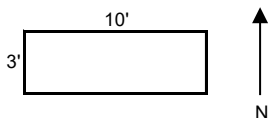


Notes: 1.) Photo of NTP-117 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-118

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

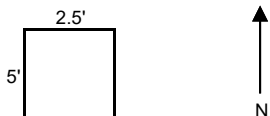
Ground El. 57.5 FT
Datum NAVD88
Date Start 12/3/2021
Date Finish 12/3/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Dark brown, fine to coarse SAND and Silt, trace fine Gravel. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	WEATHERED BEDROCK 1.8'±	Brown, fine to coarse SAND and fine to coarse Gravel, little to some silt. Moist.	D	-	Loamy Sand
3	1.8'±	Test pit terminated at approximately 1.8' bgs on probable bedrock.			
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED
0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-118

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 57.5 FT
Datum NAVD88
Date Start 12/3/2021
Date Finish 12/3/2021



TOPSOIL

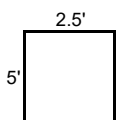
SEVERELY
WEATHERED
BEDROCK

Notes: 1.) Photo of NTP-118 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-119
SHEET 1 of 2
FILE NO. 96700.04
CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

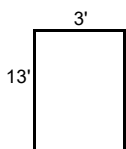
Ground El. 62.0 FT
Datum NAVD88
Date Start 12/3/2021
Date Finish 12/3/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL	Dark brown, fine to coarse SAND, some Silt, trace fine Gravel. Few roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	1.5'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (FILL)	E	-	Sandy Loam
3	2.0'±	Gray, fine to coarse SAND, little Silt. Moist. (FILL)	E	-	Sand
4	FILL	Brown, fine to coarse SAND, little Silt, little fine to coarse Gravel. Moist. Few cobbles, several boulders. (FILL)	M - D	3A, 4B	Sandy Loam
5	5.5'±				
6					
7	WEATHERED/ DECOMPOSED BEDROCK	Brown, fine to coarse SAND and fine to coarse Gravel, some Silt. Moist.	D	5A, 3B	Sandy Loam
8					
9	9.5'±				
10		Test pit terminated at approximately 9.5' bgs on probable bedrock.			
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.
3.) Laboratory Grain Size Analysis 0-4': 34.3% Gravel, 41.1 % Sand, 24.6% Fines.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-119

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 62.0 FT
Datum NAVD88
Date Start 12/3/2021
Date Finish 12/3/2021



TOPSOIL

FILL

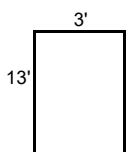
VERY
WEATHERED/
DECOMPOSED
BEDROCK

Notes: 1.) Photo of NTP-119 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-120

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 50s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

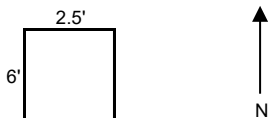
Ground El. 58.0 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Dark brown, fine to coarse SAND and Silt, trace fine Gravel. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 2.1'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (FILL)	E	-	Sandy Loam
3	NATIVE 3.0'±	Tan, fine to coarse SAND, little Silt. Moist.	E	-	Loamy Sand
4	FRACTURED ROCK 3.5'±	Chunks of rock that appear to be fractured bedrock.	D	-	-
5	Test pit terminated at approximately 3.5' bgs on probable bedrock.	Test pit terminated at approximately 3.5' bgs on probable bedrock.			
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-120

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 50s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 58.0 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

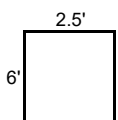


Notes: 1.) Photo of NTP-120 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-121

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 62.0 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

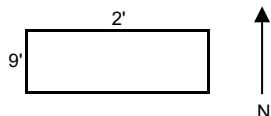
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Dark brown, fine to coarse SAND and Silt, trace fine Gravel. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	1.5'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (FILL)	E	-	Sandy Loam
3	2.0'±	Gray, fine to coarse SAND, little Silt. Moist. (FILL)	E	-	Sand
4	4.0'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (FILL)	M	-	Sandy Loam
5	SEVERELY WEATHERED BEDROCK	Brown, fine to coarse SAND and fine to coarse Gravel, some Silt. Several cobbles. Moist.	D	1A	Sandy Loam
6					
7	7.0'±				
8		Test pit terminated at approximately 7.0' bgs on probable bedrock.			
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

∇ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-121

SHEET 2 of 2

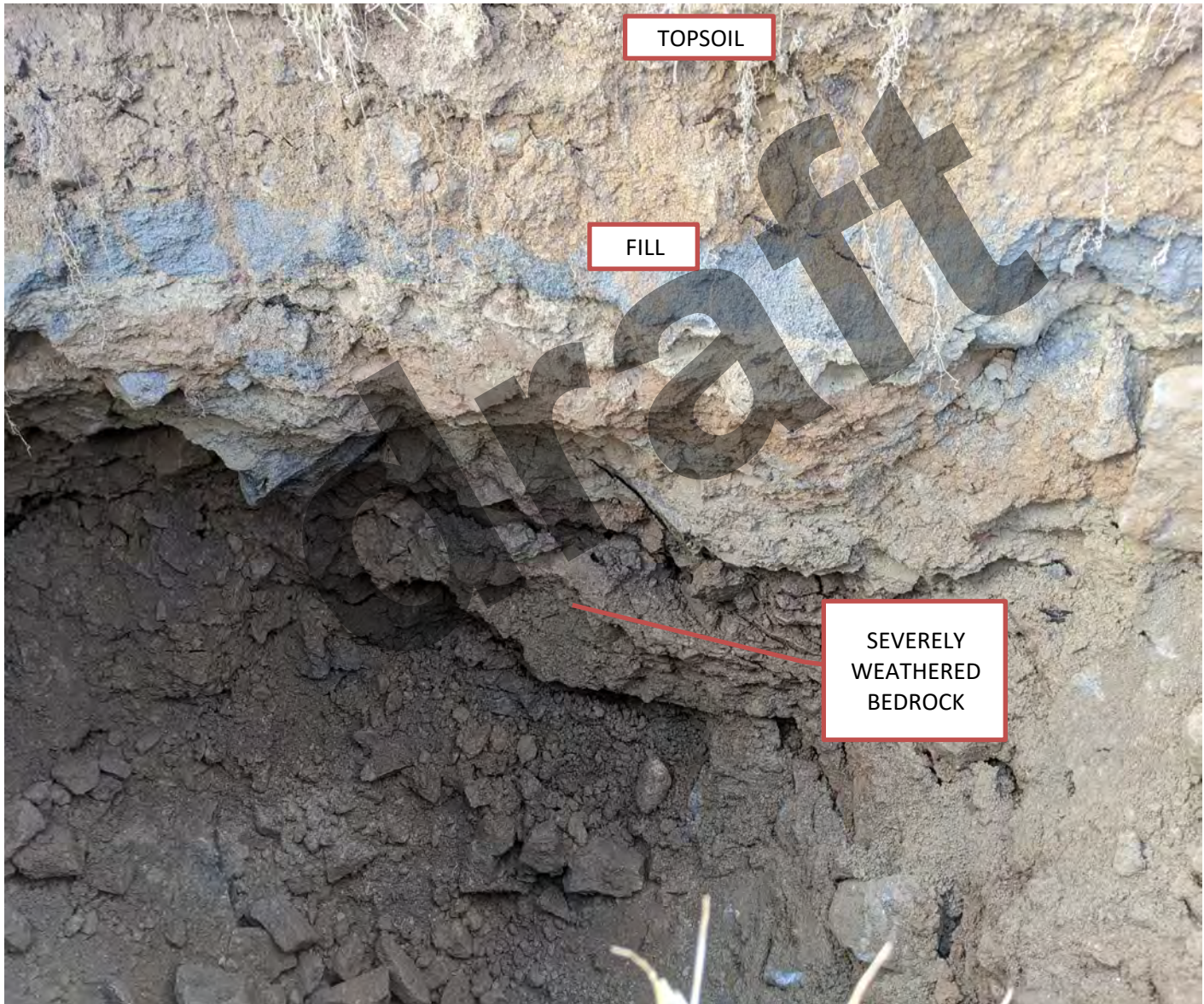
FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 62.0 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

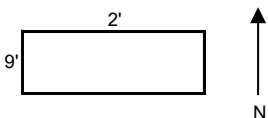


Notes: 1.) Photo of NTP-121 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-122
SHEET 1 of 2
FILE NO. 96700.04
CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 60s, Cloudy

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

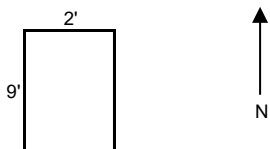
Ground El. 62.5 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.3'±	Dark brown, fine to coarse SAND and Silt, trace fine Gravel. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	1.5'±	Gray, fine to coarse SAND, little Silt. Moist. (FILL)	E	-	Sand
3	FILL	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Moist. (FILL)	E	-	Sandy Loam
4	4.0'±				
5	SEVERELY WEATHERED BEDROCK	Brown, fine to coarse SAND and fine to coarse Gravel, some Silt. Several cobbles. Moist.	D	3A, 2B, 1C	Sandy Loam
6					
7					
8	7.5'±	Test pit terminated at approximately 7.5' bgs due to caving.			
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED	
0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-122

SHEET 2 of 2

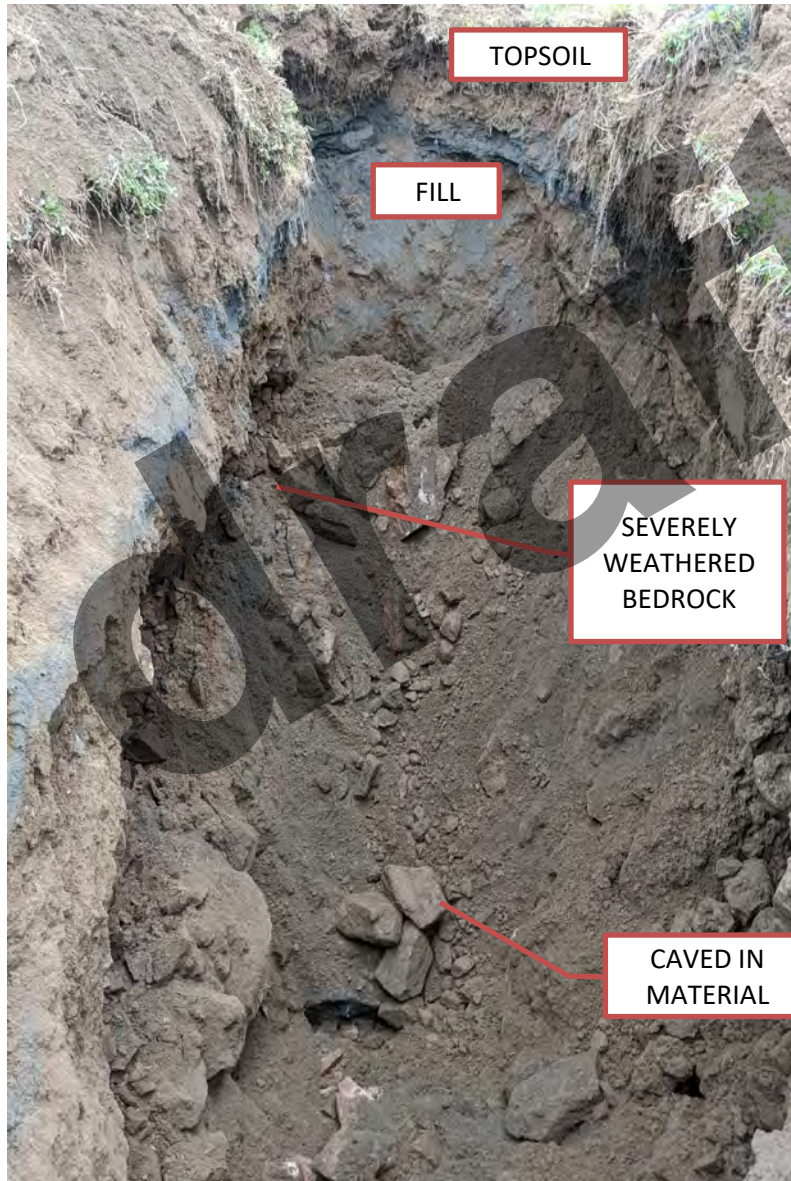
FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 60s, Cloudy

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 62.5 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

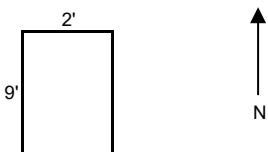


Notes: 1.) Photo of NTP-122 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-123

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 50s, Partly Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 62.0 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

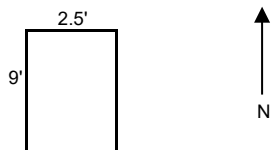
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Dark brown, fine to coarse SAND and Silt, trace fine Gravel. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	1.5'±	Gray, fine to coarse SAND, little Silt. Moist. (FILL)	E	-	Sand
3	FILL	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Few cobbles and few boulders. Moist. (FILL)	E	2A	Sandy Loam
4	4.0'±				
5	SEVERELY WEATHERED BEDROCK	Brown, fine to coarse SAND and fine to coarse Gravel, some Silt. Several cobbles. Moist.	D	-	Sandy Loam
6	6.5'±				
7		Test pit terminated at approximately 6.5' bgs due to caving.			
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.
3.) Laboratory Grain Size Analysis 0-4': 21.0% Gravel, 51.8 % Sand, 27.2% Fines.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED
0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-123

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 50s, Partly Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 62.0 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

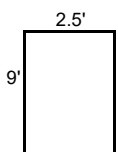


Notes: 1.) Photo of NTP-123 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-124

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 50s, Partly Sunny

Make Shovel
Model -
Capacity -
Reach -

Ground El. 59.5 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

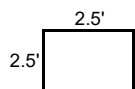
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	FOREST MAT 0.5'±	Dark brown, Organic SILT. Many roots, Very few cobbles. Moist. (FOREST MAT) Test pit terminated at approximately 0.5' bgs on probable bedrock.	E	-	Loam
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with shovel to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



BOULDER

12" - 24"

24" - 36"

>36"

CLASS

A

B

C

PROPORTIONS USED

0-10% Trace

10-20% Little

20-35% Some

35-50% And

EXCAVATION EFFORT

E = Easy

M = Moderate

D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-124

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 50s, Partly Sunny

Make Shovel
Model -
Capacity -
Reach -

Ground El. 59.5 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

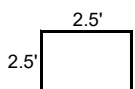


Notes: 1.) Photo of NTP-124 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-125

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 50s, Partly Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 60.5 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

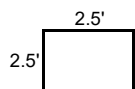
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL	Dark brown, fine to coarse SAND and Silt, trace fine Gravel. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	1.0'±	Test pit terminated at approximately 1.0' bgs on probable bedrock.			
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



BOULDER

12" - 24"

24" - 36"

>36"

CLASS

A

B

C

PROPORTIONS USED

0-10% Trace

10-20% Little

20-35% Some

35-50% And

EXCAVATION EFFORT

E = Easy

M = Moderate

D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-125

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 50s, Partly Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 60.5 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

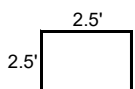


Notes: 1.) Photo of NTP-125 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-126

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 50s, Partly Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 59.0 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

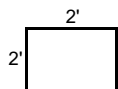
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL/FILL	Dark brown, fine to coarse SAND and Silt, some fine to coarse Gravel. Few roots. Moist. (TOPSOIL/FILL)	E	-	Sandy Loam
2	0.9'±	Test pit terminated at approximately 0.9' bgs on probable bedrock.			
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED
0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-126

SHEET 2 of 2

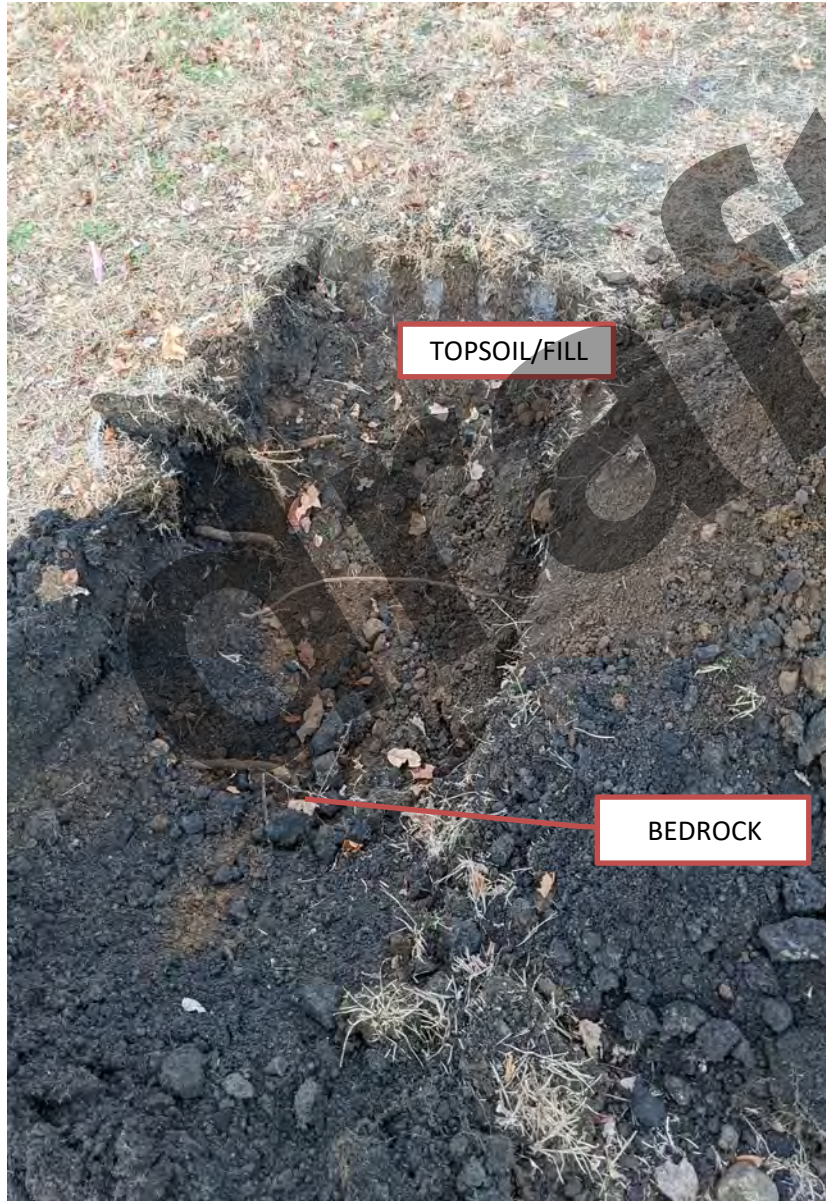
FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 50s, Partly Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 59.0 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

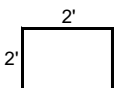


Notes: 1.) Photo of NTP-126 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-127
SHEET 1 of 2
FILE NO. 96700.04
CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

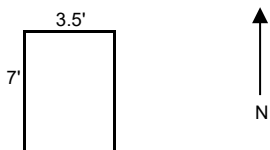
Ground El. 58.5 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	ASPHALT	Approximately 6-inches of Asphalt	-	-	-
2	FILL	Dark brown, fine to coarse GRAVEL, some fine to coarse Sand, little Silt. Several asphalt pieces. Moist. (SUBBASE)	E - M	-	Loamy Sand
3		Brown, fine to coarse GRAVEL and fine to coarse Sand, trace Silt. Few cobbles. Moist. (FILL)	M - D	3A	Sand
4					
5	5.0'±	Test pit terminated at approximately 5.0' bgs in fill due to proximity of underground gas and water utility lines.			
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.
3.) Laboratory Grain Size Analysis 1.2-5': 48.7% Gravel, 45.3 % Sand, 6.0% Fines.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER CLASS
12" - 24" A
24" - 36" B
>36" C

PROPORTIONS USED
0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-127

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Overcast

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 58.5 FT
Datum NAVD88
Date Start 12/6/2021
Date Finish 12/6/2021

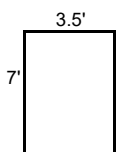


Notes: 1.) Photo of NTP-127 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-128

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

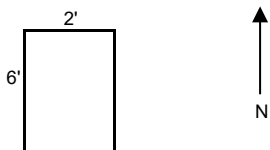
Ground El. 64.5 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.3'±	Dark brown, fine to coarse SAND and Silt, little fine to coarse Gravel. Few roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	SUBSOIL 2.0'±	Brown to tan, fine to coarse SAND and Silt, little fine to coarse Gravel. Very few cobbles. Moist. (SUBSOIL)	E	-	Sandy Loam
3		Test pit terminated at approximately 2.0' bgs on probable bedrock.			
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-128

SHEET 2 of 2

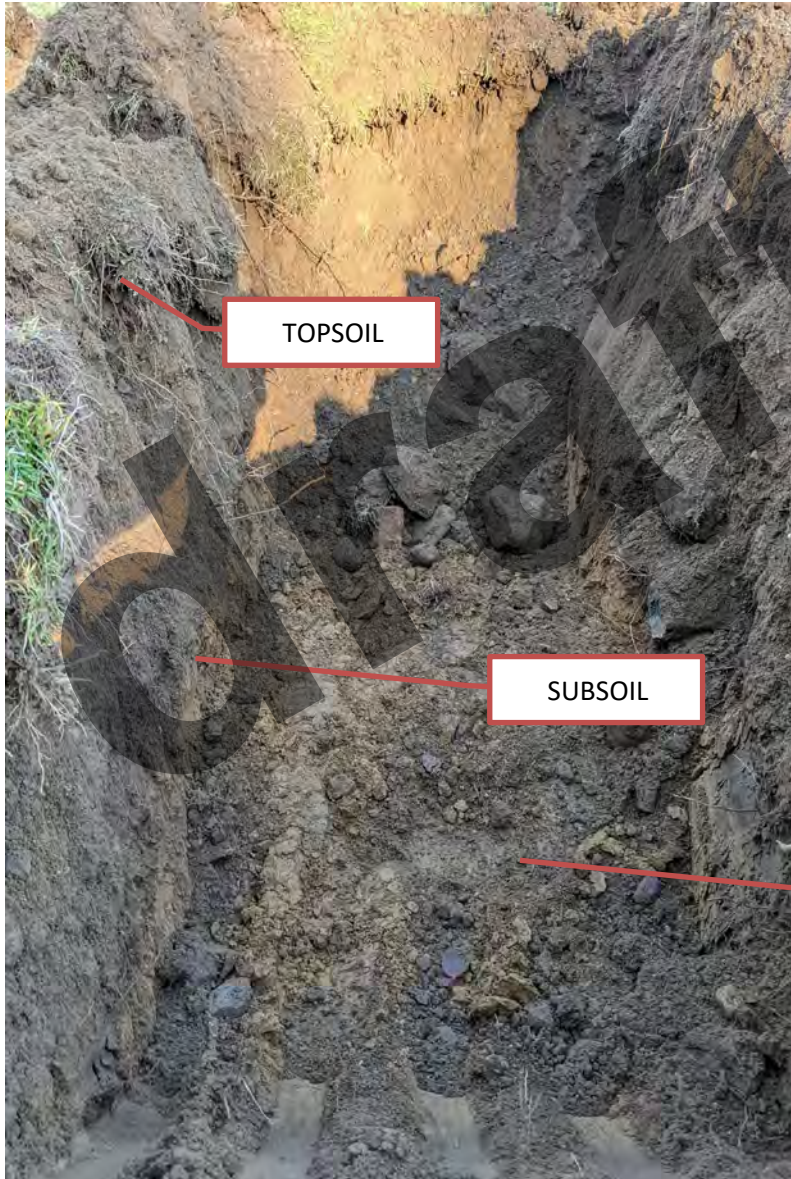
FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 64.5 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021



TOPSOIL

TOPSOIL

SUBSOIL

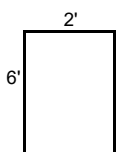
BEDROCK

Notes: 1.) Photo of NTP-128 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-129
SHEET 1 of 2
FILE NO. 96700.04
CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

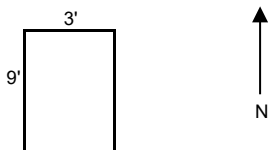
Ground El. 66.5 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Dark brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Few roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 3.0'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Few cobbles, very few boulders. Moist. (FILL)	E	1A	Sandy Loam
3					
4		Test pit terminated at approximately 3.0' bgs on probable bedrock.			
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED	
0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-129

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 66.5 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

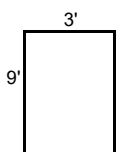


Notes: 1.) Photo of NTP-129 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-130

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 66.5 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

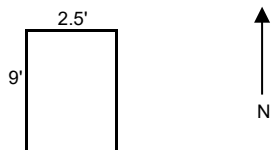
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL/FILL 3.0'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Several roots, few cobbles. Moist. (TOPSOIL/FILL)	E - M	-	Sandy Loam
2					
3					
4		Test pit terminated at approximately 3.0' bgs on probable bedrock.			
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-130

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 66.5 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

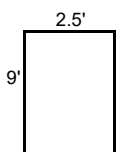


Notes: 1.) Photo of NTP-130 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-131

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 63.5 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

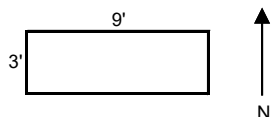
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Several roots, few cobbles. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 1.5'±	Gray, fine to coarse SAND, little Silt. Moist. (FILL)	E	-	Sand
3	WEATHERED BR 2.0'±	Brown, fine to coarse SAND and fine to coarse Gravel, little Silt. Few cobbles. Moist.	M	-	Loamy Sand
4	FRACTURED BR 2.5'±	Chunks of rock that appear to be fractured bedrock.	D	-	-
5		Test pit terminated at approximately 2.5' bgs on probable bedrock.			
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



BOULDER

12" - 24"

24" - 36"

>36"

CLASS

A

B

C

PROPORTIONS USED

0-10% Trace

10-20% Little

20-35% Some

35-50% And

EXCAVATION EFFORT

E = Easy

M = Moderate

D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-131

SHEET 2 of 2

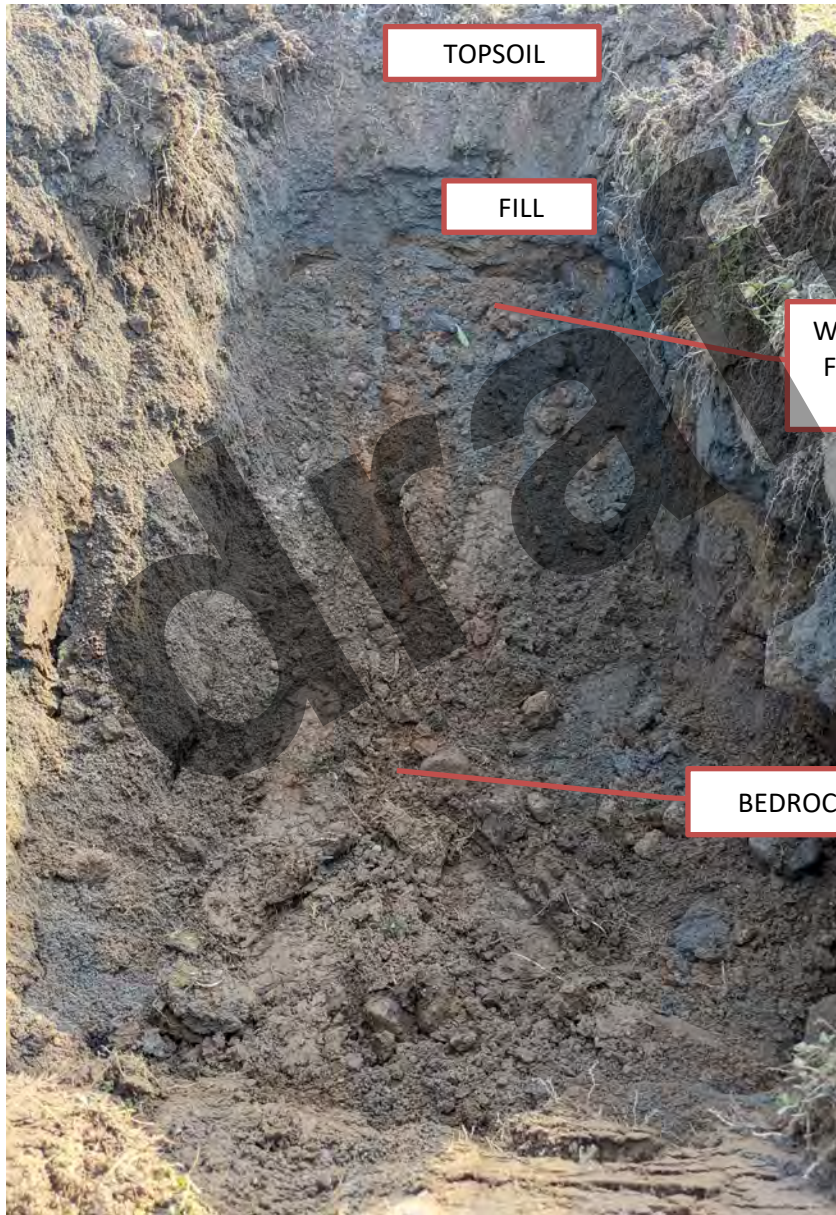
FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 63.5 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

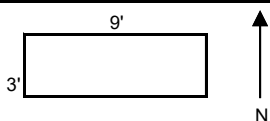


Notes: 1.) Photo of NTP-131 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-132

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 60.0 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

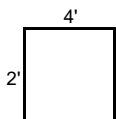
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Several roots, few cobbles. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 2.1'±	Dark brown to tan, fine to coarse SAND, some Silt, little fine to coarse Gravel. Few to several brick and ash particles. Moist. (FILL)	E	-	Sandy Loam
3	WEATHERED BEDROCK 3.0'±	Brown, fine to coarse SAND and fine to coarse Gravel, little Silt. Few cobbles. Moist.	D	-	Loamy Sand
4		Test pit terminated at approximately 3.0' bgs on probable bedrock.			
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



BOULDER

12" - 24"

24" - 36"

>36"

CLASS

A

B

C

PROPORTIONS USED

0-10% Trace

10-20% Little

20-35% Some

35-50% And

EXCAVATION EFFORT

E = Easy

M = Moderate

D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-132

SHEET 2 of 2

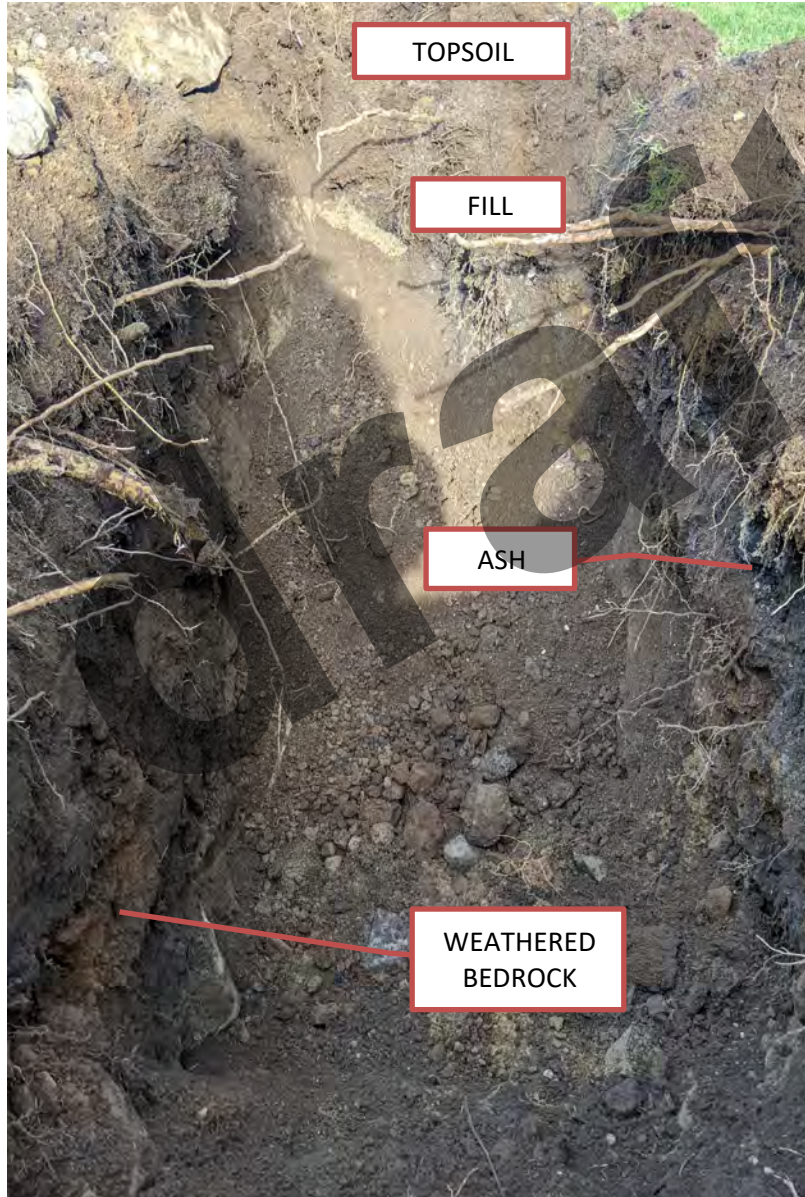
FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 60.0 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

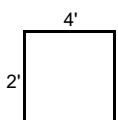


Notes: 1.) Photo of NTP-132 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-133

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 62.0 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

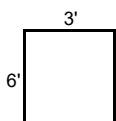
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Several roots, few cobbles. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 4.0'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Few cobbles, few glass, ash, brick, and other debris. Moist. (FILL)	E	-	Sandy Loam
3					
4					
5	FRACTURED BR 4.5'±	Chunks of rock that appear to be fractured bedrock.	D	-	
6		Test pit terminated at approximately 4.5' bgs on probable bedrock.			
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



BOULDER

12" - 24"

24" - 36"

>36"

CLASS

A

B

C

PROPORTIONS USED

0-10% Trace

10-20% Little

20-35% Some

35-50% And

EXCAVATION EFFORT

E = Easy

M = Moderate

D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-133

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 62.0 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

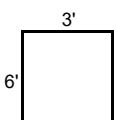


Notes: 1.) Photo of NTP-133 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-134

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Partly Cloudy

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

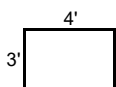
Ground El. 60.0 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.5'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Several roots, few cobbles. Moist. (TOPSOIL)	E	-	Sandy Loam
2		Test pit terminated at approximately 1.5' bgs on probable bedrock.			
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER

12" - 24"
24" - 36"
>36"

CLASS

A
B
C

PROPORTIONS USED

0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-134

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Partly Cloudy

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 60.0 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

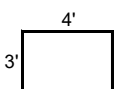


Notes: 1.) Photo of NTP-134 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-135

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Partly Cloudy

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

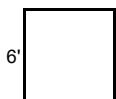
Ground El. 58.0 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Several roots, few cobbles. Moist. (TOPSOIL)	E	-	Sandy Loam
2	FILL 2.5'±	Dark brown to brown, fine to coarse SAND, little Silt, little fine to coarse Gravel. Moist. (FILL)	E	-	Loamy Sand
3	NATIVE 3.4'±	Tan to brown, fine to coarse SAND, little Silt, little fine to coarse Gravel. Moist.	E	-	Loamy Sand
4	3.5'±	Approx. 2-inches of chunks of rock that appear to be fractured bedrock.	D	-	-
5	1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.	Test pit terminated at approximately 3.5' bgs on probable bedrock.			
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.
3.) Laboratory Grain Size Analysis 1.2-5': 22.4% Gravel, 44.8 % Sand, 32.8% Fines.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER
12" - 24"
24" - 36"
>36"

CLASS
A
B
C

PROPORTIONS USED
0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-135

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Partly Cloudy

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. 58.0 FT
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

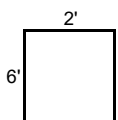


Notes: 1.) Photo of NTP-135 in progress.

WATER SYMBOLS

▼ Groundwater

▬ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-136

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Partly Cloudy

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. N/A
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

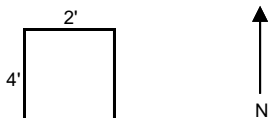
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 1.0'±	Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Several roots. Moist. (TOPSOIL)	E	-	Sandy Loam
2	SUBSOIL 1.3'±	Tan, fine to coarse SAND and Silt, little fine to coarse Gravel. Moist. (SUBSOIL)	E	-	Sandy Loam
3		Test pit terminated at approximately 1.3' bgs on probable bedrock.			
4					
5		Electrical conduit for light poles was encountered at approximately 8-inches bgs. The town and the DPW are going to return to site to repair damage. Area backfilled and coned off until they return.			
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



BOULDER	CLASS
12" - 24"	A
24" - 36"	B
>36"	C

PROPORTIONS USED

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

EXCAVATION EFFORT

E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-136

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 40s, Partly Cloudy

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. N/A
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

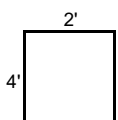


Notes: 1.) Photo of NTP-136 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-137

SHEET 1 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

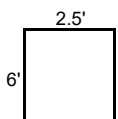
Ground El. N/A
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL 3.5'±	Dark brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Few cobbles, very few boulders, many roots. Moist. (TOPSOIL)	E	1A	Sandy Loam
2					
3					
4					
5		Test pit terminated at approximately 3.5' bgs on probable bedrock.			
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER
12" - 24"
24" - 36"
>36"

CLASS
A
B
C

PROPORTIONS USED
0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-137

SHEET 2 of 2

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make John Deere
Model 310 SL HL
Capacity ~1/4 CY
Reach 15 Feet

Ground El. N/A
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

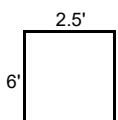


Notes: 1.) Photo of NTP-137 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-138

SHEET 1 of 1

FILE NO. 96700.04

CHKD BY SNP

Engineer S. Kurtzer
Contractor Swampscott DPW
Operator Scot
Weather 30s, Sunny

Make Shovel
Model -
Capacity -
Reach -

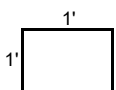
Ground El. 66.5
Datum NAVD88
Date Start 12/7/2021
Date Finish 12/7/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	USDA Textural Class
1	TOPSOIL	Less than 1 inch of: Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. Several roots, few cobbles. Moist. (TOPSOIL)	E	-	Sandy Loam
2		Test pit terminated at approximately 0.1' bgs on probable bedrock.			
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket in lifts to ground surface.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater



BOULDER
12" - 24"
24" - 36"
>36"

CLASS
A
B
C

PROPORTIONS USED
0-10% Trace
10-20% Little
20-35% Some
35-50% And

EXCAVATION EFFORT
E = Easy
M = Moderate
D = Difficult



BORING LOG

Project: Hadley Elementary School

Location: Swampscott, Massachusetts

Nobis Project No.: 96700.03

Boring No.: NB-1

Boring Location: N: 2997799.00 E: 818583.00

Checked by: AJ

Date Start: March 3, 2021

Date Finish: March 3, 2021

Contractor: New England Boring Contractors

Driller: P. Schofield

Nobis Rep.: S. Pape

Rig Type / Model: Truck / B-48 Mobile

Hammer Type: Automatic Hammer

Hammer Hoist: Automatic

Ground Surface Elev.: 57.9

Datum: NAVD 88

	Drilling Method	Sampler	Groundwater Observations					
Type	Casing	Split-Spoon	Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
			03/03/21	11:20	6	5	10	10 min.
Size ID (in.)	4	1-3/8						
Advancement	Drive and Wash	140-lb Hammer						

Depth (ft.)	SAMPLE INFORMATION				REC % / RQD %	Ground Water	LITHOLOGY		SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
	Type & No.	Rec (in.)	Depth (ft.)	Blows / 6 in.			Graphic	Stratum Elev. / Depth (ft.)		
1	S-1	11	0.5-2	12	100/0	▽		57.6 / 0.3 ASPHALTIC PAVEMENT	3" ASPHALT.	1
2				9					S-1A (8"): Medium dense, grayish brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. Wet. (FILL).	
3	S-2	13	2-4	11				FILL	S-1B (3"): Medium dense, dark brown, fine to coarse SAND & SILT. Wet. (FILL).	
4				8					S-2A (10"): Medium dense, brown, fine to coarse SAND, little fine to coarse Gravel, little Silt. Wet. (FILL).	
5				10				54.4 / 3.5		
6	S-3	8	4-4.9	48					S-2B (3"): Medium dense, dark gray, fine to coarse GRAVEL, trace fine to coarse Sand. Bedrock particles and fragments. Wet. (WEATHERED BEDROCK).	
7				50/5"					S-3: Very dense, dark gray, fine to coarse GRAVEL, trace fine to coarse Sand. Bedrock particles and fragments. Wet. (WEATHERED BEDROCK).	
8	C-1	24	5-7						C-1: Hard, moderately weathered, extremely fractured, gray, fine-grained, GABBRO-DIORITE, Massively bedded, very close to close shallow primary joint set, very close steep to vertical secondary joints.	
9										
10	C-2	36	7-10					50.9 / 7.0	C-2: Hard, slightly weathered, moderately fractured, gray, fine-grained, GABBRO-DIORITE, Massively bedded, close horizontal to shallow primary joint set, very close steep to vertical secondary joints and cracks.	
11					100/50	▽		47.9 / 10.0	Boring terminated at 10 feet.	2
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										




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

NOTES:

1) Water introduced to borehole to advance roller cone bit through pavement, and during rotary wash.

2) Borehole backfilled with drilling spoils and sand upon completion. Pavement patched with asphalt cold patch.

BOREHOLE LOG - NOBIS GINT DATA TEMPLATE OCT 7 2011 GDT - 5/3/21 10:43 - J:\96700.03 - HADLEY ELEMENTARY SCHOOL - SWAMPSCOTT MA SD GEOTECHEXPLOATIONS\96700.03 - HADLEY ELEMENTARY SCHOOL - EXPLORATION LOGS.GPJ

				BORING LOG				Boring No.: NB-2					
Project: <u>Hadley Elementary School</u>				Boring Location: <u>N: 2997721.00 E: 818357.00</u>				Checked by: <u>AJ</u>					
Location: <u>Swampscott, Massachusetts</u>				Date Start: <u>March 3, 2021</u>				Date Finish: <u>March 3, 2021</u>					
Nobis Project No.: <u>96700.03</u>				Rig Type / Model: <u>Truck / B-48 Mobile</u>				Ground Surface Elev.: <u>66</u>					
Contractor: <u>New England Boring Contractors</u>				Hammer Type: <u>Automatic Hammer</u>				Datum: <u>NAVD 88</u>					
Driller: <u>P. Schofield</u>				Hammer Hoist: <u>Automatic</u>									
Nobis Rep.: <u>S. Pape</u>													
		Drilling Method		Sampler		Groundwater Observations							
Type		Casing		Split-Spoon		Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time		
Size ID (in.)		4		1-3/8		03/03/21	13:45	2	0	11.6	5 min.		
Advancement		Drive and Wash		140-lb Hammer									
Depth (ft.)	SAMPLE INFORMATION					REC % / RQD %	Ground Water	LITHOLOGY		SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)		NOTES	
	Type & No.	Rec (in.)	Depth (ft.)	Blows/6 in.	Graphic			Stratum Elev. / Depth (ft.)					
1	S-1	15	0-2	5		57/17		TOPSOIL 65.0 / 1.0	S-1A (7"): Medium dense, brown, Organic SILT, some fine to coarse Sand, trace fine Gravel. Moist. (TOPSOIL).		1		
2				7					S-1B (8"): Medium dense, brown, fine to coarse SAND, little Silt, trace fine Gravel. Moist. (FILL).				
3	S-2	8	2-4	2					S-2: Loose, brown-tan, fine to coarse SAND, little fine Gravel, trace Silt. Wet. (FILL).				
4				6									
5	S-3	9	4-6	15					S-3: Medium dense, grayish tan, fine to coarse SAND, some Silt, little fine Gravel. Wet.				
6				8									
7	S-4	14	6-7.2	32					S-4: Very dense, dark tan, fine to coarse SAND, some fine to coarse Gravel, little Silt. Wet.				
8				85									
9	C-1	17	7.8-10.3	50/2"					C-1: Hard, severely weathered, extremely fractured, gray, fine-grained, GABBRO-DIORITE, Slightly weathered section from 7.8 to 8.3 feet below ground surface. Becomes very severely weathered and gravel-like at about 8.3 feet bgs.				
10													
11	C-2	14	10.3-11.6	88/0					C-2: very severely weathered, extremely fractured, gray, fine-grained, GABBRO-DIORITE, Very severely weathered, gravel-like.				
12					54.4 / 11.6		Boring terminated at 11.6 feet.		2				
13													
14													
15													
16													
17													
18													
19													
20													
21													
Soil	Percentage	Non-Soil		NOTES:									
trace	5 - 10	very few		1) Water introduced to borehole for rotary wash.									
little	10 - 20	few		2) Borehole backfilled with drilling spoils and sand upon completion.									
some	20 - 35	several											
and	35 - 50	numerous											
Soil descriptions, and lithology, are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between strata; transitions may be gradual.												Page No. <u>1</u> of <u>1</u>	



BORING LOG

Project: Hadley Elementary School

Location: Swampscott, Massachusetts

Nobis Project No.: 96700.03

Boring No.: NB-3

Boring Location: N: 2997598.00 E: 818689.00

Checked by: AJ

Date Start: March 3, 2021

Date Finish: March 3, 2021

Contractor: New England Boring Contractors

Driller: P. Schofield

Nobis Rep.: S. Pape

Rig Type / Model: Truck / B-48 Mobile


Hammer Type: Automatic Hammer

Hammer Hoist: Automatic

Ground Surface Elev.: 63.2

Datum: NAVD 88

	Drilling Method	Sampler	Groundwater Observations					
Type	Casing	Split-Spoon	Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
			▽ 03/03/21	15:30	1.5	0	7.2	5 min.
Size ID (in.)	4	1-3/8						
Advancement	Drive and Wash	140-lb Hammer						

SAMPLE INFORMATION					REC % / RQD %	Ground Water	LITHOLOGY		SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
Depth (ft.)	Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.			Graphic	Stratum Elev. / Depth (ft.)		
1	S-1	11	0.5-2	7	75/18		62.9 / 0.3 ASPHALTIC PAVEMENT FILL	4" ASPHALT.	1	
				5			62.3 / 0.9 ORGANIC MATERIAL	S-1A (3"): Loose, tan, fine to coarse SAND, little fine to coarse Gravel, trace Silt. Wet. (FILL).		
2				4				S-1B (8"): Loose, brown, Organic SILT, some fine Sand, trace Organic Fibers. Wet. (TOPSOIL).		
	S-2	6	2-2.5	50				S-2A (5"): Very dense, brown, Organic SILT, some fine to coarse Sand, some fine to coarse Gravel. Wet. (TOPSOIL).		
3	C-1	43	2.5-7.3	50/0'				S-2B (1"): Gray, rock fragments. Wet. (BEDROCK).		
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
							56.0 / 7.2	C-1: Hard, slightly weathered, moderately fractured, gray, fine-grained, GABBRO-DIORITE, Massively bedded, close to very close shallow primary joint set, very close steep to vertical secondary joints and cracks.	2	
8								Boring terminated at 7.2 feet.		
9										
10										
11										
12										
13										
14										
15										
16										
17										

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

NOTES:

1) Water introduced to borehole to advance roller cone bit through pavement, and during rotary wash.

2) Borehole backfilled with drilling spoils and sand upon completion. Pavement patched with asphalt cold patch.

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-1
SHEET 1 of 2
FILE NO. 96700.03
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 61.2 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	Remarks
1	TOPSOIL /FILL	Brown, fine to coarse SAND, some organic matter, trace fine to coarse Gravel, trace cobbles. Moist.	M	TRACE/A	
2	BEDROCK	1.5'± 2.0'± Extremely fractured rock. Bucket sparking.	D	N/A	
3		Bottom of exploration 2 feet bgs; Excavator refusal on bedrock.			1, 2
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

	<u>BOULDER</u>	<u>CLASS</u>	<u>PROPORTIONS USED</u>		<u>EXCAVATION EFFORT</u>
	12" - 24"	A	0-10%	Trace	E = Easy
	24" - 36"	B	10-20%	Little	M = Moderate
	>36"	C	20-35%	Some	D = Difficult
			35-50%	And	

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-1
 SHEET 2 of 2
 FILE NO. 96700.03
 CHKD BY AJ

Engineer S. Pape
 Contractor Swampscott DPW
 Operator Evan Segal
 Weather 40°F Partly cloudy

Make John Deere
 Model 310SL HL
 Capacity 0.2 CY
 Reach 12 ft

Ground El. 61.2 FT
 Datum NAVD88
 Date Start 3/4/2021
 Date Finish 3/4/2021



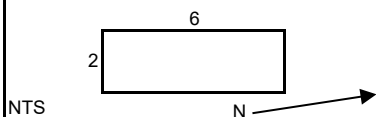
TOPSOIL

EXPOSED BEDROCK

Notes: 1.) Photo of NTP-1 in progress.

WATER SYMBOLS

▼ Groundwater
 ▽ Estimated Seasonal High Groundwater



NTS

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-2

SHEET 1 of 2

FILE NO. 96700.03

CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 62.8 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	Remarks
1	TOPSOIL	Brown, fine to coarse SAND, some organic matter, trace fine to coarse Gravel, trace cobbles. Moist. (12 inches) 1.0'±	M	Trace/A	Frozen
2	FILL	Brown, fine to coarse SAND, little fine to coarse Gravel, little silt. Moist. 2.5'±	M	Little/A+B	
3		Bottom of exploration 2.5 feet bgs; Excavator refusal on bedrock.			1,2
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

	<u>BOULDER</u>	<u>CLASS</u>	<u>PROPORTIONS USED</u>	<u>EXCAVATION EFFORT</u>
	12" - 24"	A	0-10% Trace	E = Easy
	24" - 36"	B	10-20% Little	M = Moderate
	>36"	C	20-35% Some	D = Difficult
			35-50% And	

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-2

SHEET 2 of 2

FILE NO. 96700.03

CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 62.8 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

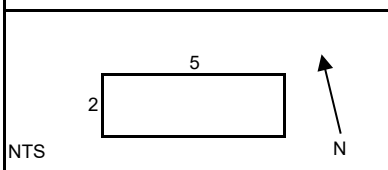


Notes: 1.) Photo of NTP-2 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-3
SHEET 1 of 2
FILE NO. 96700.03
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 57.7 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	Remarks
1	TOPSOIL	0.5'± Brown, fine to coarse SAND, some organic material. Moist.	E	None Obs.	
	SAND FILL	1.0'± Tan, fine to medium SAND, trace silt. Moist.	E	None Obs.	
2		1.5'± Becomes grayish brown, some silt.			1
	BURIED TOPSOIL	2.0'± Brown, organic SILT, some organic fibers. Buried topsoil.	E	None Obs.	
3	SANDY SILT	3.0'± Orangish brown, SILT, some fine to medium Sand. Moist	E	None Obs.	
4		Bottom of exploration 3 feet bgs; Excavator refusal on bedrock.			2,3
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) 1 foot thick buried swingset foundation encountered 1'± bgs on East side of NTP-3.
2.) Test pit backfilled with excavated soils and compacted with excavator bucket.
3.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

	<u>BOULDER</u>	<u>CLASS</u>	<u>PROPORTIONS USED</u>		<u>EXCAVATION EFFORT</u>
	12" - 24"	A	0-10%	Trace	E = Easy
	24" - 36"	B	10-20%	Little	M = Moderate
	>36"	C	20-35%	Some	D = Difficult
			35-50%	And	

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-3

SHEET 2 of 2

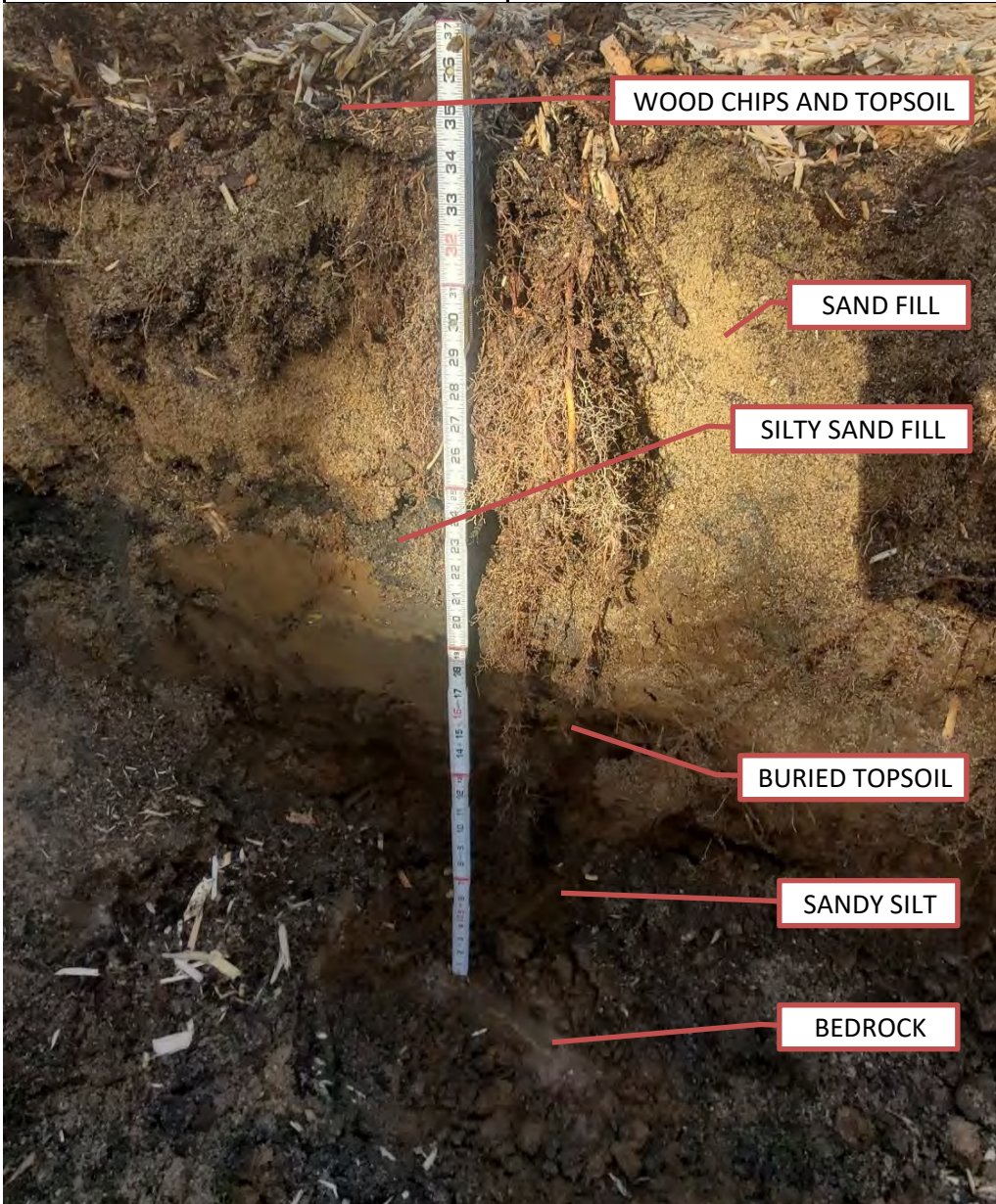
FILE NO. 96700.03

CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 57.7 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

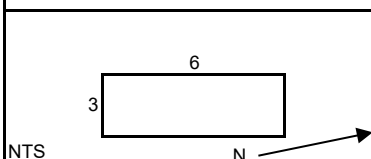


Notes: 1.) Photos of NTP-3 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-4
SHEET 1 of 2
FILE NO. 96700.03
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 59.3 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	Remarks
1	TOPSOIL	Brown, fine to coarse SAND, some organic material, trace fine to coarse Gravel, trace cobbles. Moist. (17 inches)	E	None Observed	
2	SILT & SAND	1.4'± 1.8'± Orangish brown, fine to medium SILT & SAND. Moist.	E	None Obs.	
3		Bottom of exploration 1.8 feet bgs; Excavator refusal on bedrock.			1,2
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

<p>NTS</p>	<p>BOULDER CLASS</p> <p>12" - 24" A</p> <p>24" - 36" B</p> <p>>36" C</p>	<p>PROPORTIONS USED</p> <p>0-10% Trace</p> <p>10-20% Little</p> <p>20-35% Some</p> <p>35-50% And</p>	<p>EXCAVATION EFFORT</p> <p>E = Easy</p> <p>M = Moderate</p> <p>D = Difficult</p>

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-4

SHEET 2 of 2

FILE NO. 96700.03

CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 59.3 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

SILT & SAND

TOPSOIL

Notes: 1.) Photo of NTP-4 in progress.

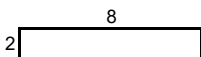
WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater

NTS

N



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-5
SHEET 1 of 2
FILE NO. 96700.03
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 58.1 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

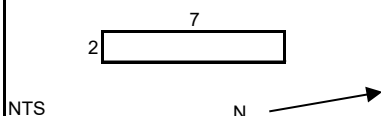
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	Remarks
1	TOPSOIL /FILL	Brown, fine to coarse SAND, some fine to coarse Gravel, little silt, little cobbles, trace organic matter. Moist.	E	Little/A	1
2					
3					
4	FILL	Dark grayish brown, fine to coarse SAND & SILT. Moist.	E	Trace/A	
5	SAND & SILT	Light gray, mottled, fine SAND & SILT, trace cobbles up to 8 inches in diameter. Moist.	M	Trace/A	
6					
7					
8					
9		Bottom of exploration 8 feet bgs; Excavator refusal on bedrock.			2,3
10					
11					
12					
13					
14					
15					

Notes: 1.) Two 4-inch C.I. conduits encountered at North end of test pit. Appeared to run from LC&ECo manhole cover to East wing of existing building.
2.) Test pit backfilled with excavated soils and compacted with excavator bucket.
3.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

BOULDER		CLASS	PROPORTIONS USED		EXCAVATION EFFORT
12" - 24"		A	0-10%	Trace	E = Easy
24" - 36"		B	10-20%	Little	M = Moderate
>36"		C	20-35%	Some	D = Difficult
			35-50%	And	



NTS

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-5
SHEET 2 of 2
FILE NO. 96700.03
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 58.1 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021



TOPSOIL

TWO 4-INCH C.I. CONDUITS

COBBLES

FILL

SILT & SAND

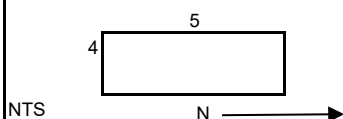
BEDROCK

Notes: 1.) Photo of NTP-5 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



NTS

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-6
SHEET 1 of 2
FILE NO. 96700.03
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 62.2 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

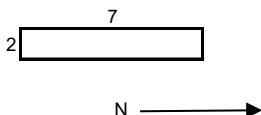
Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	Remarks
1	TOPSOIL /FILL	Brown, fine to coarse SAND, little fine to coarse Gravel, little Silt, little organic material. Moist	M	None Observed	Top Frozen
2					
3	SAND FILL	1.8'± Gray, fine to medium SAND, little fines. Moist.	E	None Obs.	1
4	FILL	Brown, fine to coarse SAND, some fine to coarse Gravel, little Silt, little cobbles. Moist. G-2 Laboratory Particle Size Analysis [13% Cobble, 17% Coarse Gravel, 12% Fine Gravel, 8% Coarse Sand, 16% Medium Sand, 15% Fine Sand, 18.7% Fines]	E	Little/A+B	
5					
6					
7		Bottom of exploration 5.6 feet bgs; Excavator refusal on bedrock.			2,3
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) G-1 Laboratory Particle Size Analysis [0.3% Fine Gravel, 3% Coarse Sand, 45% Medium Sand, 28% Fine Sand, 23.5% Fines]
2.) Test pit backfilled with excavated soils and compacted with excavator bucket.
3.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

BOULDER		CLASS	PROPORTIONS USED		EXCAVATION EFFORT
12" - 24"		A	0-10%	Trace	E = Easy
24" - 36"		B	10-20%	Little	M = Moderate
>36"		C	20-35%	Some	D = Difficult
			35-50%	And	



NTS

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-6

SHEET 2 of 2

FILE NO. 96700.03

CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 62.2 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021



TOPSOIL

SAND FILL

FILL

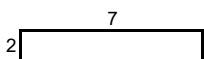
BEDROCK

Notes: 1.) Photo of NTP-6 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



NTS

N →

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-7
SHEET 1 of 2
FILE NO. 96700.03
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 61.2 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	Remarks
1	TOPSOIL	0.5'± Topsoil and organic material (6 inches).	E	None Obs.	
	SAND FILL	1.0'± Gray, fine to medium SAND, some silt. Moist. (3 inches)	E	None Obs.	
2	FILL	Brown, fine to coarse SAND, some fine to coarse Gravel, some silt. Moist. G-1 (1-4') Laboratory Particle Size Analysis [8% Coarse Gravel, 20% Fine Gravel, 8% Coarse Sand, 21% Medium Sand, 20% Fine Sand 23% Fines]	M	Little/A+B	
3					
4					
5					
6					
7	BEDROCK	Gray, extremely fractured, Salem GABBRO-DIORITE.	D	N/A	
8		Bottom of exploration 7.5 feet bgs; Excavator refusal on bedrock.			1,2
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

 NTS	 N	BOULDER	CLASS	PROPORTIONS USED	EXCAVATION EFFORT
		12" - 24"	A	0-10% Trace	E = Easy
		24" - 36"	B	10-20% Little	M = Moderate
		>36"	C	20-35% Some	D = Difficult
				35-50% And	

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-7

SHEET 2 of 2

FILE NO. 96700.03

CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 61.2 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021



TOPSOIL

SAND FILL

FILL

EXTREMELY FRACTURED ROCK

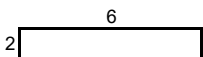
BEDROCK

Notes: 1.) Photo of NTP-7 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



NTS

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-8
SHEET 1 of 2
FILE NO. 95780.00
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 63.2 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	Remarks
1	TOPSOIL /FILL	Topsoil and organic material	E	None Observed	
2	SAND FILL	1.5'± 2.0'± Gray, fine to medium SAND, some silt. Moist.	E	None Obs.	
3	SAND & SILT	Tan, fine to medium SAND & SILT, trace fine to coarse gravel, trace cobbles. Moist	M	Trace/A+B	
4		3.8'±			
5		Bottom of exploration 3.8 feet bgs; Excavator refusal on bedrock.			1,2
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

 NTS	 N	BOULDER	CLASS	PROPORTIONS USED	EXCAVATION EFFORT
		12" - 24"	A	0-10% Trace	E = Easy
		24" - 36"	B	10-20% Little	M = Moderate
		>36"	C	20-35% Some	D = Difficult
				35-50% And	

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-8

SHEET 2 of 2

FILE NO. 96700.03

CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 63.2 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021



TOPSOIL

SAND FILL

SAND & SILT

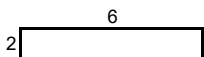
BEDROCK

Notes: 1.) Photo of NTP-8 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



NTS

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-9
SHEET 1 of 2
FILE NO. 96700.03
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 63.7 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	Remarks
1	TOPSOIL /FILL	Brown, fine to medium SAND & SILT, little organic material, trace fine to coarse Gravel. Moist. 1.0'±	E	None Observed	
2	SAND FILL	Gray, fine to medium SAND, some Silt. Moist. 1.5'±	E	None Obs.	
3	FILL	Brown, fine to coarse SAND, some fine to coarse Gravel, trace silt, trace cobbles. Moist. 3.3'±	M	Little/A+B	
4	SILTY CLAY	Orangish tan, CLAY & SILT, and fine to coarse Sand, little fine to coarse Gravel, trace Cobbles. Moist. 5.2'±	E	None Observed	1
5					
6		Bottom of exploration 5.2 feet bgs; Excavator refusal on bedrock.			2,3
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) G-1 (3.3-4.3') Laboratory Particle Size Analysis [3% Coarse Gravel, 10% Fine Gravel, 5% Coarse Sand, 14% Medium Sand, 24% Fine Sand, 44% Fines.
2.) Test pit backfilled with excavated soils and compacted with excavator bucket.
3.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

 NTS	BOULDER	CLASS	PROPORTIONS USED		EXCAVATION EFFORT
	12" - 24"	A	0-10%	Trace	E = Easy
	24" - 36"	B	10-20%	Little	M = Moderate
	>36"	C	20-35%	Some	D = Difficult
			35-50%	And	

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-9
SHEET 2 of 2
FILE NO. 96700.03
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 63.7 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021



TOPSOIL

SAND FILL

FILL

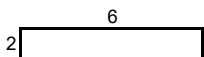
SILTY CLAY

Notes: 1.) Photo of NTP-9 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



NTS

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-10
SHEET 1 of 2
FILE NO. 96700.03
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 61.5 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	Remarks
1	TOPSOIL /FILL	Brown, fine to coarse SAND & SILT, some organic material, trace fine to coarse Gravel. Moist.	E	None Observed	
2	SAND FILL	1.5'± Gray, fine to medium SAND, some silt. Moist.	E	None Obs.	
3	FILL	Brown, fine to coarse SAND, some fine to coarse Gravel, little Silt, trace cobbles. G-1 Laboratory Particle Size Analysis [13% Coarse Gravel, 19% Fine Gravel, 9% Coarse Sand, 21% Medium Sand, 20% Fine Sand, 18% Fines]	M	Some/A-C	Sidewalls caved.
4					
5					
6					
7					
8	SILTY CLAY	7.5'± Orangish tan, Silty CLAY, trace fine sand, trace cobbles. Moist.	M	Trace/A	G-2
9					
10		9.4'± Bottom of exploration 9.4 feet bgs; Excavator refusal on bedrock.			1,2
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

	<u>BOULDER</u>	<u>CLASS</u>	<u>PROPORTIONS USED</u>	<u>EXCAVATION EFFORT</u>
	12" - 24"	A	0-10% Trace	E = Easy
	24" - 36"	B	10-20% Little	M = Moderate
	>36"	C	20-35% Some	D = Difficult
			35-50% And	

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-10

SHEET 2 of 2

FILE NO. 96700.03

CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 61.5 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021



TOPSOIL

FILL

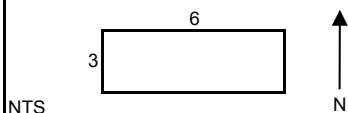
ROCK

Notes: 1.) Photo of NTP-10 in progress.

WATER SYMBOLS

▼ Groundwater

▽ Estimated Seasonal High Groundwater



TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-11
SHEET 1 of 2
FILE NO. 96700.03
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 64.1 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021

Depth Below Grade (ft)	Strata Change & Water Level	Subsurface Description	Excavation Effort	Boulder Qty/Class	Remarks
1	TOPSOIL	Brown, fine to coarse SAND, some organic Silt, trace fine to coarse gravel, trace organic fibers. Moist. 1.0'±	E	None Obs.	
2	SILTY SAND WITH GRAVEL	Orangish brown, fine to coarse SAND, some silt, little fine to coarse gravel. Moist. 2.6-3.2'±	E	Little/A+B	
3					
4		Bottom of exploration 2.6 to 3.2 feet bgs; Excavator refusal on bedrock.			1,2
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Notes: 1.) Test pit backfilled with excavated soils and compacted with excavator bucket.
2.) Groundwater not encountered.

WATER SYMBOLS

▼ Groundwater
▽ Estimated Seasonal High Groundwater

		<u>BOULDER</u>	<u>CLASS</u>	<u>PROPORTIONS USED</u>	<u>EXCAVATION EFFORT</u>
		12" - 24"	A	0-10% Trace	E = Easy
		24" - 36"	B	10-20% Little	M = Moderate
		>36"	C	20-35% Some	D = Difficult
				35-50% And	

TEST PIT LOG



PROJECT

Hadley Elementary School

10 Whitman Road

Swampscott, Massachusetts

TEST PIT NO. NTP-11
SHEET 2 of 2
FILE NO. 96700.03
CHKD BY AJ

Engineer S. Pape
Contractor Swampscott DPW
Operator Evan Segal
Weather 40°F Partly cloudy

Make John Deere
Model 310SL HL
Capacity 0.2 CY
Reach 12 ft

Ground El. 64.1 FT
Datum NAVD88
Date Start 3/4/2021
Date Finish 3/4/2021



TOPSOIL

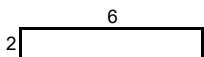
SILTY SAND WITH GRAVEL

BEDROCK

Notes: 1.) Photo of TP-11 in progress.

WATER SYMBOLS


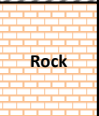
▼ Groundwater
▽ Estimated Seasonal High Groundwater



NTS



Project:	Proposed Elementary School - Stanley School Site, Swampscott, MA		
Client:	Mount Vernon Group Architects, Inc.	LGCI Project No.: 1319	
Excavation Subcontractor: Swampscott DPW	Date Started:	08/12/13	
Excavation Foreman : Paul J. Plourde	Date Completed:	08/12/13	
LGCI Engineer: J. MacGregor	Location:	Northwestern corner of ball fields	
Ground Surface El: not provided	Total Depth:	5.0 feet	
Groundwater Depth: not encountered	Excavator Type:	CAT 416C rubber tire backhoe	
	Test Pit Dimensions:	3.0 x 6.0 feet	

Depth Scale	Exc. Effort	Strata	Soil Description
5 ft		Topsoil	0 to 0.9 feet: Topsoil
	E		0.9 to 1.5 feet: Heterogeneous fill consisting of sand, gravel, stone dust, and brick
	E		1.5 to 3.5 feet: Silty SAND with Gravel (SM), fine to coarse, 20-25% fines, 15-20% gravel, brown and gray, moist
	M		
	M		3.5 to 5.0 feet: rock, fractured, hard, fresh to slightly weathered; silt, sand, and mineral deposits on fracture faces, dark gray and white
	V		
10 ft			Bottom of test pit at 5.0 feet Backfilled with excavated material.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult



Project:	Proposed Elementary School - Stanley School Site, Swampscott, MA		
Client:	Mount Vernon Group Architects, Inc.		LGCI Project No.: 1319
Excavation Subcontractor: Swampscott DPW	Date Started:	08/12/13	
Excavation Foreman : Paul J. Plourde	Date Completed:	08/12/13	
LGCI Engineer: J. MacGregor	Location:	Northeastern corner of ball fields	
Ground Surface El: not provided	Total Depth:	6.5 feet	
Groundwater Depth: not encountered	Excavator Type:	CAT 416C rubber tire backhoe	
	Test Pit Dimensions:	3.0 x 6.0 feet	

Depth Scale	Exc. Effort	Strata	Soil Description
5 ft		Topsoil	0 to 0.75 feet: Topsoil
	E	Fill ~5.5 ft	0.75 to 1.5 feet: Stone dust
	M		1.5 to 3.0 feet: layered sand with pockets of organic soil
	M		
	D		3.0 to 5.5 feet: rock fill with silty sand, few bricks, and pockets of organic soil
	D		
10 ft		Rock	5.5 to 6.5 feet: fractured rock
	V		Bottom of test pit at 6.5 feet Backfilled with excavated material.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult



Project:	Proposed Elementary School - Stanley School Site, Swampscott, MA		
Client:	Mount Vernon Group Architects, Inc.	LGCI Project No.: 1319	
Excavation Subcontractor: Swampscott DPW	Date Started:	08/12/13	
Excavation Foreman : Paul J. Plourde	Date Completed:	08/12/13	
LGCI Engineer: J. MacGregor	Location:	Approx center of western side of field	
Ground Surface El: not provided	Total Depth:	6.5 feet	
Groundwater Depth: not encountered	Excavator Type:	CAT 416C rubber tire backhoe	
	Test Pit Dimensions:	2.5 x 6.0 feet	

Depth Scale	Exc. Effort	Strata	Soil Description
5 ft	E	Topsoil ~1.0 ft	0 to 1.0 foot: Topsoil
	M	Fill ~4.0 ft	1.0 to 4.0 feet: Silty SAND (SM), fine to coarse, 25-30% fines, 20-25% subrounded to subangular gravel, brown, dry-moist; several cobbles
	M		
	M		
	M	Subsoil ~6.5 ft	4.0 to 6.5 feet: Sandy SILT (ML), slightly plastic, 35-40% fine to coarse sand, 10-15% gravel, rusty brown, moist
	M		
10 ft			Refusal on possibe rock
			Bottom of test pit at 6.5 feet on probable rock Backfilled with excavated material.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult



Project:	Proposed Elementary School - Stanley School Site, Swampscott, MA		
Client:	Mount Vernon Group Architects, Inc.	LGCI Project No.: 1319	
Excavation Subcontractor: Swampscott DPW	Date Started:	08/12/13	
Excavation Foreman : Paul J. Plourde	Date Completed:	08/12/13	
LGCI Engineer: J. MacGregor	Location:	Approx center of ball field	
Ground Surface El: not provided	Total Depth:	6.0 feet	
Groundwater Depth: not encountered	Excavator Type:	CAT 416C rubber tire backhoe	
	Test Pit Dimensions:	3.0 x 6.0 feet	

Depth Scale	Exc. Effort	Strata	Soil Description
5 ft	E	Topsoil	0 to 1.0 foot: Topsoil
	M	Fill	1.0 to 1.25 feet: Stone dust
	M		1.25 to 5.0 feet: Silty SAND (SM), fine to coarse, 15-20% fines, 25-30% subrounded to subangular gravel, brown, moist
	M		
	M		
10 ft	V	ROCK	5.0 to 6.0 feet: Fractured rock
			Bottom of test pit at 6.0 feet Backfilled with excavated material.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult



Project:	Proposed Elementary School - Stanley School Site, Swampscott, MA		
Client:	Mount Vernon Group Architects, Inc.	LGCI Project No.: 1319	
Excavation Subcontractor:	Swampscott DPW	Date Started:	08/12/13
Excavation Foreman :	Paul J. Plourde	Date Completed:	08/12/13
LGCI Engineer:	J. MacGregor	Location:	Approx center of eastern side of field
Ground Surface El:	not provided	Total Depth:	4.0 feet
Groundwater Depth:	not encountered	Excavator Type:	CAT 416C rubber tire backhoe
		Test Pit Dimensions:	2.5 x 6.0 feet

Depth Scale	Exc. Effort	Strata	Soil Description
5 ft		Topsoil	0 to 0.75 feet: Topsoil
	E	Fill ~1.6 ft	0.75 to 1.6 feet: Sand fill over stone dust
	M	SAND ~3.0 ft	1.6 to 3.0 feet: Well Graded SAND with Silt and Gravel (SW-SM), fine to coarse, 10-15% fines, 30-35% gravel, light brown, moist; numerous cobbles
	D		
	V	ROCK	3.0 to 4.0 feet: Fractured rock with sand and silt on faces of fracture
10 ft			Bottom of test pit at 4.0 feet Backfilled with excavated material.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult



Project:	Proposed Elementary School - Stanley School Site, Swampscott, MA		
Client:	Mount Vernon Group Architects, Inc.	LGCI Project No.: 1319	
Excavation Subcontractor: Swampscott DPW	Date Started:	08/12/13	
Excavation Foreman : Paul J. Plourde	Date Completed:	08/12/13	
LGCI Engineer: J. MacGregor	Location:	Southwestern corner of ball field	
Ground Surface El: not provided	Total Depth:	3.5 feet	
Groundwater Depth: not encountered	Excavator Type:	CAT 416C rubber tire backhoe	
	Test Pit Dimensions:	2.5 x 6.0 feet	

Depth Scale	Exc. Effort	Strata	Soil Description
5 ft	E	Topsoil	0 to 1.0 foot: Topsoil
	M	Fill ~2.0 ft	1.0 to 2.0 feet: Silty SAND with Gravel (SM), fine to coarse, 30-35% fines, 15-20% gravel, pieces of brick, brown, moist
	D	Topsoil ~3.0 ft	2.0 to 3.0 feet: buried topsoil
	V	ROCK	3.0 to 3.5 feet: rock, fractured, hard, slightly weathered; silt and sand on faces of fracture, dark gray and white
10 ft			Bottom of test pit at 3.5 feet Backfilled with excavated material.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult



Project:	Proposed Elementary School - Stanley School Site, Swampscott, MA		
Client:	Mount Vernon Group Architects, Inc.		LGCI Project No.: 1319
Excavation Subcontractor: Swampscott DPW	Date Started:	08/12/13	
Excavation Foreman : Paul J. Plourde	Date Completed:	08/12/13	
LGCI Engineer: J. MacGregor	Location:	Southeastern corner of ball field	
Ground Surface El: not provided	Total Depth:	8.3 feet	
Groundwater Depth: not encountered	Excavator Type:	CAT 416C rubber tire backhoe	
	Test Pit Dimensions:	2.5 x 8.0 feet	

Depth Scale	Exc. Effort	Strata	Soil Description
5 ft		Topsoil	0 to 0.5 feet: Topsoil
	E	Fill	0.5 to 4.5 feet: Silty SAND with Gravel (SM), fine to coarse, 30-35% fines, 20-25% gravel, dark brown, moist; numerous cobbles and few boulders
	M		
	M		
	M		
10 ft	D	~4.5 ft	4.5 to 7.0 feet: organic soil with cobbles
	D	Organic soil with cobbles	
	D	~ 7.0 ft	
	V	Sandy SILT	7.0 to 8.3 feet: Sandy SILT (ML), moderately plastic, 30-35% fine sand, mottled rusty brown, tan, and gray, moist.
		~8.3 ft	
15 ft			
			Bottom of test pit at 8.0 feet on probable top of rock. Backfilled with excavated material.

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult



Project:	Proposed Elementary School - Stanley School Site, Swampscott, MA		
Client:	Mount Vernon Group Architects, Inc.		LGCI Project No.: 1319
Excavation Subcontractor: Swampscott DPW	Date Started:	08/12/13	
Excavation Foreman : Paul J. Plourde	Date Completed:	08/12/13	
LGCI Engineer: J. MacGregor	Location:	Southeast of existing school	
Ground Surface El: not provided	Total Depth:	2.5 feet	
Groundwater Depth: not encountered	Excavator Type:	CAT 416C rubber tire backhoe	
	Test Pit Dimensions:	2.5 x 5.0 feet	

Depth Scale	Exc. Effort	Strata	Soil Description
5 ft		Topsoil	0 to 0.5 feet: Topsoil
	E	Fill ~2.5 ft	0.5 to 2.5 feet: Well Graded GRAVEL with SAND(GW), fine to coarse, <5% fines, 40-45% fine to coarse sand, brown, moist
	M		
	M		
	M		
	D		Bottom of test pit at 2.5 feet on probable top of rock. Backfilled with excavated material. Rock outcrops to south and east of TP-8
	D		
	D		
	V		
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

