New Bedford, MA

True Value Marine Hardware

September 2019

STORMWATER MANAGEMENT REPORT

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1.0 Overview

1.1 Objectives of Calculations

The calculations presented in this report are an analysis of the site hydrology and stormwater runoff, including scenarios for both Existing Conditions and Proposed Conditions. The project is considered a redevelopment project and the objective of this analysis is to demonstrate that measures have been implemented to comply with the Massachusetts Stormwater Management Standards and City of New Bedford Stormwater requirements to the maximum extent practicable. Analysis of the Existing and Proposed Conditions is included for the two (2), ten (10), and one hundred (100) year rainfall events. A description of the project and how it relates to the ten Stormwater Management Standards is included.

1.2 Calculation Methods and Assumptions

Stormwater runoff is analyzed using the following:

- "HydroCADä Stormwater Modeling System," by Applied Microcomputer Systems based upon SCS Technical Releases No. 55 and 20 for generating hydraulic calculations including peak flows and runoff volumes

1.3 Equations and Sources of Data Used

- 24-Hour Rainfall data (Technical Paper 40: Bristol County)
  - 2 yr = 3.40 in. 10 yr = 4.80 in. 100 yr = 7.00 in.
- Soils information from the Natural Resources Conservation Service (NRCS) website

1.4 Points of Analysis

- POA1 – Offsite to the Northeast, into the Acushnet River

1.5 Contact Information

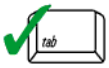
- Shoreline Resources, Inc.
- 137 Popes Island, New Bedford, MA 02750
- (774) 930-3795

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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.

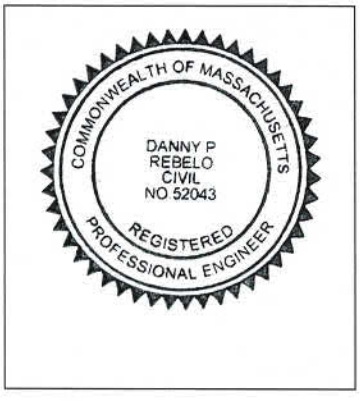
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the 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 9/20/19

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): _____

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 Field[1]

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

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

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

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

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

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

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

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

Checklist 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.

2.0 Existing Conditions Description

The project site is a portion of 137-143 Popes Island, a currently developed 3.011 +/- acre parcel located in New Bedford, Massachusetts (the "Property"). The New Bedford Assessor's Office identifies the Property as Map 60, Lot 13. Records indicate that current site operations include a marine retail store (#137 Popes Island) and a Machine Shop (#143 Popes Island). The property is zoned as Industrial A.

The Property is located on the central portion of Popes Island, an island located in the center of the Acushnet River near its outfall to the Atlantic Ocean. (Refer to Figure 1: Site Locus) Access to the Property is provided via Route 6, which spans the Acushnet River to the east and west. Land Use in the vicinity of the Property generally includes industrial and commercial properties, as well as a park along the southern side.

The existing property includes two buildings: 137 and 143 Popes Island. Access to both buildings is provided via a paved driveway connecting to Route 6. This driveway leads to two small parking areas near the front of the property, as well as a larger paved area in the rear. The majority of the lot contains impervious surfaces with some vegetated areas. The north and eastern sides of the property are separated from the Acushnet River by a 10' +/- slope protected by riprap.

Topography at the site generally slopes in three directions. The front portion generally slopes to the east towards the Acushnet River. The center of the property has been graded to drain into an existing closed drainage system, which appear to continue south towards Route 6. A series of roof leaders also appears to drain into this system. The rear portion of the property generally slopes to the northeast, towards the Acushnet River.

Natural Resources Conservation Service soil maps indicate soils in the project area are considered Urban land and do not have an assigned Hydrologic Soil Group (HSG) rating. Note that, as the majority of the soils on the Property are impervious and no infiltration is proposed, the HSG rating is generally unimportant to the stormwater design (refer to the following sections). As a conservative measure, a rating of HSG D has been applied to the hydrologic calculations where applicable. Refer to Appendix C for a copy of NRCS Soil Maps.

3.0 Proposed Conditions with Mitigation

The project proposes a change-in-use for a portion of the existing machine shop to be used for bulk item storage and a marine retail store. Associated site improvements will include re-striping the front parking areas and redeveloping the rear parking area to meet City parking regulations. As no net increase in impervious area is proposed, this project is considered a redevelopment under the Massachusetts Stormwater Standards. For the purposes of this report, the "Site" shall be used to refer to the limit of alterations in the northern area of the Site.

Stormwater management is proposed via the installation of a hydrodynamic separator within the rear parking area. The parking lot will be re-graded as needed and provided with a cape cod berm along its easterly limit to direct flow towards the separator. The separator has been sized to convey post-development runoff and provide sufficient pollutant removal to meet water quality regulations. The outlet of this structure will be an opening that drains onto a riprap apron for erosion control. Runoff from the apron will then flow overland towards the Acushnet River.

The proposed redevelopment will use the footprint of the existing paved area, and no impervious surfaces are proposed for parking. The hydrodynamic separator will protrude from the ground, creating approximately 50 +/- s.f of impervious area. This increase will be offset by the removal and restoration of 650 +/- s.f. of existing pavement that will no longer be needed for the proposed parking lot layout. This area will be revegetated with loam and seed to enhance the quantity of pervious cover on the Site. A net decrease of 600 +/- s.f. of impervious area is anticipated as a result of this project. No other exterior areas beyond the rear parking lot will be altered with the exception of re-striping existing pavement, adjustment of the building's entryway, and installation of bollards/signs.

Refer to Appendix D for figures showing the pre- and post- development watersheds. Refer to Appendices E and F for copies of the pre- and post-development HydroCAD calculations. Additional calculations relating to the design are provided in Appendix G. See the Appendices H and I for drawing sheets of the proposed drainage system and details describing system components.

4.0 SUMMARY OF RESULTS

Peak Rate of Runoff		Flow (cubic feet per second)					
		2 Year Storm		10 Year Storm		100 Year Storm	
Outlet To:		Exist	Prop	Exist	Prop	Exist	Prop
POA1	Acushnet River	1.79	1.58	2.56	2.26	3.75	3.33

Runoff Volume		Volume (acre-feet)					
		2 Year Storm		10 Year Storm		100 Year Storm	
Outlet To:		Exist	Prop	Exist	Prop	Exist	Prop
POA1	Acushnet River	0.175	0.175	0.253	0.253	0.375	0.375

Supplemental Calculations:

Recharge Volume Required = 0 cu. ft. (No loss of recharge as no new impervious area proposed)
Recharge Volume Provided = 5 cu. ft. (From 600 sq. ft. net Increase in pervious area (HSG D))

Water Quality Volume Required = 2,358 cu. ft.
Water Quality Volume Provided = Refer to sizing calculations by manufacturer

Existing TSS Removal Rate = 0 %
Proposed TSS Removal Rate for Rear Parking = 80%

5.0 COMMENTS AND CONCLUSIONS

As a result of the aforementioned proposed mitigation measures, runoff will be captured, peak flows will be controlled, and water quality volume will be provided. The provided analysis has demonstrated that there will be no adverse impacts as a result of the project. The proposed stormwater management Best Management Practices have been designed to meet the DEP's Stormwater Management Policy to the maximum extent practicable. Summaries of compliance with the ten DEP Stormwater Management Standards and City of New Bedford Stormwater Management Rules are provided in the following sections.

6.0 Summary of Compliance with Ten Stormwater Management Standards

Shoreline Resources, LLC. is proposing the redevelopment of the existing property at 137-143 Popes Island in New Bedford, MA. The following summary has been prepared to illustrate the project's conformance with MassDEP's Stormwater Management Standards. Note that the project is a redevelopment project and need only meet certain standards the maximum extent practicable.

LID Measures:

Low Impact Development (LID) techniques on the project site are limited due to the limited space available on-site and the need to protect local resource areas. A reduction in impervious area is proposed under the redevelopment.

Standard 1: No New Untreated Discharges

No new stormwater conveyances (e.g. outfalls) may discharge directly untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth

No new untreated discharges to wetlands are created as part of this project. Existing site conditions currently allow runoff to flow, untreated, from the rear parking area into the Acushnet River. The redevelopment proposes to capture and treat this runoff using a hydrodynamic separator. Runoff discharged from this separator will be directed to a riprap apron to control erosion prior to flow into the Acushnet River. Construction period controls consisting of compost filter tubes are proposed between the Site and the Acushnet River, and will be required prior to the start of the project. – project complies.

Standard 2: Peak Rate Attenuation

Stormwater management systems shall be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates.

The proposed design retains existing cover types to prevent an increase in peak discharge rates, and some existing impervious areas will be revegetated. The rear parking area will be graded to direct runoff towards a hydrodynamic separator to capture, treat, and control runoff. A net decrease in peak runoff rate is anticipated as part of the project – project complies.

Standard 3: Recharge

Loss of annual recharge to groundwater shall be eliminated or minimized. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type.

As no new impervious areas are proposed, there will be no loss in annual recharge from the pos-development site compared to pre-development conditions. The re-vegetation of existing impervious area will improve the Site's ability to infiltrate runoff. – project complies.

Standard 4: Water Quality

Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids.

The proposed hydrodynamic separator will provide treatment of stormwater runoff that does not currently exist. The proposed improvements will provide a TSS removal rate of 80%, and the unit has been sized to treat the 1" water quality volume from the Site. – project complies.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

Land use with high potential pollutant loads must have source control and pollution prevention measures implemented in accordance with the Massachusetts Stormwater Handbook.

The existing Property includes a machine shop, which classifies as an LUHPPL. While no operation areas of this use will discharge directly to the Site, there is a possibility for spills to occur. As a redevelopment project, the Site need only fully comply with the pollution prevention requirements of this standard, while other aspects must be met only to the maximum extent practicable. A significant improvement in managing potential pollutant loads over existing conditions is anticipated as part of this project.

Structural BMPs

Runoff from the Site is located outside of the machine shop, and thus does not come into contact with the actual area or activity that may generate the higher potential pollutant load. As a result, the structural BMP requirements do not apply.

Pollution Prevention

Spill control and pollution prevention measures are outlined in Appendix B. The hydrodynamic separator is designed to provide emergency oil storage suitable for the anticipated spill magnitude at the Site.

Treatment

Standard 5 requires the implementation a treatment train that provides at least 80% TSS removal and treatment of the 1-inch water quality volume, which has been provided as discussed in Standard 4. As no infiltration BMP is proposed, the requirement for 44% pretreatment and use of specific BMPs is not required.

– project complies.

Standard 6: Critical Areas

Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of specific source control, pollution prevention measures.

The project proposes discharge near to the Acushnet River. The Massachusetts Division of Marine Wildlife classifies the portion of the Acushnet River in the vicinity of the Site as a shellfish growing area, which is defined as a critical area under the standards. However, a discharge is only considered to be near to a critical area if "there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors."

The previous sections have demonstrated that the post-development Site will be an improvement over existing conditions. Peak discharge rates will be mitigated, recharge will be maintained, TSS removal will be achieved, and the 1" water quality volume will be provided. The proposed hydrodynamic separator will provide treatment that does not currently exist, and as such it is not likely that a significant impact will occur to this area.

In any case, a redevelopment project must only comply fully with the pollution prevention requirements of this standards, while the pretreatment and treatment requirements need only be met to the maximum extent practicable.

Pollution Prevention

Spill control and pollution prevention measures are outlined in Appendix B. The hydrodynamic separator is designed to provide oil storage suitable for the anticipated spill magnitude at the Site.

Treatment

The Massachusetts Stormwater Handbook provides a list of BMPs typically appropriate for discharges near to shellfish growing areas. Each option was evaluated for possible use at the Site, but the installation of each was made impractical by the limited space available on the Site, the shallow depth to groundwater, the need to protect resource areas, and the need to avoid impacts to the existing flood control levee that could be caused by an outlet pipe.

Proprietary separators are acceptable as pretreatment devices near to shellfish growing areas but may only be used for treatment if verified by the TARP or STEP programs for other uses. Stormceptor has been approved in the state of Massachusetts by the STEP program, and TSS removal rates are provided in Appendix G. The proposed hydrodynamic separator will provide TSS removal in excess of what is required and treat the 1" water quality volume. As site constraints limit the available treatment options, the project meets this standard to the maximum extent practicable.

- project complies to maximum extent practicable.

Standard 7: Redevelopment

A redevelopment project is required to meet certain Stormwater Management Standards only to the maximum extent practicable.

The project is a redevelopment project under the definition of (2): "Development, rehabilitation, expansion, and phased projects on previously developed sites, provided the redevelopment results in no net increase in impervious area." Certain standards have been met only to the maximum extent practicable as noted in previous sections.

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

A plan to control construction related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities shall be developed and implemented.

The project will not disturb greater than one acre and will not require the development of a Stormwater Pollution Prevention Plan (SWPPP) prior to construction. An erosion control plan has been included with the design plans, and a Construction Period Pollution Prevention and Sediment Control Plan has been provided as Appendix A of this report.

Standard 9: Long Term Operation and Maintenance Plan

A Long-Term Operation and Maintenance Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

Operations and Maintenance of Stormwater management systems will be the responsibility of Shoreline Resources, LLC. Therefore, inspection and maintenance of the stormwater management system will be in accordance with the attached Operation and Maintenance Plan.

Standard 10: Prohibition of Illicit Discharges

All illicit discharges to the stormwater management system are prohibited.

There are currently no known non-stormwater illicit discharges within the project limits and new discharges are prohibited. An illicit discharge compliance statement is attached.

7.0 SUMMARY OF COMPLIANCE WITH STORMWATER MANAGEMENT RULES

The following summary has been prepared to illustrate the project's conformance with the Stormwater Management Rules and Regulations established by the City of New Bedford.

1: Stormwater Management Basins: All stormwater management basins, including detention, retention, and sedimentation basins, shall have side slopes composed of earthen embankments with side slopes no greater than 3:1.

No basins are proposed under this project – not applicable.

2: Site Planning Process: The site planning process shall include identifying and mapping critical resource areas, delineating potential buildings envelopes, and developing methods to minimize impervious cover.

Critical areas are identified in Section 6.0. No new buildings are proposed under this project. The proposed site design will result in a net decrease in impervious area. – project complies.

3: Untreated Discharges: All stormwater runoff generated from land development and land use conversion shall be treated to the maximum extent practicable prior to discharge to a wetland, local water body, municipal drainage system, or right-of-way (ROW).

The proposed design uses a hydrodynamic separator to treat stormwater prior to discharge to the Acushnet River. A significant improvement over existing conditions is anticipated. – project complies.

4: Site Design Criteria: Low Impact Development site planning and design strategies must be used to the maximum extent practicable.

LID measures are limited due to the desire to minimize alteration of the existing Site. The proposed redevelopment will result in a net decrease in impervious area. – project complies.

5: Channel Protection: Protection of channels from bank and bed erosion and degradation shall be provided by controlling the discharge rate from the 2-year storm to the pre-development rate.

The post-development Site will mitigate peak flow rates by reducing the total impervious area on the Site. A net decrease in peak discharge rate for the 2-year storm is anticipated. – project complies.

6: Overbank Flooding Protection: Downstream overbank flood and property protection shall be provided by attenuating the post-development peak discharge rate for the 10-year storm.

The post-development Site will mitigate peak flow rates by reducing the total impervious area on the Site. A net decrease in peak discharge rate for the 10-year storm is anticipated. – project complies.

7: Extreme Flooding Protection: Extreme flooding and public safety protection shall be provided be controlling and safely conveying the 100-year storm event.

The post-development Site will mitigate peak flow rates by reducing the total impervious area on the Site. A net decrease in peak discharge rate for the 100-year storm is anticipated. – project complies.

8: Recharge: Annual groundwater recharge rates shall be maintained by promoting infiltration and recharge. Stormwater runoff volume to be recharged shall be determined using the methods prescribed in the MASWMS

As no new impervious areas are proposed, post-development recharge will be approximately equal to pre-development recharge. Recharge calculations are provided in Appendix G. – project complies.

9: Structural Practices for Water Quality: All structural Stormwater Management facilities shall be selected and designed using the appropriate criteria from the MASWMS. Structural BMPs must be designed to remove 80% of the average annual post development total suspended solids (TSS).

The proposed stormwater management system is a proprietary stormwater BMP, as described in Volume 2 Chapter 4 of the MASWMS. Supporting calculations have been provided in Appendix G to show that the proposed system will provide 80% TSS removal efficiency – project complies.

10: Water Quality Volume: The prescribed water quality volume required in the sizing of a structural stormwater practices shall be 1.0 inches x the total impervious area in critical areas.

The proposed stormwater management system has been designed and sized to treat the 1" water quality volume, as described in Appendix G. – project complies.

10 (sic): Sensitive Areas: Stormwater discharged to critical areas with sensitive resources may be subject to additional criteria at the discretion of the Stormwater authority.

The Acushnet River is listed as a shellfish growing area and may qualify as a critical area. The proposed stormwater management design is a significant improvement over existing discharges from the Site. Refer to Section 6.0 of this report.

11 Hotspots: Stormwater discharges from land uses or activities with higher potential pollutant loads, "hotspots," require the use of specific Stormwater Management BMPs.

The existing machine shop is a land use with a higher potential pollutant load. Refer to Section 6.0 of this report. – project complies.

12: Redevelopment: Redevelopment projects are presumed to meet the specified stormwater requirements described in the Stormwater Rules and Regulations of the City of New Bedford if one of the following criteria is met :

1. The total impervious cover is reduced by 40% from existing conditions;
2. Stormwater practices are implemented to provide stormwater controls for at least 40% of the Site's impervious area; or
3. A combination of impervious area reduction and the area controlled by a stormwater management practice is equal to or exceeds 40%.

The project is a redevelopment project, as defined by the Stormwater Rules and Regulations, as the land contain existing impervious cover and the activity does not result in a net increase in impervious cover. As a redevelopment project, the Site meets Standard 12 under item (2) above. Note that the Stormwater Rules and Regulations define "Site" as "any lot or parcel of land or area of property where land-disturbing activities are, were, or will be performed." As noted earlier, the Site described in this report includes only the rear parking area where alterations are proposed, and not the entire lot. Stormwater practices have been implemented for more than 40% of the Site's impervious area. The project is considered to meet the stormwater requirements of these Rules and Regulations. – project complies.

13: On-Site Stormwater Retainage: Stormwater management facilities for development and redevelopment projects shall be designed to either:

1. Retain the first one (1) inch of runoff from all impervious cover on site; or
2. Provide the level of pollutant removal equal to or greater than the level of pollutant removal provided through the use of filtration of the first one (1) inch of runoff from impervious cover on site.

Due to site constraints and the desire to minimize alteration of the Site, potential for stormwater retainage is limited. The proposed hydrodynamic separator has been designed to treat the first one (1) inch of runoff from all impervious cover on the Site. – project complies.

Illicit Discharge Compliance Statement

It is the intent of the Owner, Shoreline Resources LLC., to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease. The proposed improvements at 137-143 Popes Island (Assessor's Map 60, Lot 13) are intended to remove untreated existing discharges to the stormwater management system and provide necessary treatment at all proposed discharges. To the extent of my knowledge, the proposed project does not create any illicit discharges and all illicit discharges are prohibited in the future.

Shoreline Resources, LLC.

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True Value Marine Hardware
137 - 143 Popes Island
New Bedford, MA

Figure 1

Site Locus Map

MassDEP - Bureau of Waste Site Cleanup

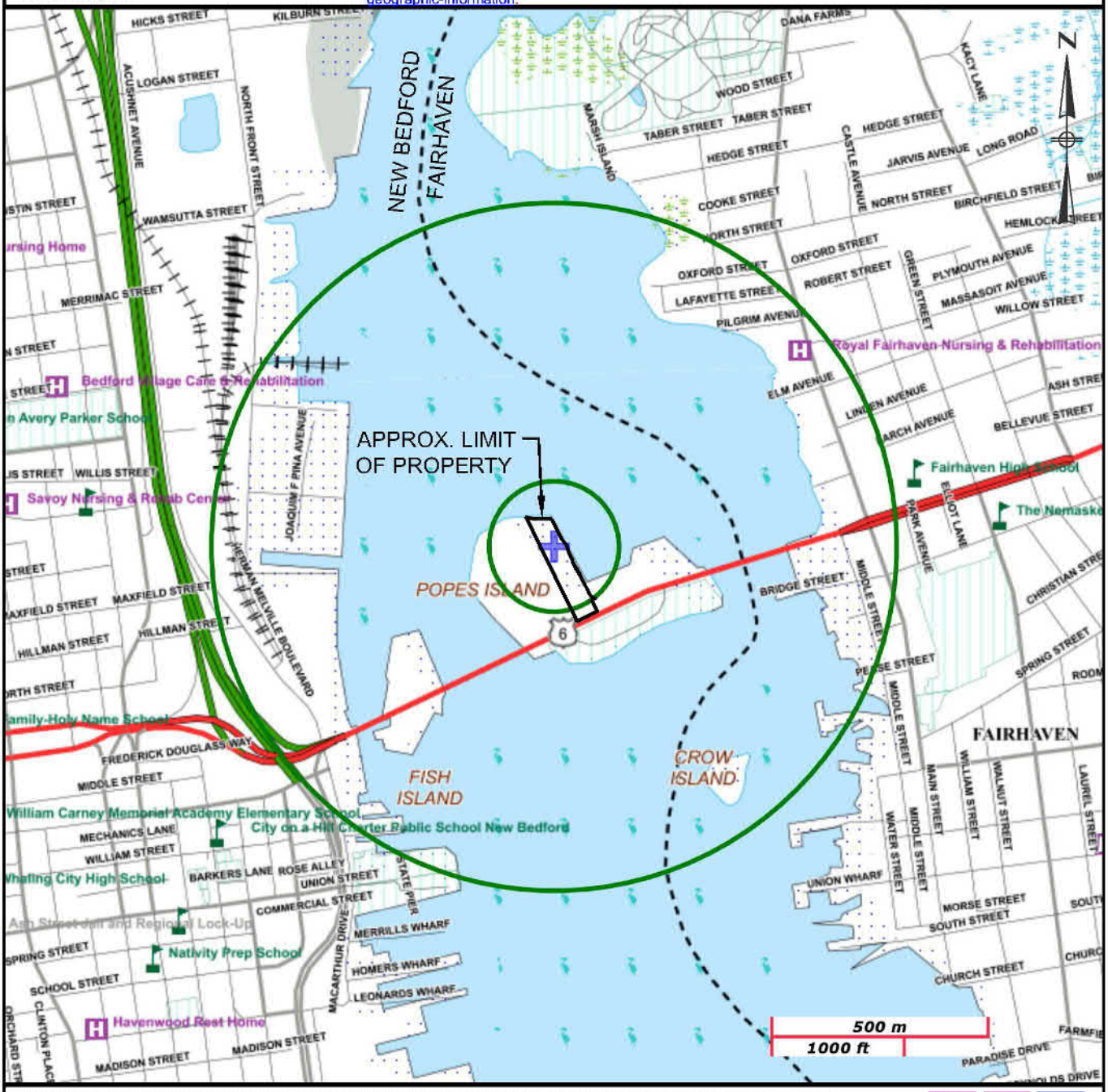
Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

Site Information:
TRUE VALUE MARINE HARDWARE
143 POPES ISLAND NEW BEDFORD, MA

NAD83 UTM Meters:
4611788mN , 340471mE (Zone: 19)
September 12, 2019

The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at: https://www.mass.gov/orgs/massgis-bureau-of-geographic-information.

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail
Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct
Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam
Aquifers: Medium Yield, High Yield, EPA Sole Source
Non Potential Drinking Water Source Area: Medium, High (Yield)
PWS Protection Areas: Zone II, IWPA, Zone A
Hydrography: Open Water, PWS Reservoir, Tidal Flat
Wetlands: Freshwater, Saltwater, Cranberry Bog
FEMA 100yr Floodplain; Protected Open Space; ACEC
Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential
Solid Waste Landfill; PWS: Com.GW, SW, Emerg., Non-Com.

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New Bedford, MA

Figure No. 2

MassDEP Phase 1 Site Assessment Map

O:\6700s\6727 - Shoreline Resources - LSP\Drawing Files\PlanSet\2019-9-19 NOI Figures\NOI Figures.dwg - Plot Date: 9/12/2019 1:39 PM

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

Accredited Levee Notes to Users: Check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at http://www.fema.gov/business/nfip/index.shtm.

The **projection** used in the preparation of this map was Massachusetts State Plane Mainland Zone (FIPS zone 2001). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base Map information shown on this FIRM was derived from digital orthophotography. Base map files were provided in digital form by Massachusetts Geographic Information System (MassGIS). Ortho imagery was produced at a scale of 1:5,000. Aerial photography is dated April 2005.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.
ZONE AE — Base Flood Elevations determined.
ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR — Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS
ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS
ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary
0.2% Annual Chance Floodplain Boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A — Cross section line
23 — 23 — Transect line
45° 02' 08", 98° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
4969000 M — 1000-meter ticks: Massachusetts State Plane Mainland Zone (FIPS Zone 2001), Transverse Mercator projection
5000 000 N — 1000-meter Universal Transverse Mercator grid values, zone 19
DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
July 7, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
July 16, 2014 - to reflect the accreditation of formerly provisionally accredited levees.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

0 150 300
SCALE IN FEET: 1"=300'

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0393G

FIRM
FLOOD INSURANCE RATE MAP
BRISTOL COUNTY, MASSACHUSETTS
(ALL JURISDICTIONS)

PANEL 393 OF 550
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FAIRHAVEN, TOWN OF	250054	0393	G
NEW BEDFORD, CITY OF	250076	0393	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
25005C0393G
MAP REVISED
JULY 16, 2014

Federal Emergency Management Agency

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True Value Marine Hardware

137 - 143 Popes Island
New Bedford, MA

Figure No. 3

FEMA FIRM Map

APPENDIX A – CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN

Introduction

The anticipated area of disturbance as a result of this project is less than one acre; therefore, filing a notice of intent with EPA and development of a Stormwater Pollution Prevention Plan (SWPPP) is not required. The following plan provides general guidance for the prevention of pollution and erosion and sedimentation during construction.

Potential Erosion and Sedimentation

Portions of the project involve soil disturbance; therefore, site preparation, scheduling, and construction practices need to be carefully planned to prevent construction debris and erosion from adversely impacting downstream resources. Although it is not always possible to avoid all impacts the following guidelines shall be followed:

- Minimize land disturbance area and soil exposure to stormwater and wind erosion.
- Minimize time that area is disturbed.
- Avoid routing stormwater runoff or dewatering flows through disturbed areas.
- Inspect and maintain erosion controls until all soils are stabilized.
- Maintain good housekeeping practices.
- Stabilize disturbed soils as soon as possible to limit exposure.

Erosion and Sedimentation Plan

This Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan have been prepared in accordance with the Department of Environmental Protection's Massachusetts Erosion and Sedimentation Guidelines for Urban and Suburban Areas.

Pre-Construction and Site Preparation

- Contractor shall install all erosion control barriers in accordance with the construction documents prior to commencing any land disturbance activity.
- Inspect and maintain erosion controls until all soils are stabilized.
- Monitor weather reports daily and stabilize/prepare site if storm event in excess of the 2-year storm is expected.

Inspection and Maintenance of Erosion Controls during Construction

Inspect erosion controls weekly and after every storm event until all soils are stabilized.

- Erosion Control Barrier: Check for sedimentation accumulation, removing sediments when they reach excessive volumes (approximately 1/3 the height of the barrier). Also remove sediments when runoff ponds for 24 or more hours to prevent potential mosquito breeding habitat. Restake/replace tubes and silt fence as necessary to maintain their effectiveness.
- Catch basin Inlet Protection: Check for sedimentation accumulation, removing sediments when they reach excessive volumes.

Good Housekeeping

- Avoid stockpiling of soil within 100 feet of wetland resources and wellhead protection areas. If necessary, provide sufficient erosion controls to prevent migration of sediments.
- Minimize hazardous materials stored on site. All materials stored on site shall be stored in original containers and sealed.
- Refuel construction equipment off-site.
- Any spills of hazardous materials shall be reported, contained, and removed in accordance with local, State, and Federal regulations.

Plans

See proposed construction drawings for locations of all proposed erosion and sedimentation controls.

Potential 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)
Equipment Re-fueling	Diesel Fuel, Gasoline	Staging Area*
Leaking or Broken Hydraulic Lines	Hydraulic Oil	Building Work Areas and Laydown Area
Minor Equipment Maintenance	Diesel Fuel, Gasoline, Hydraulic Oil, Motor Oil, Anti-Freeze	Staging Area*
Applying Fertilizer	Nitrogen, Phosphorous	Newly Seeded Areas
Portable Sanitary Toilets	Bacteria, Parasites and Viruses	Staging Area*
Vehicle Accident	Diesel Fuel, Gasoline	Entire Site
Trash Containers/Dumpsters	Paper, Plastic, and Food Waste	Staging Area*

*All vehicle and equipment staging to be conducted within southern portion of Site, as far from critical resource areas and drain inlets as possible during given stage of construction.

APPENDIX B – LONG TERM OPERATION AND MAINTENANCE PLAN

Long Term Operation & Maintenance Plan

Stormwater Management Systems

True Value Marine Hardware – New Bedford, MA

This stormwater management system (SWMS) operations and maintenance plan has been prepared in accordance with the Massachusetts Department of Environmental Protection's Stormwater Management Standards.

General Information

Project Name:	**True Value Marine Hardware**
Project Type:	Site Redevelopment
Address:	137 – 143 Popes Island, New Bedford, MA
SWMS Owner:	Shoreline Resources, LLC 706 Acushnet Ave. New Bedford, MA 02740
Responsible Party:	Shoreline Resources, LLC
Contact:	Scott Taber
Signature:	G. Scott Taber

It shall be the responsibility of the Owner to provide a revised plan to the City of New Bedford indicating any change of ownership or responsible party.

BMP Inspection and Maintenance Procedures

Effectiveness of Best Management Practices (BMPs) is maximized when properly maintained. The following inspections schedule and maintenance required of BMPs for this project (see attached plan) shall be as outlined and documented below

- **Stormceptor Unit**: Refer to the attached manufacturer maintenance recommendations (Appendix H).

Public Safety and Features

1. Provide police detail for extended occupation of roadway if traffic dictates.
2. All excavations and entry into closed structures will be completed in accordance with OSHA requirements.

Approximate Maintenance Budget

Inspection and maintenance for this site is estimated as follows.

1. Inspections	$200
2. Stormceptor	$180
Annual Total	$380

BETA

Long Term Operation & Maintenance Plan

Stormwater Management Systems

True Value Marine Hardware – New Bedford, MA

BMP Inspection and Maintenance Documentation Form

Inspection No.: Date: _____ Weather: _____

Date & Amount of Last Precipitation Event: _____

Inspector Name: _____ Inspection Signature: _____

BMP	Condition/Stability	Comment & Recommendations	Date Corrected
Stormceptor Unit			
Trash Rack			
Riprap Apron			
Other			
Additional Comments			

Long Term Operation & Maintenance Plan

Stormwater Management Systems

True Value Marine Hardware – New Bedford, MA

Spill Prevention Plan

The building at 143 Popes Island is currently used by East Coast Fabrication, Inc. Operations within the building classify as Land Use with Higher Potential Pollutant Loads, (LUHPPL) and storage and loading activities may be conducted within or adjacent to the rear parking area. The purpose of this plan is to outline the source control and pollution prevention measures to minimize the risk of pollution to stormwater runoff.

Predicted Release

All potential spills at the Site are anticipated to be during loading and handling for inbound/outbound trucks and are expected to occur within the loading areas. Spills in this area will be conveyed via overland flow towards the hydrodynamic separator.

Oil Capacity

They hydrodynamic separator is designed to provide spill control and temporary oil storage. The internal weir directs incoming stormwater and oil spills into the lower chamber. The outlet pipe extends sufficiently into the lower chamber to capture oil directly beneath the fiberglass skirt. The design includes an oil inspection pipe to evaluate oil depth and the need for removal. A hydrocarbon storage capacity of 251 gallons is provided by the unit. Regular maintenance as outlined in Appendix H will include removal and legal disposal of all captured oil.

Sorbent Materials, Spill Response Supplies, and Equipment

Spill response supplies shall be maintained within the building near the loading dock. These supplies shall include sorbent pads, booms, and granular material (i.e., Speedy Dry), and a shovel, all stored within a covered over-pack drum or similar container. The supplies are readily available to be deployed during a fuel spill or release.

Inspections and recordkeeping of the spill response equipment supplies must be maintained as part of this plan, and training shall be conducted to inform the employees on where the equipment is located and the procedure for using the material as part of the oil spill response training curriculum.

APPENDIX C – SOILS DATA


70° 55' 52" W
70° 54' 4" W
339300
339700
340100
340500
340900
341300
341700
41° 39' 40" N
41° 37' 53" N
4613900
4613500
4613100
4612700
4612300
4611900
4611500
4611100
4610700
Acushnet
18
Dover St
Coggeshall
Howland
195
602
305C
305B
651
606
Adams
Purchase
607
Herman Melville
6
Park
Ramp
Pleasant
2nd
6th
Main
Map Scale: 1:16,100 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 200 400 800 1200
Feet
0 500 1000 2000 3000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Bristol County, Massachusetts, Southern Part
Survey Area Data: Version 12, Sep 7, 2018

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

Date(s) aerial images were photographed: Dec 31, 2009—Jul 3, 2017

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
305B	Paxton fine sandy loam, 3 to 8 percent slopes	C	12.2	1.4%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	C	27.5	3.1%
602	Urban land		467.2	53.2%
606	Miscellaneous water		3.9	0.4%
607	Water, saline		345.9	39.4%
651	Udorthents, smoothed	A	22.2	2.5%
Totals for Area of Interest			**878.9**	**100.0%**

Description

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

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

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

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

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

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

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

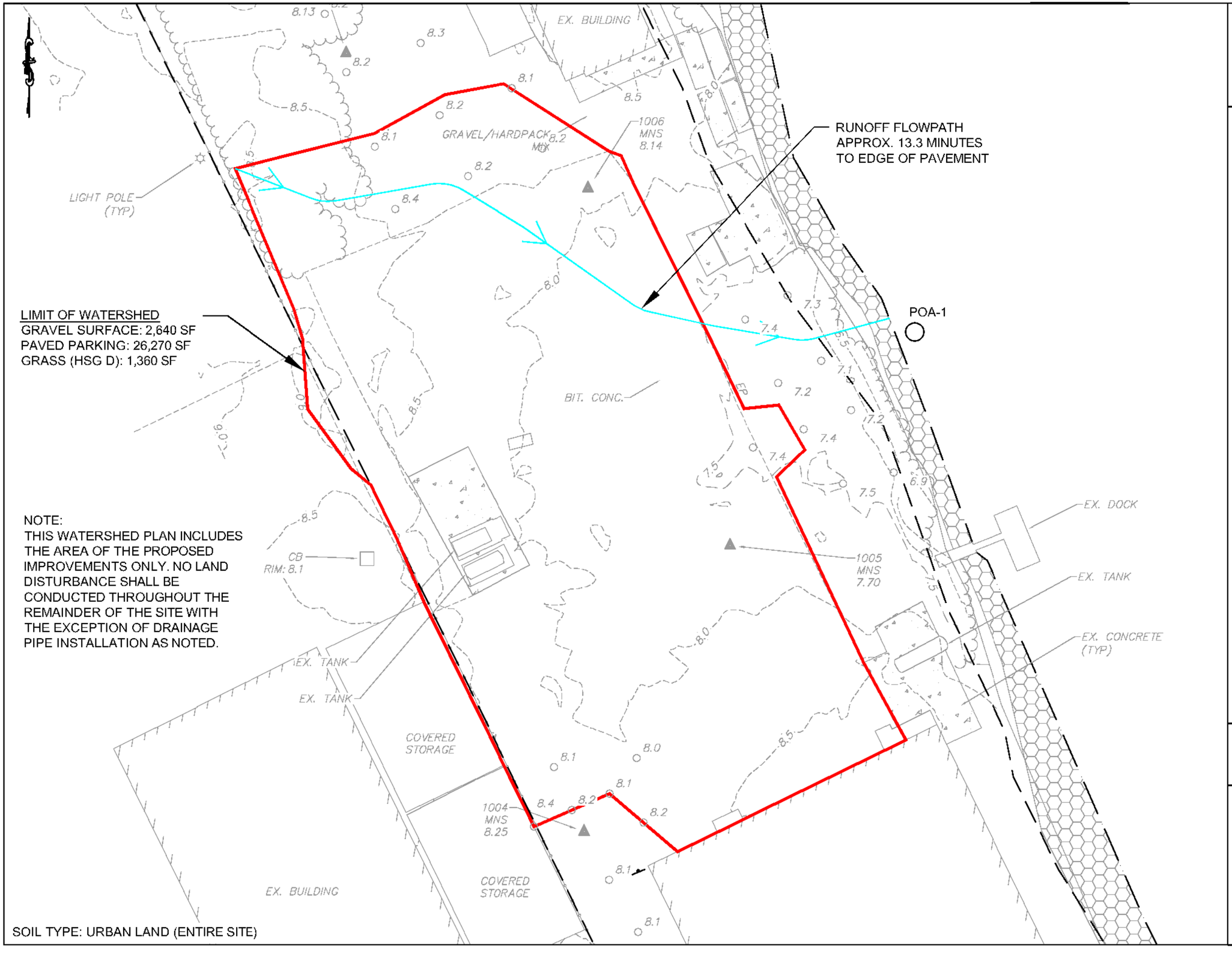
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX D – WATERSHED PLANS



NOTE:
THIS WATERSHED PLAN INCLUDES THE AREA OF THE PROPOSED IMPROVEMENTS ONLY. NO LAND DISTURBANCE SHALL BE CONDUCTED THROUGHOUT THE REMAINDER OF THE SITE WITH THE EXCEPTION OF DRAINAGE PIPE INSTALLATION AS NOTED.

SOIL TYPE: URBAN LAND (ENTIRE SITE)

Prepared by:

BETA
www.BETA-Inc.com

TRUE VALUE MARINE HARDWARE

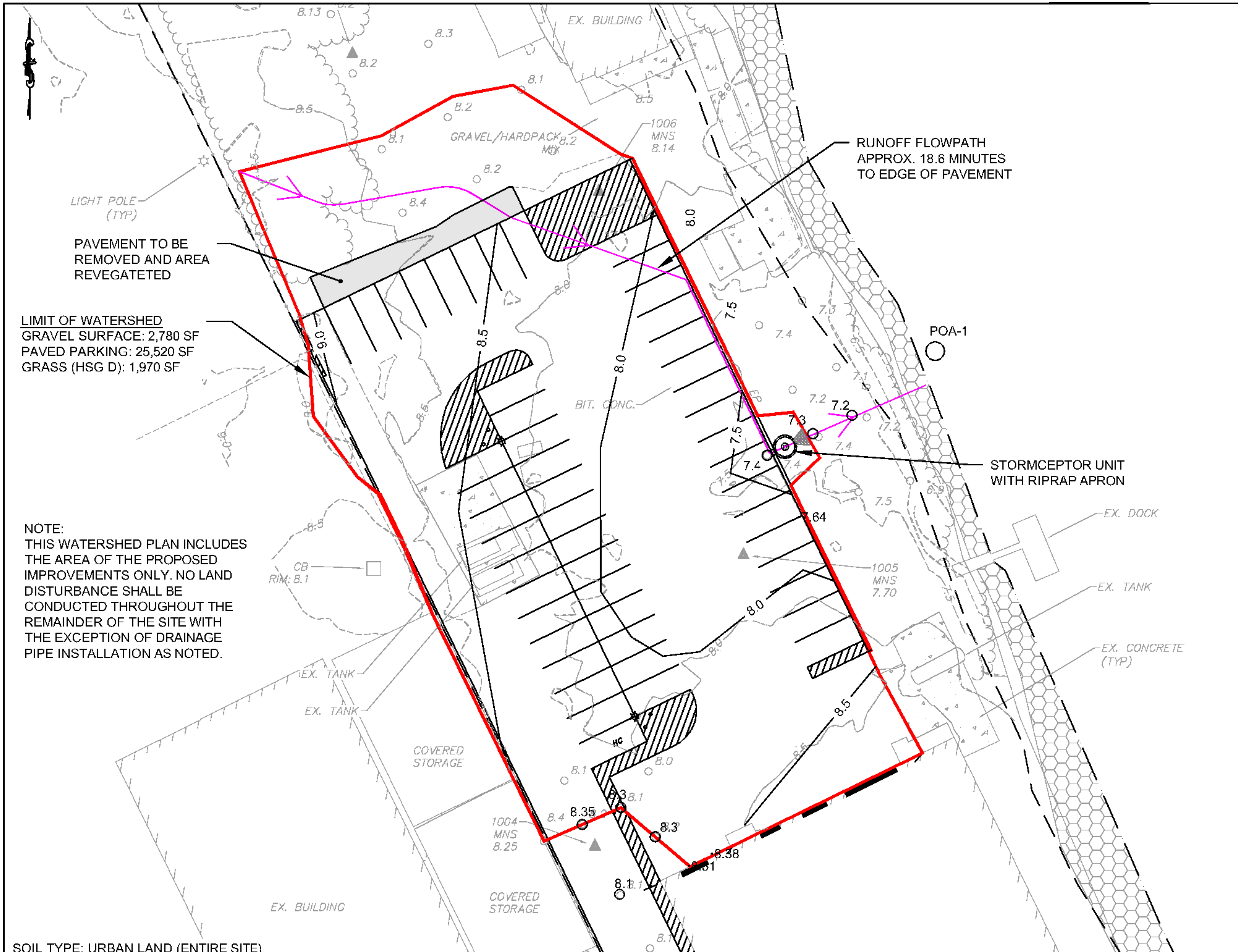
137 - 143 Popes Island
New Bedford, MA

0 30 60
SCALE IN FEET: 1"=30'

Figure No. 1

Existing Conditions

ISSUE DATE: SEPTEMBER 5, 2019
REVISION DATE: SEPTEMBER 20, 2019



Prepared by:

BETA

www.BETA-Inc.com

TRUE VALUE MARINE HARDWARE

137 - 143 Popes Island
New Bedford, MA

0 30 60

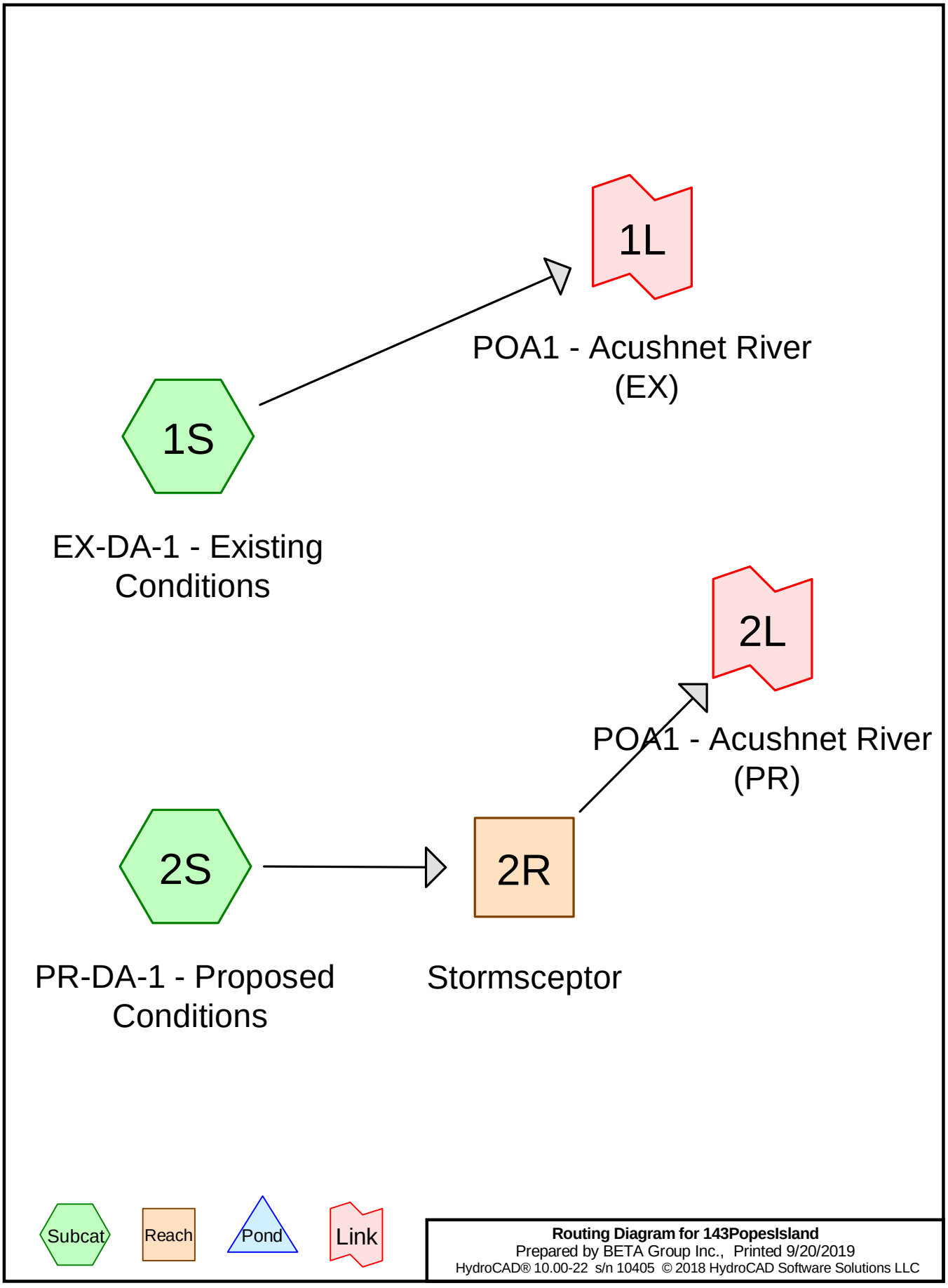
SCALE IN FEET: 1"=30'

Figure No. 2

Proposed Conditions

ISSUE DATE: SEPTEMBER 5, 2019
REVISION DATE: SEPTEMBER 20, 2019

APPENDIX E – EXISTING CONDITIONS CALCULATIONS



Routing Diagram for 143PopesIsland
Prepared by BETA Group Inc., Printed 9/20/2019

Summary for Subcatchment 1S: EX-DA-1 - Existing Conditions

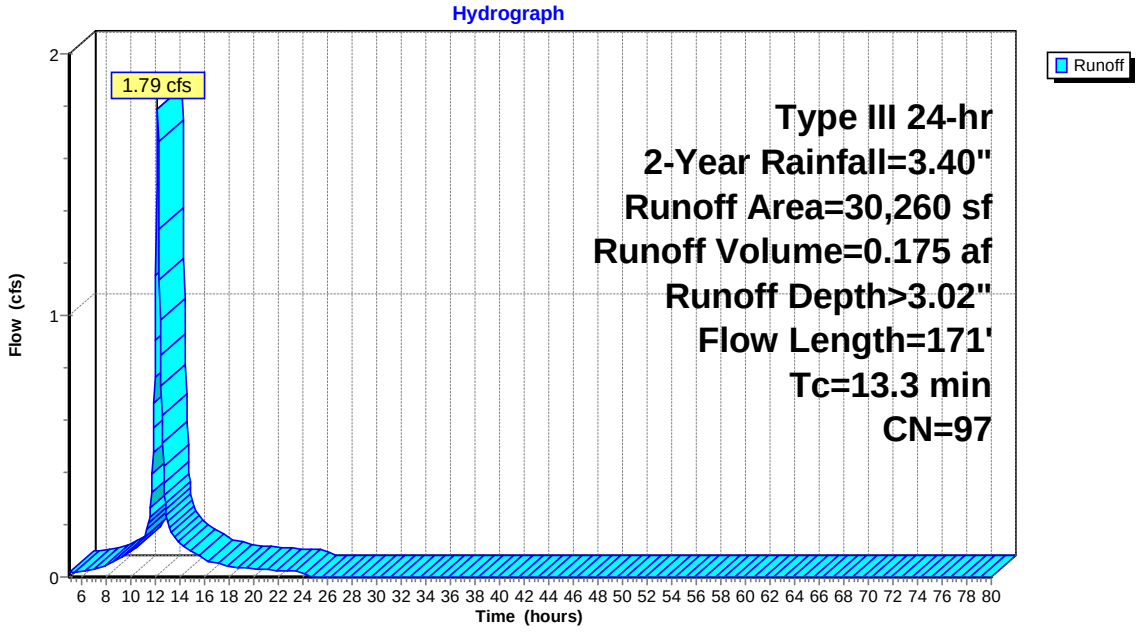
Runoff = 1.79 cfs @ 12.18 hrs, Volume= 0.175 af, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (sf)	CN	Description
2,637	96	Gravel surface, HSG D
26,267	98	Paved parking, HSG D
1,356	89	<50% Grass cover, Poor, HSG D
30,260	97	Weighted Average
3,993		13.20% Pervious Area
26,267		86.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	50	0.0030	0.07		**Sheet Flow, Sheet Flow 1** Grass: Short n= 0.150 P2= 3.40"
0.9	34	0.0015	0.62		**Shallow Concentrated Flow, Shallow Conc. 1** Unpaved Kv= 16.1 fps
0.7	87	0.0092	1.95		**Shallow Concentrated Flow, Shallow Conc. 2** Paved Kv= 20.3 fps
13.3	171	Total			

Subcatchment 1S: EX-DA-1 - Existing Conditions

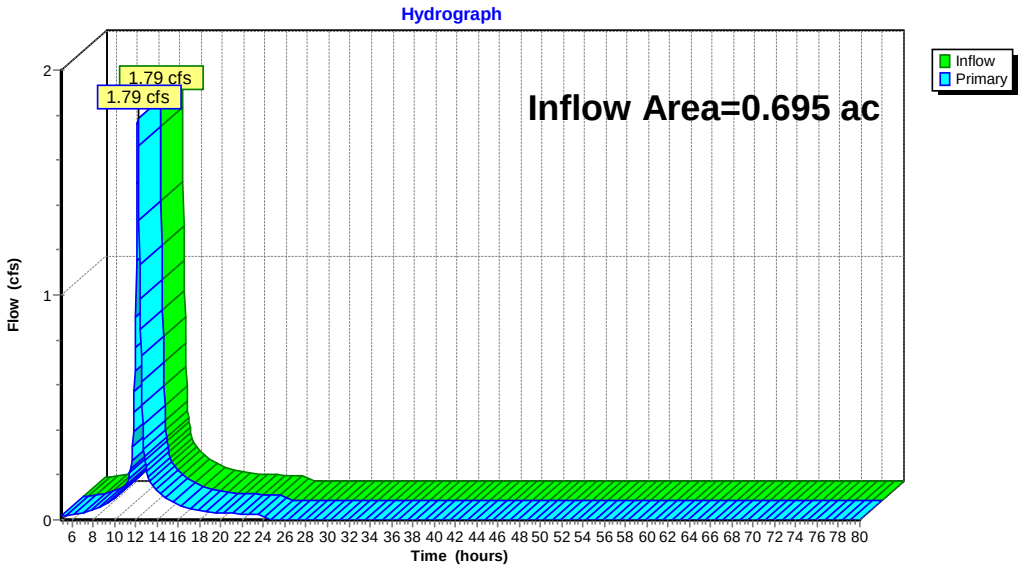


Summary for Link 1L: POA1 - Acushnet River (EX)

Inflow Area = 0.695 ac, 86.80% Impervious, Inflow Depth > 3.02" for 2-Year event
Inflow = 1.79 cfs @ 12.18 hrs, Volume= 0.175 af
Primary = 1.79 cfs @ 12.18 hrs, Volume= 0.175 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs

Link 1L: POA1 - Acushnet River (EX)



Summary for Subcatchment 1S: EX-DA-1 - Existing Conditions

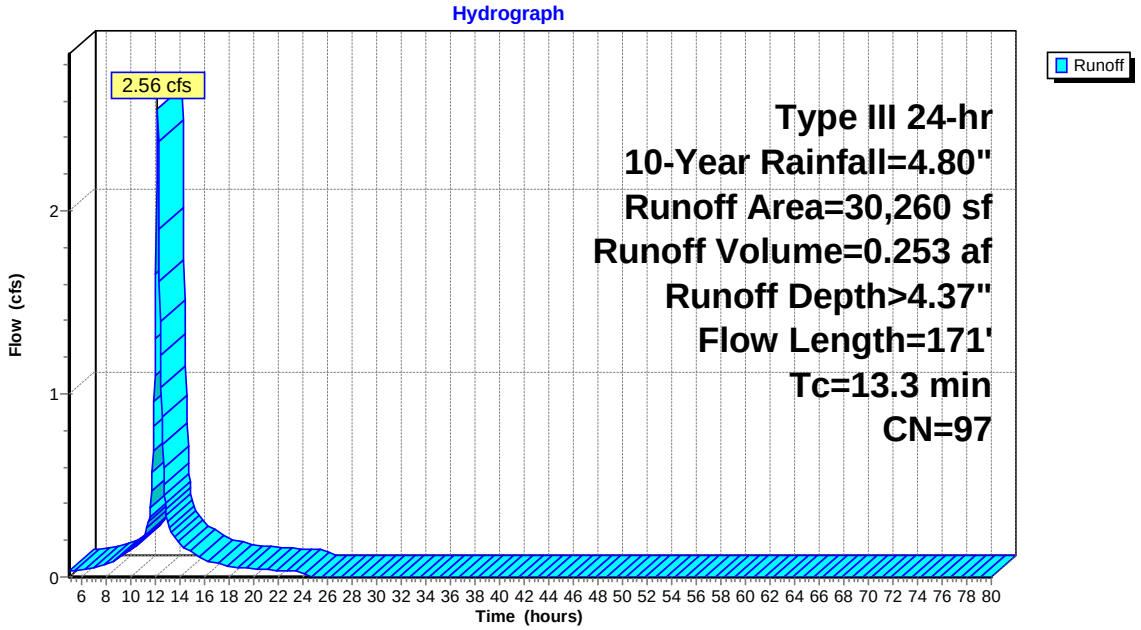
Runoff = 2.56 cfs @ 12.18 hrs, Volume= 0.253 af, Depth> 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
2,637	96	Gravel surface, HSG D
26,267	98	Paved parking, HSG D
1,356	89	<50% Grass cover, Poor, HSG D
30,260	97	Weighted Average
3,993		13.20% Pervious Area
26,267		86.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	50	0.0030	0.07		**Sheet Flow, Sheet Flow 1** Grass: Short n= 0.150 P2= 3.40"
0.9	34	0.0015	0.62		**Shallow Concentrated Flow, Shallow Conc. 1** Unpaved Kv= 16.1 fps
0.7	87	0.0092	1.95		**Shallow Concentrated Flow, Shallow Conc. 2** Paved Kv= 20.3 fps
13.3	171	Total			

Subcatchment 1S: EX-DA-1 - Existing Conditions

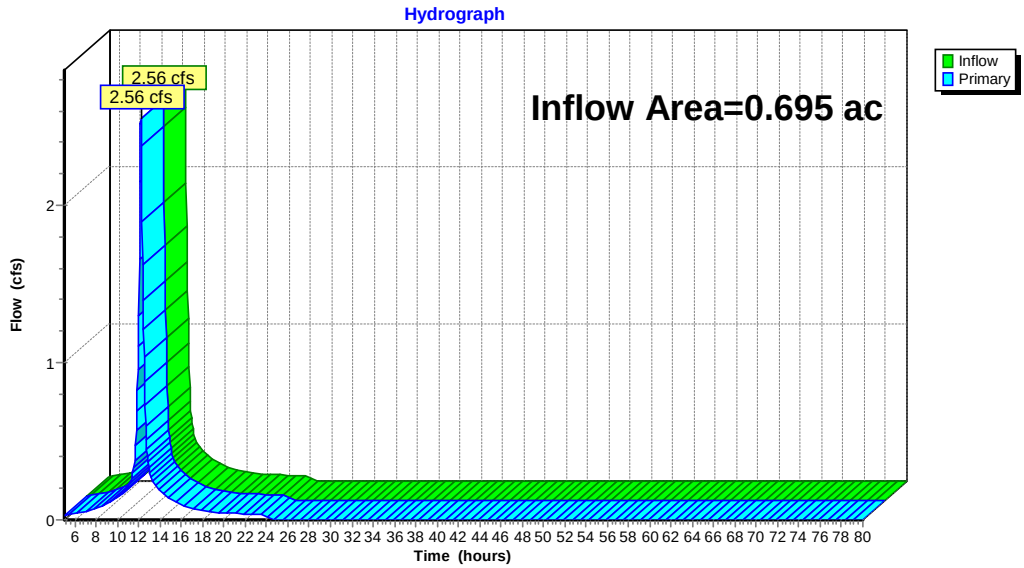


Summary for Link 1L: POA1 - Acushnet River (EX)

Inflow Area = 0.695 ac, 86.80% Impervious, Inflow Depth > 4.37" for 10-Year event
Inflow = 2.56 cfs @ 12.18 hrs, Volume= 0.253 af
Primary = 2.56 cfs @ 12.18 hrs, Volume= 0.253 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs

Link 1L: POA1 - Acushnet River (EX)



Summary for Subcatchment 1S: EX-DA-1 - Existing Conditions

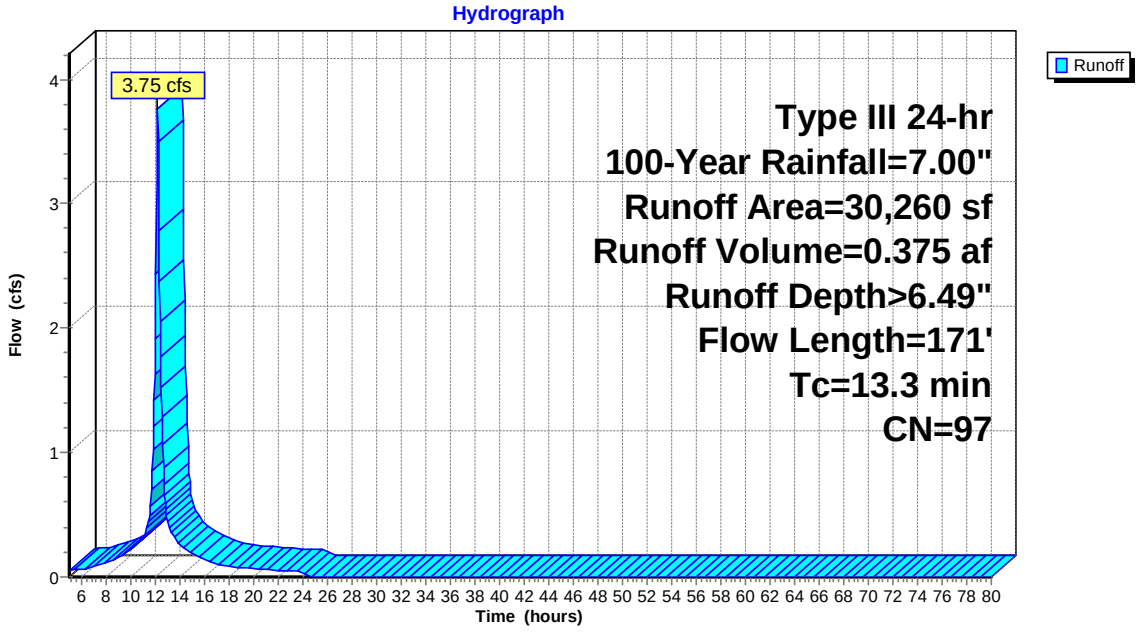
Runoff = 3.75 cfs @ 12.18 hrs, Volume= 0.375 af, Depth> 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
2,637	96	Gravel surface, HSG D
26,267	98	Paved parking, HSG D
1,356	89	<50% Grass cover, Poor, HSG D
30,260	97	Weighted Average
3,993		13.20% Pervious Area
26,267		86.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	50	0.0030	0.07		**Sheet Flow, Sheet Flow 1** Grass: Short n= 0.150 P2= 3.40"
0.9	34	0.0015	0.62		**Shallow Concentrated Flow, Shallow Conc. 1** Unpaved Kv= 16.1 fps
0.7	87	0.0092	1.95		**Shallow Concentrated Flow, Shallow Conc. 2** Paved Kv= 20.3 fps
13.3	171	Total			

Subcatchment 1S: EX-DA-1 - Existing Conditions

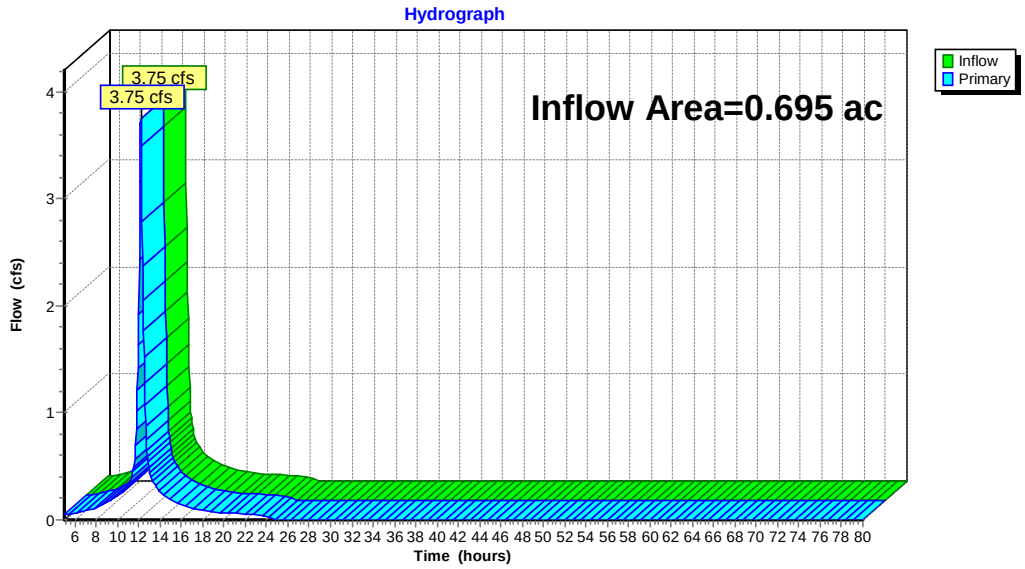


Summary for Link 1L: POA1 - Acushnet River (EX)

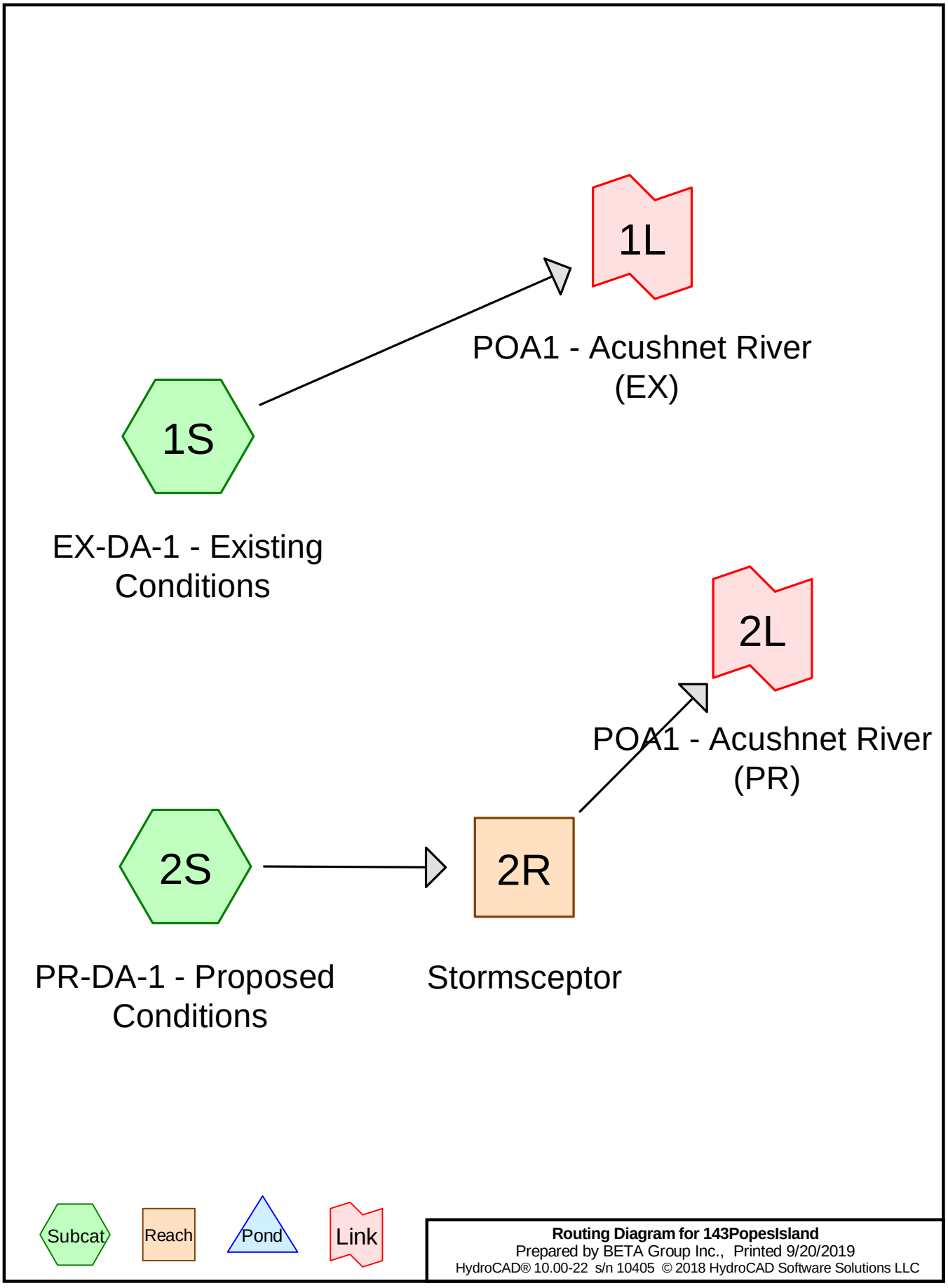
Inflow Area = 0.695 ac, 86.80% Impervious, Inflow Depth > 6.49" for 100-Year event
Inflow = 3.75 cfs @ 12.18 hrs, Volume= 0.375 af
Primary = 3.75 cfs @ 12.18 hrs, Volume= 0.375 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs

Link 1L: POA1 - Acushnet River (EX)



APPENDIX F – PROPOSED CONDITIONS CALCULATIONS



Routing Diagram for 143PopesIsland
Prepared by BETA Group Inc., Printed 9/20/2019

Summary for Subcatchment 2S: PR-DA-1 - Proposed Conditions

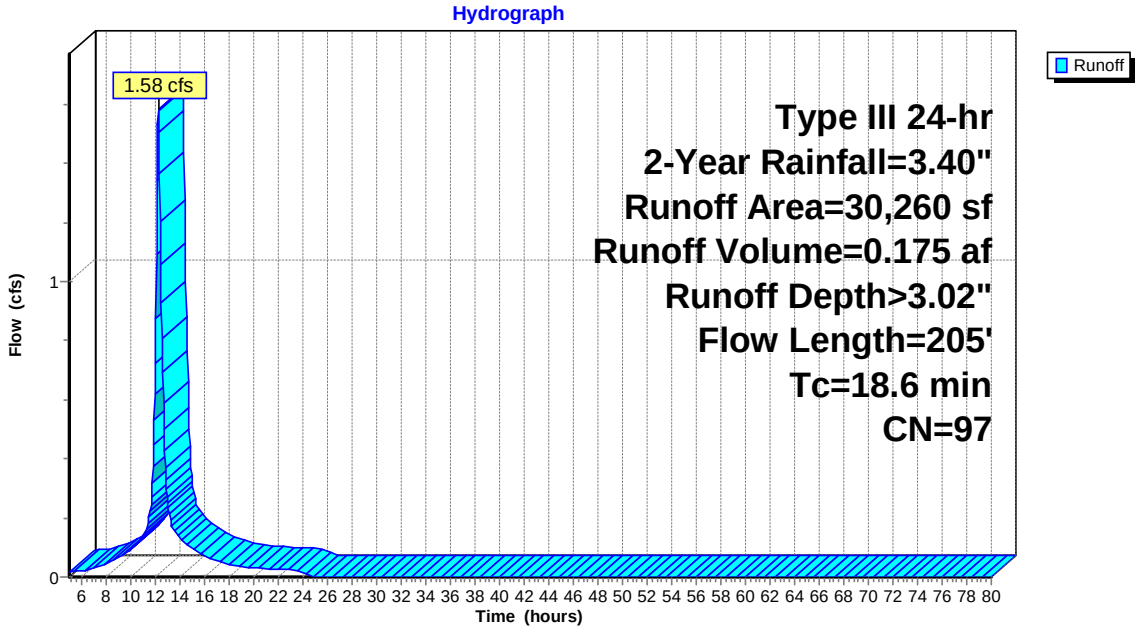
Runoff = 1.58 cfs @ 12.25 hrs, Volume= 0.175 af, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (sf)	CN	Description
2,778	96	Gravel surface, HSG D
25,515	98	Paved parking, HSG D
1,967	89	<50% Grass cover, Poor, HSG D
30,260	97	Weighted Average
4,745		15.68% Pervious Area
25,515		84.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	50	0.0012	0.05		**Sheet Flow, Sheet Flow 1** Grass: Short n= 0.150 P2= 3.40"
0.6	33	0.0030	0.88		**Shallow Concentrated Flow, Shallow Conc. 1** Unpaved Kv= 16.1 fps
0.1	10	0.0100	1.50		**Shallow Concentrated Flow, Shallow Conc. 2** Grassed Waterway Kv= 15.0 fps
1.1	112	0.0066	1.65		**Shallow Concentrated Flow, Shallow Conc. 3** Paved Kv= 20.3 fps
18.6	205	Total			

Subcatchment 2S: PR-DA-1 - Proposed Conditions



Summary for Reach 2R: Stormsceptor

Inflow Area = 0.695 ac, 84.32% Impervious, Inflow Depth > 3.02" for 2-Year event
Inflow = 1.58 cfs @ 12.25 hrs, Volume= 0.175 af
Outflow = 1.58 cfs @ 12.25 hrs, Volume= 0.175 af, Atten= 0%, Lag= 0.1 min

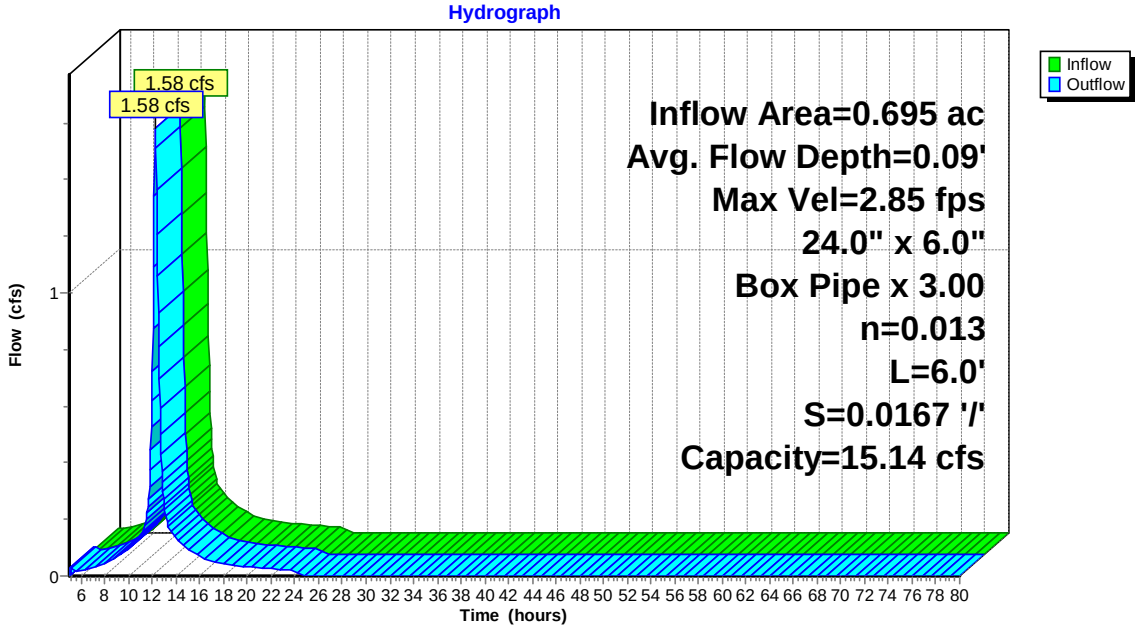
Routing by Stor-Ind+Trans method, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.85 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.84 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.50' Flow Area= 3.0 sf, Capacity= 15.14 cfs

A factor of 3.00 has been applied to the storage and discharge capacity
24.0" W x 6.0" H Box Pipe
n= 0.013
Length= 6.0' Slope= 0.0167 '/'
Inlet Invert= 7.40', Outlet Invert= 7.30'

Reach 2R: Stormsceptor

Hydrograph

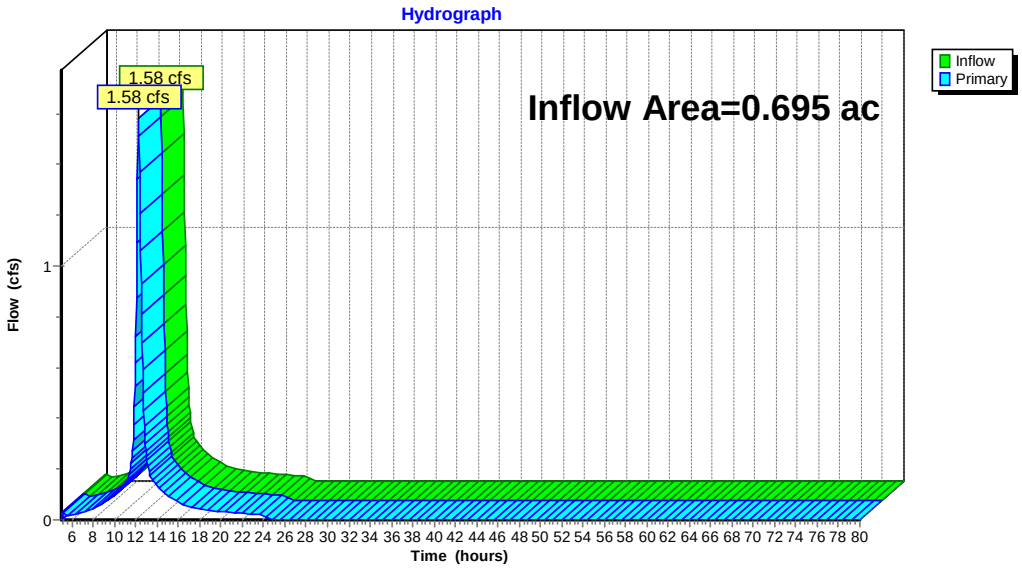


Summary for Link 2L: POA1 - Acushnet River (PR)

Inflow Area = 0.695 ac, 84.32% Impervious, Inflow Depth > 3.02" for 2-Year event
Inflow = 1.58 cfs @ 12.25 hrs, Volume= 0.175 af
Primary = 1.58 cfs @ 12.25 hrs, Volume= 0.175 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs

Link 2L: POA1 - Acushnet River (PR)



Summary for Subcatchment 2S: PR-DA-1 - Proposed Conditions

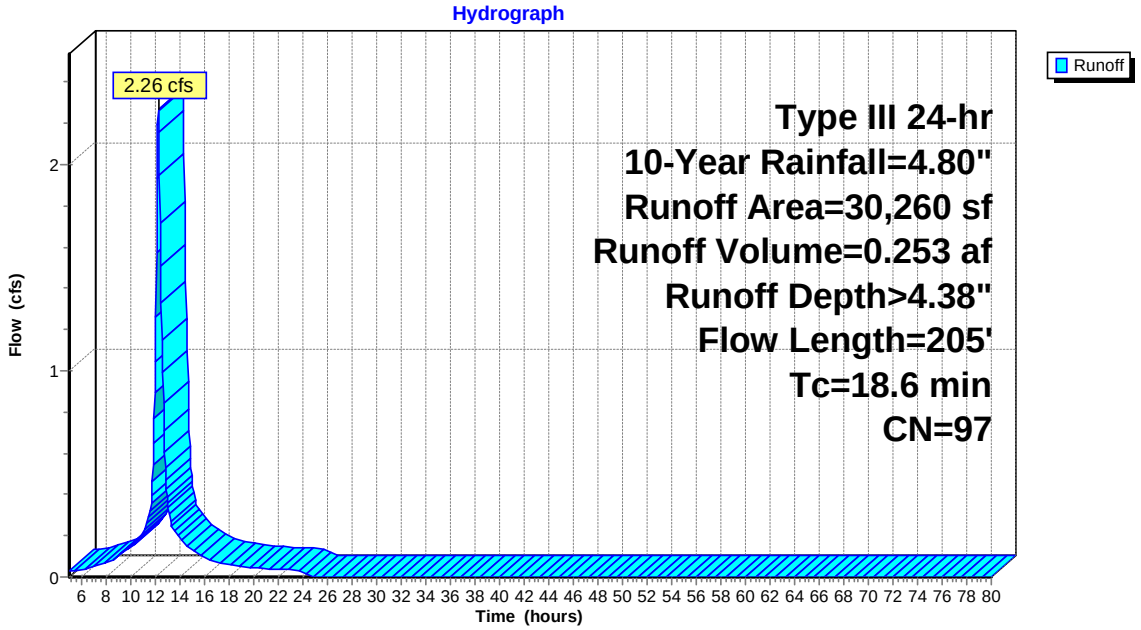
Runoff = 2.26 cfs @ 12.24 hrs, Volume= 0.253 af, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
2,778	96	Gravel surface, HSG D
25,515	98	Paved parking, HSG D
1,967	89	<50% Grass cover, Poor, HSG D
30,260	97	Weighted Average
4,745		15.68% Pervious Area
25,515		84.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	50	0.0012	0.05		**Sheet Flow, Sheet Flow 1** Grass: Short n= 0.150 P2= 3.40"
0.6	33	0.0030	0.88		**Shallow Concentrated Flow, Shallow Conc. 1** Unpaved Kv= 16.1 fps
0.1	10	0.0100	1.50		**Shallow Concentrated Flow, Shallow Conc. 2** Grassed Waterway Kv= 15.0 fps
1.1	112	0.0066	1.65		**Shallow Concentrated Flow, Shallow Conc. 3** Paved Kv= 20.3 fps
18.6	205	Total			

Subcatchment 2S: PR-DA-1 - Proposed Conditions



Summary for Reach 2R: Stormsceptor

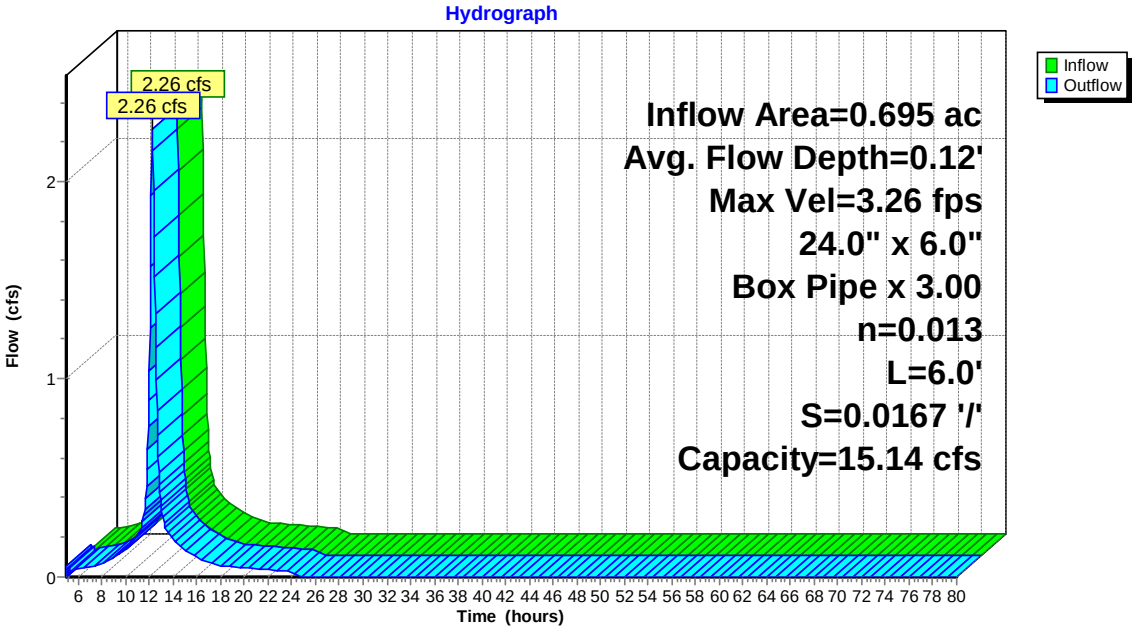
Inflow Area = 0.695 ac, 84.32% Impervious, Inflow Depth > 4.38" for 10-Year event
Inflow = 2.26 cfs @ 12.24 hrs, Volume= 0.253 af
Outflow = 2.26 cfs @ 12.25 hrs, Volume= 0.253 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.26 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.97 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.24 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 0.50' Flow Area= 3.0 sf, Capacity= 15.14 cfs

A factor of 3.00 has been applied to the storage and discharge capacity
24.0" W x 6.0" H Box Pipe
n= 0.013
Length= 6.0' Slope= 0.0167 '/'
Inlet Invert= 7.40', Outlet Invert= 7.30'

Reach 2R: Stormsceptor

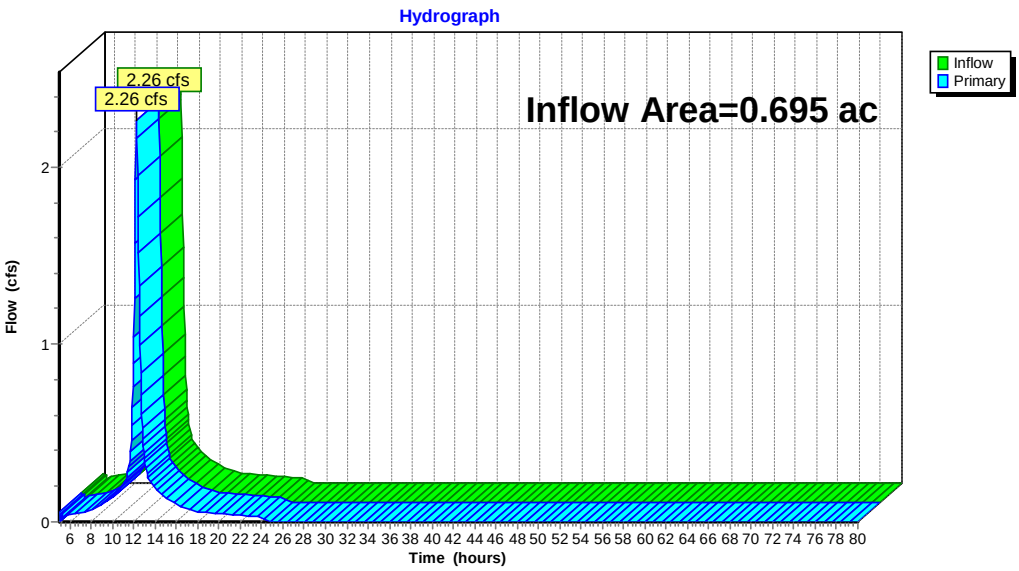


Summary for Link 2L: POA1 - Acushnet River (PR)

Inflow Area = 0.695 ac, 84.32% Impervious, Inflow Depth > 4.37" for 10-Year event
Inflow = 2.26 cfs @ 12.25 hrs, Volume= 0.253 af
Primary = 2.26 cfs @ 12.25 hrs, Volume= 0.253 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs

Link 2L: POA1 - Acushnet River (PR)



Summary for Subcatchment 2S: PR-DA-1 - Proposed Conditions

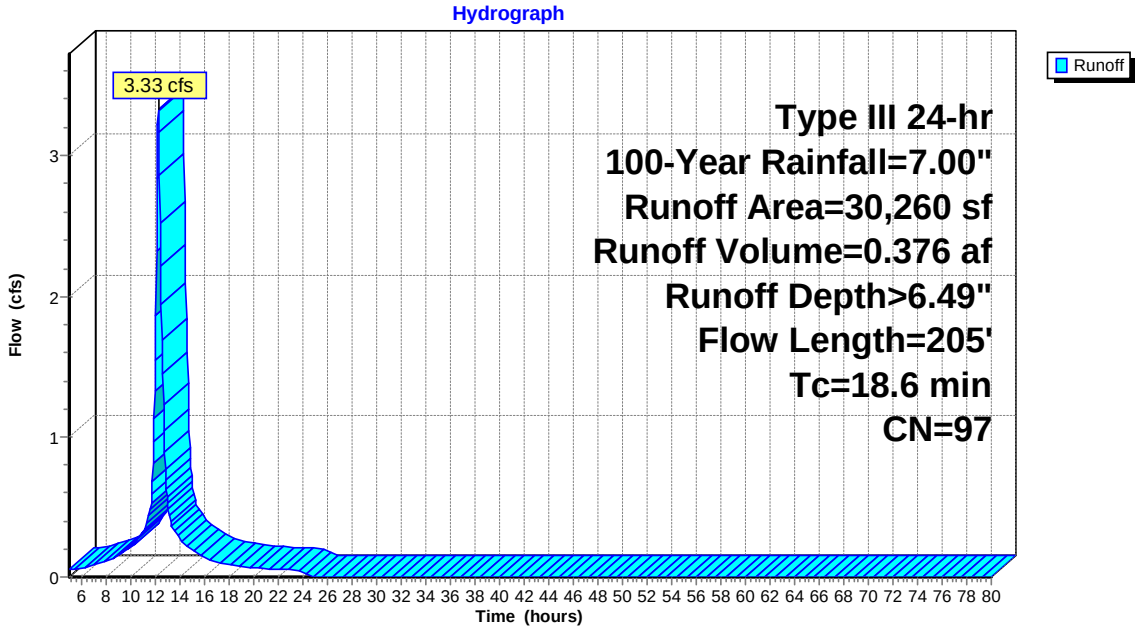
Runoff = 3.33 cfs @ 12.24 hrs, Volume= 0.376 af, Depth> 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (sf)	CN	Description
2,778	96	Gravel surface, HSG D
25,515	98	Paved parking, HSG D
1,967	89	<50% Grass cover, Poor, HSG D
30,260	97	Weighted Average
4,745		15.68% Pervious Area
25,515		84.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	50	0.0012	0.05		**Sheet Flow, Sheet Flow 1** Grass: Short n= 0.150 P2= 3.40"
0.6	33	0.0030	0.88		**Shallow Concentrated Flow, Shallow Conc. 1** Unpaved Kv= 16.1 fps
0.1	10	0.0100	1.50		**Shallow Concentrated Flow, Shallow Conc. 2** Grassed Waterway Kv= 15.0 fps
1.1	112	0.0066	1.65		**Shallow Concentrated Flow, Shallow Conc. 3** Paved Kv= 20.3 fps
18.6	205	Total			

Subcatchment 2S: PR-DA-1 - Proposed Conditions



Summary for Reach 2R: Stormsceptor

Inflow Area = 0.695 ac, 84.32% Impervious, Inflow Depth > 6.49" for 100-Year event
Inflow = 3.33 cfs @ 12.24 hrs, Volume= 0.376 af
Outflow = 3.33 cfs @ 12.25 hrs, Volume= 0.376 af, Atten= 0%, Lag= 0.0 min

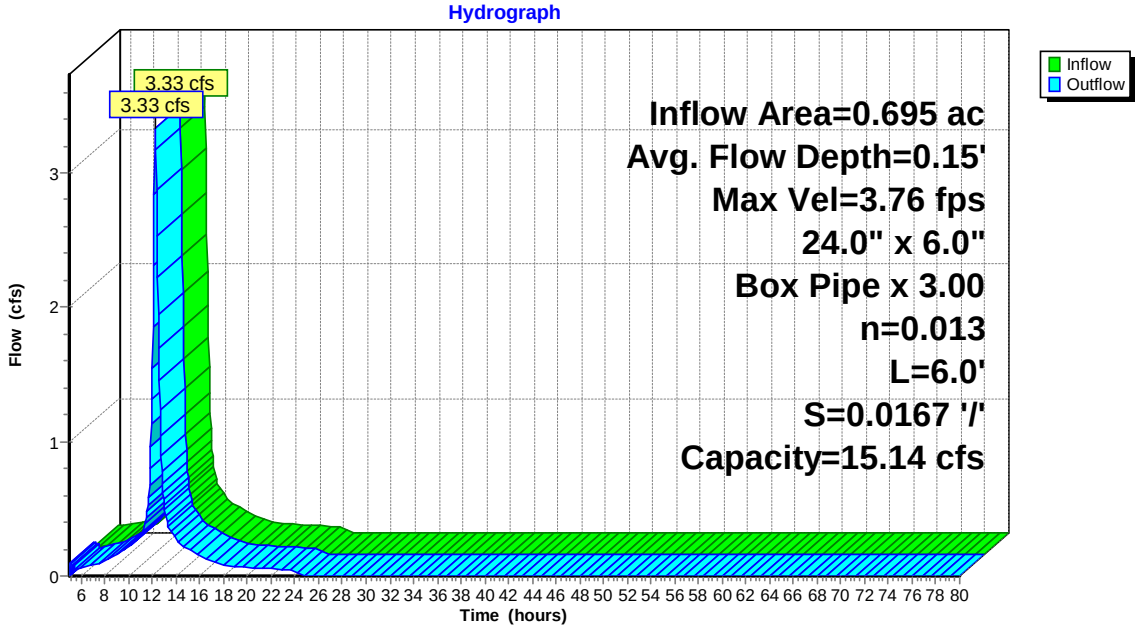
Routing by Stor-Ind+Trans method, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.76 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.13 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.24 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.50' Flow Area= 3.0 sf, Capacity= 15.14 cfs

A factor of 3.00 has been applied to the storage and discharge capacity
24.0" W x 6.0" H Box Pipe
n= 0.013
Length= 6.0' Slope= 0.0167 '/'
Inlet Invert= 7.40', Outlet Invert= 7.30'

Reach 2R: Stormsceptor

Hydrograph

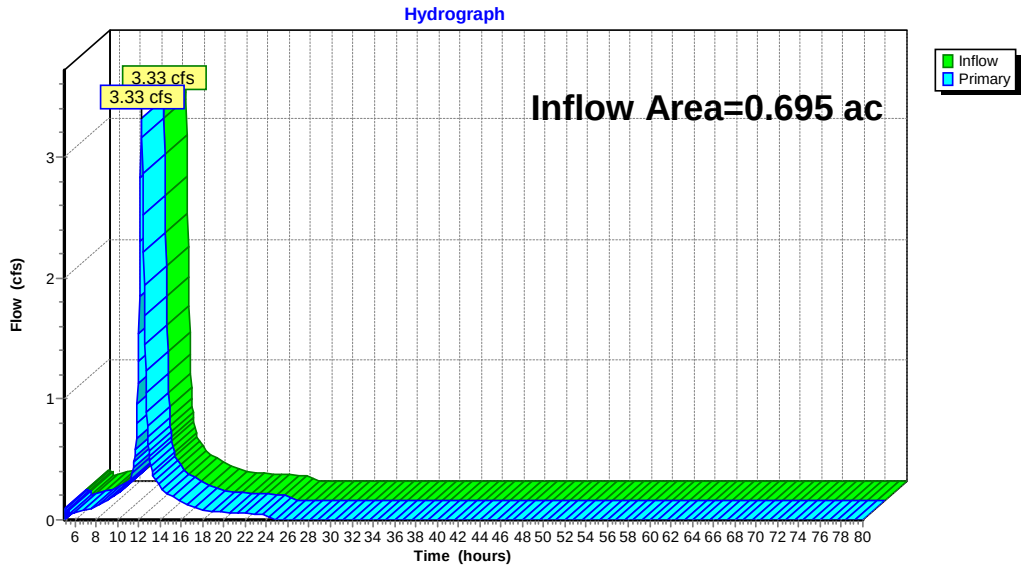


Summary for Link 2L: POA1 - Acushnet River (PR)

Inflow Area = 0.695 ac, 84.32% Impervious, Inflow Depth > 6.49" for 100-Year event
Inflow = 3.33 cfs @ 12.25 hrs, Volume= 0.376 af
Primary = 3.33 cfs @ 12.25 hrs, Volume= 0.376 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-80.00 hrs, dt= 0.05 hrs

Link 2L: POA1 - Acushnet River (PR)



APPENDIX G – SUPPLEMENTAL CALCULATIONS

1 Springfield Street
Suite 4
Chicopee, MA 01013
413.331.5326
www.BETA-Inc.com

JOB	True Value Marine Hardware	NO.	6727
CALC	SLB	DATE	09/20/19
CHKD	DPR	DATE	09/20/19
DESC	Supplementary Calculations	SHEET	1 OF 1

Total Impervious Area = **28293** sq. ft.
Net New Impervious Area = **-600** sq. ft.
Net New Pervious Area = **600** sq. ft.

Required Recharge Volume

Recharge Volume (R_V) Required = New Impervious Area x Runoff Depth (from HSG)

R_V (Urban Land*) = 0.00 sf. x 0.10 in x 0.08 ft/in = 0 cu. ft.

Total R_V Required = 0 cu. ft.

Provided Recharge Volume

Recharge Volume (R_V) Required = New Impervious Area x Runoff Depth (from HSG)

R_V (Urban Land*) = 600.00 sf. x 0.10 in x 0.08 ft/in = 5 cu. ft.

Total R_V Provided = 5 cu. ft.

Required Water Quality Volume

Water Quality Volume (WQ_V) Required = Impervious Area x Runoff Depth (Excluding roof area)**

WQ_V (All Areas) = 28,293 sf. x 1.0 in x 0.08 ft/in = 2358 cu. ft.

Total WQ_V Required = 2358 cu. ft.

Provided Water Quality Volume

Refer to
Total WQ_V Provided = Refer to Sizing Calculations by Manufacturer

* Hydrologic Soil Goup (HSG) D assumed for urban land
** 1" Water Quality Volume used to meet City of New Bedford regulations

RIPRAP SIZING CALCULATIONS

Project:	True Value Marine Hardware	Date:	9/20/2019
Town:	New Bedford, MA	Revised:	
		Job No.	6727
		Calc. by:	SLB

$$D_{50} = 0.2D\,[Q/(g)^{1/2}D^{2.5}]^{4/3}\,[D/Tw]$$

D = Diameter, ft.
g = Accel. of gravity, 32.2 f.p.s.
Q = Discharge rate, c.f.s.
D50 = Riprap size, ft. (minimum)
Tw = Tailwater Depth, ft.(Unknown Tw = 0.4 x D)

Class	D_{50}(in.)	Apron Length	Apron Depth
1	5	4D	$3.5D_{50}$
2	6	4D	$3.3D_{50}$
3	10	5D	$2.4D_{50}$

Width(at apron end) = 3D+(2/3)L

Note: Formulas taken from HEC No. 14; Publication No. FHWA-NHI-06-086 July 2006

STORMSCEPTOR OUTLET

D =	1	ft
Q100YR =	3.57	cfs
Tw =	0.4	ft
D50 =	0.27	ft
	3.23	in
RIPRAP CLASS =	1	
L =	4	ft (minimum)
DEPTH =	11.32	in (minimum)
W =	5.67	ft (minimum)

Project: True Value Marine Hardware
Location: New Bedford, MA
Prepared For: BETA Group / Stephen Borgatti

Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Procedure: Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the tc, read the unit peak discharge (qu) from Figure 1 or Table in Figure 2. qu is expressed in the following units: cfs/mi^2/watershed inches (csm/in).

Compute Q Rate using the following equation:

$$Q = (qu)\ (A)\ (WQV)$$

where:

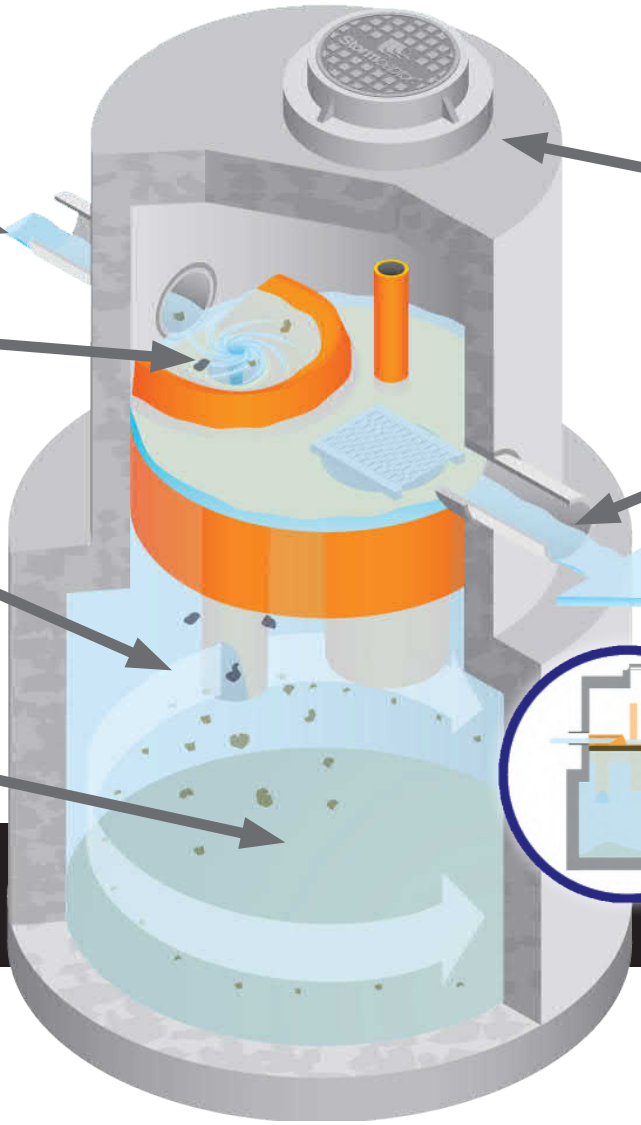
Q = flow rate associated with first 1" of runoff
qu = the unit peak discharge, in csm/in.
A = impervious surface drainage area (in square miles)
WQV = water quality volume in watershed inches (1" in this case)

Structure Name	Impv. (acres)	A (miles^2)	t_c (min)	t_c (hr)	WQV (in)	qu (csm/in.)	Q (cfs)
WQU #1	0.64	0.0010000	5.0	0.083	1.00	795.00	0.80

Stormceptor®

Stormwater Treatment Made Simple!

TSS & Oil Removal ■ *Scour Prevention* ■ *Small Footprint*



Design Flexibility

Proven Performance

Environmentally Engineered Stormwater Solutions...
that exceed your client's needs!

A calm treatment environment

CONTECH® ENGINEERED SOLUTIONS

Stormceptor® STC

Stormceptor® is an underground stormwater quality treatment device that is unparalleled in its effectiveness for pollutant capture and retention. With thousands of systems operating worldwide, Stormceptor delivers protection every day in every storm.

With patented technology, optimal treatment occurs by allowing free oil to rise and sediment to settle. The Stormceptor design prohibits scour and release of previously captured pollutants, ensuring superior treatment and protection during even the most extreme storm events.

Stormceptor is very easy to design and provides flexibility under varying site constraints such as tight right-of-ways, zero lot lines and retrofit projects. Design flexibility allows for a cost-effective approach to stormwater treatment. Stormceptor has proven performance backed by the longest record of lab and field verification in the industry.

Tested Performance

- Fine particle capture
- Prevents scour or release
- 95%+ Oil removal

Massachusetts – Water Quality (Q) Flow Rate

Stormceptor STC Model	Inside Diameter (ft)	Typical Depth Below Inlet Pipe Invert [1] (in)	Water Quality Flow Rate Q [2] (cfs)	Peak Conveyance Flow Rate [3] (cfs)	Hydrocarbon Capacity [4] (Gallons)	Maximum Sediment Capacity [4] (ft^3)
STC 450i	4	68	0.40	5.5	86	46
STC 900	6	63	0.89	22	251	89
STC 2400	8	104	1.58	22	840	205
STC 4800	10	140	2.47	22	909	543
STC 7200	12	148	3.56	22	1,059	839
STC 11000	2 x 10	142	4.94	48	2,792	1,086
STC 16000	2 x 12	148	7.12	48	3,055	1,677

[1] Depth Below Pipe Inlet Invert to the Bottom of Base Slab, and Maximum Sediment Capacity can vary to accommodate specific site designs and pollutant loads. Depths can vary to accommodate special designs or site conditions. Contact your local representative for assistance.
[2] Water Quality Flow Rate (Q) is based on 80% annual average TSS removal of the OK110 particle size distribution.
[3] Peak Conveyance Flow Rate is based upon ideal velocity of 3 feet per second and outlet pipe diameters of 18-inch, 36-inch, and 54-inch diameters.
[4] Hydrocarbon & Sediment capacities can be modified to accommodate specific site design requirements, contact your local representative for assistance.

APPENDIX H – SUBMITTALS BY OTHERS

CONTECH®
ENGINEERED SOLUTIONS

Stormceptor® STC
Owner's Manual

Stormceptor® STC

Table of Contents

For patent information, go to www.ContechES.com/ip.

Your selection of a Stormceptor® means that you have chosen the most recognized and efficient stormwater oil/sediment separator available for protecting the environment. Stormceptor is a pollution control device often referred to as a "Hydrodynamic Separator (HDS)" or an "Oil Grit Separator (OGS)", engineered to remove and retain pollutants from stormwater runoff to protect our lakes, rivers and streams from the harmful effects of non-point source pollution.

1 – Stormceptor Overview

Stormceptor is a patented stormwater quality structure most often utilized as a treatment component of the underground storm drain network for stormwater pollution prevention. Stormceptor is designed to remove sediment, total suspended solids (TSS), other pollutants attached to sediment, hydrocarbons and free oil from stormwater runoff. Collectively the Stormceptor provides spill protection and prevents non-point source pollution from entering downstream waterways.

Key benefits of Stormceptor include:

- Removes sediment, suspended solids, debris, nutrients, heavy metals, and hydrocarbons (oil and grease) from runoff and snowmelt.
- Will not scour or re-suspend trapped pollutants.
- Provides sediment and oil storage.
- Provides spill control for accidents, commercial and industrial developments.
- Easy to inspect and maintain (vacuum truck).
- "STORMCEPTOR" is clearly marked on the access cover (excluding inlet designs).
- Relatively small footprint.
- 3rd Party tested and independently verified.
- Dedicated team of experts available to provide support.

Model Types:

- STC (Standard)
- EOS (Extended Oil Storage)
- OSR (Oil and Sand Removal)
- MAX (Custom designed unit, specific to site)

Configuration Types:

- Inlet unit (accommodates inlet flow entry, and multi-pipe entry)
- In-Line (accommodates multi-pipe entry)
- Submerged Unit (accommodates the site's tailwater conditions)
- Series Unit (combines treatment in two systems)

PLEASE MAINTAIN YOUR STORMCEPTOR

To ensure long-term environmental protection through continued performance as originally designed for your site, Stormceptor must be maintained, as any stormwater treatment practice does. The need for maintenance is determined through inspection of the Stormceptor. Procedures for inspection are provided within this document. Maintenance of the Stormceptor is performed from the surface via vacuum truck.

If you require information about Stormceptor, or assistance in finding resources to facilitate inspections or maintenance of your Stormceptor please call Contech at 1-800-338-1122.

2 – Stormceptor Operation & Components

Stormceptor is a flexibly designed underground stormwater quality treatment device that is unparalleled in its effectiveness for pollutant capture and retention using patented flow separation technology. Stormceptor creates a non-turbulent treatment environment below the insert platform within the system. The insert diverts water into the lower chamber, allowing free oils and debris to rise, and sediment to settle under relatively low velocity conditions. These pollutants are trapped and stored below the insert and protected from large runoff events for later removal during the maintenance procedure.

With thousands of units operating worldwide, Stormceptor delivers reliable protection every day, in every storm. The patented Stormceptor design prohibits the scour and release of captured pollutants, ensuring superior water quality treatment and protection during even the most extreme storm events. Stormceptor's proven performance is backed by the longest record of lab and field verification in the industry.

Stormceptor Schematic and Component Functions

Below are schematics of two common Stormceptor configurations with key components identified and their functions briefly described.

- **Manhole access cover** – provides access to the subsurface components
- **Precast reinforced concrete structure** – provides the vessel's watertight structural support
- **Fiberglass insert** – separates vessel into upper and lower chambers
- **Weir** – directs incoming stormwater and oil spills into the lower chamber
- **Orifice plate** – prevents scour of accumulated pollutants
- **Inlet drop tee** – conveys stormwater into the lower chamber
- **Fiberglass skirt** – provides double-wall containment of hydrocarbons
- **Outlet riser pipe** – conveys treated water to the upper chamber; primary vacuum line access port for sediment removal
- **Oil inspection port** – primary access for measuring oil depth and oil removal
- **Safety grate** – safety measure to cover riser pipe in the event of manned entry into vessel

Figure 1.

Inline Stormceptor

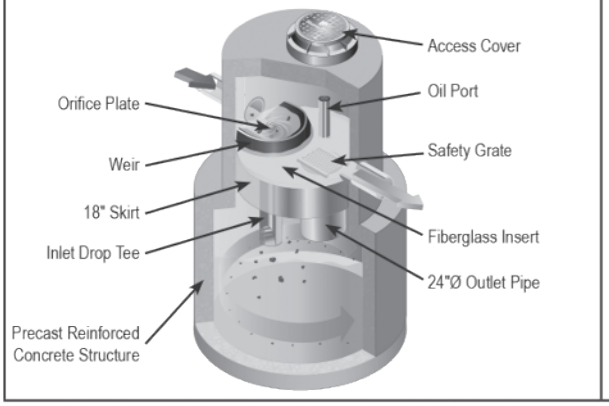
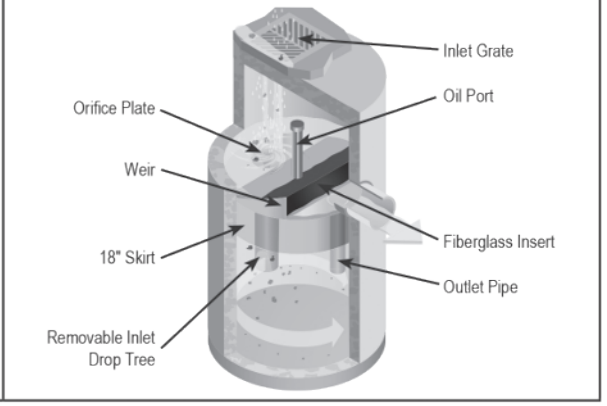


Figure 2.

Inlet Stormceptor



3 – Stormceptor Identification

Stormceptor is available in both precast concrete and fiberglass vessels, with precast concrete often being the dominant material of construction.

In the Stormceptor, a patented, engineered fiberglass insert separates the structure into an upper chamber and lower chamber. The lower chamber will remain full of water, as this is where the pollutants are sequestered for later removal. Multiple Stormceptor model (STC, OSR, EOS and MAX) configurations exist, each to be inspected and maintained in a similar fashion.

Each unit is easily identifiable as a Stormceptor by the trade name "Stormceptor" embossed on each access cover at the surface. To determine the location of "inlet" Stormceptor units with horizontal catch basin inlet, look down into the grate as the Stormceptor insert will be visible. The name "Stormceptor" is not embossed on inlet models due to the variability of inlet grates used/approved across North America.

Once the location of the Stormceptor is determined, the model number may be identified by comparing the measured depth from the fiberglass insert level at the outlet pipe's invert (water level) to the bottom of the tank using Table 1.

In addition, starting in 1996 a metal serial number tag containing the model number has been affixed to the inside of the unit, on the fiberglass insert. If the unit does not have a serial number, or if there is any uncertainty regarding the size of the unit using depth measurements, please contact your local Contech Representative for assistance.

Sizes/Models

Typical general dimensions and capacities of the standard precast STC, EOS & OSR Stormceptor models are provided in Tables 1 and 2. Typical rim to invert measurements are provided later in this document. The total depth for cleaning will be the sum of the depth from outlet pipe invert (generally the water level) to rim (grade) and the depth from outlet pipe invert to the precast bottom of the unit. Note that depths and capacities may vary slightly between regions.

Table 1. Stormceptor Dimensions - Insert to Base of Structure

STC Model	Insert to Base (in.)
450	60
900	55
1200	71
1800	105
2400	94
3600	134
4800	128
6000	150
200	134
11000*	128
13000*	150
16000*	134

Notes:

1. Depth Below Pipe Inlet Invert to the Bottom of Base Slab can vary slightly by manufacturing facility, and can be modified to accommodate specific site designs, pollutant loads or site conditions. Contact your local representative for assistance.

**Consist of two chamber structures in series.*

Table 2. Storage Capacities

STC Model	Hydrocarbon Storage Capacity (gal)	Sediment Capacity (ft^3)
450	86	46
900	251	89
1200	251	127
1800	251	207
2400	840	205
3600	840	373
4800	909	543
6000	909	687
200	1059	839
11000*	2797	1089
13000*	2797	1374
16000*	3055	1677

Notes:

1. Hydrocarbon & Sediment capacities can be modified to accommodate specific site design requirements, contact your local representative for assistance.

**Consist of two chamber structures in series*

4 – Stormceptor Inspection & Maintenance

Regular inspection and maintenance is a proven, cost-effective way to maximize water resource protection for all stormwater pollution control practices, and is required to insure proper functioning of the Stormceptor. Both inspection and maintenance of the Stormceptor is easily performed from the surface. Stormceptor's patented technology has no moving parts, simplifying the inspection and maintenance process.

Please refer to the following information and guidelines before conducting inspection and maintenance activities.

When is inspection needed?

- Post-construction inspection is required prior to putting the Stormceptor into service.
- Routine inspections are recommended during the first year of operation to accurately assess the sediment accumulation.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- Inspections should also be performed immediately after oil, fuel, or other chemical spills.

When is maintenance cleaning needed?

- For optimum performance, the unit should be cleaned out once the sediment depth reaches the recommended maintenance sediment depth, which is approximately 15% of the unit's total storage capacity (see Table 3). The frequency should be adjusted based on historical inspection results due to variable site pollutant loading.
- Sediment removal is easier when removed on a regular basis at or prior to the recommended maintenance sediment depths, as sediment build-up can compact making removal more difficult.
- The unit should be cleaned out immediately after an oil, fuel or chemical spill.

What conditions can compromise Stormceptor performance?

- If construction sediment and debris is not removed prior to activating the Stormceptor unit, maintenance frequency may be reduced.
- If the system is not maintained regularly and fills with sediment and debris beyond the capacity as indicated in Table 2, pollutant removal efficiency may be reduced.
- If an oil spill(s) exceeds the oil capacity of the system, subsequent spills may not be captured.
- If debris clogs the inlet of the system, removal efficiency of sediment and hydrocarbons may be reduced.
- If a downstream blockage occurs, a backwater condition may occur for the Stormceptor and removal efficiency of sediment and hydrocarbons may be reduced.

What training is required?

The Stormceptor is to be inspected and maintained by professional vacuum cleaning service providers with experience in the maintenance of underground tanks, sewers and catch basins.

For typical inspection and maintenance activities, no specific supplemental training is required

Recommended Stormceptor Inspection Procedure:

• Stormceptor is to be inspected from grade through a standard surface manhole access cover.

• Sediment and oil depth inspections are performed with a sediment probe and oil dipstick.

• Oil depth is measured through the oil inspection port, either a 4-inch or 6-inch diameter port.

• Sediment depth can be measured through the oil inspection port or the 24-inch diameter outlet riser pipe.

• Inspections also involve a visual inspection of the internal components of the system.

What equipment is typically required for maintenance?

• Vacuum truck equipped with water hose and jet nozzle

• Small pump and tubing for oil removal

• Manhole access cover lifting tool

• Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)

• Flashlight

• Camera

• Data log / Inspection Report

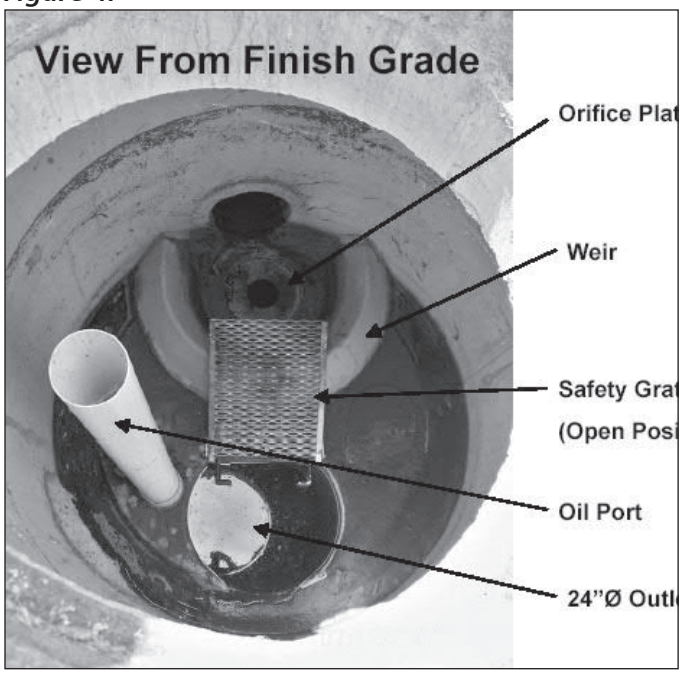
• Safety cones

• Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers

• Gas analyzer, respiratory gear, hoist and safety harness for specially trained personnel if confined space entry is required

Figure 3.

Figure 4.



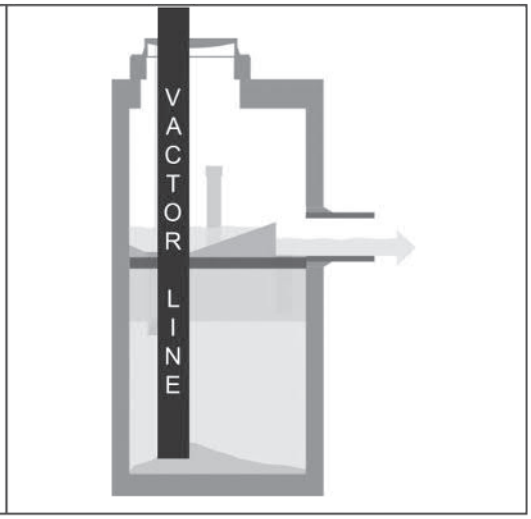
Recommended Stormceptor Maintenance Procedure

Maintenance of Stormceptor is performed using a vacuum truck. No entry into the unit is required for maintenance. DO NOT ENTER THE STORMCEPTOR CHAMBER unless you have the proper personal safety equipment, have been trained and are qualified to enter a confined space, as identified by local Occupational Safety and Health Regulations (e.g. 29 CFR 1910.146). Without the proper equipment, training and permit, entry into confined spaces can result in serious bodily harm and potentially death. Consult local and/or state regulations to determine the requirements for confined space entry. Be aware, and take precaution that the Stormceptor fiberglass insert may be slippery. In addition, be aware that some units do not have a safety grate to cover the outlet riser pipe that leads to the submerged, lower chamber.

- Ideally maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is to be maintained through a standard surface manhole access cover.
- Insert the oil dipstick into the oil inspection port. If oil is present, pump off the oil layer into separate containment using a small pump and tubing.
- Maintenance cleaning of accumulated sediment is performed with a vacuum truck.
  - » For 6-ft diameter models and larger, the vacuum hose is inserted into the lower chamber via the 24-inch outlet riser pipe (See Fig. 5).
  - » For 4-ft diameter model, the removable drop tee is lifted out, and the vacuum hose is inserted into the lower chamber via the 12-inch drop tee hole (See Fig. 6).

Figure 5.

Figure 6.



- Using the vacuum hose, decant the water from the lower chamber into a separate containment tank or to the sanitary sewer, if permitted by the local regulating authority.
- Remove the sediment sludge from the bottom of the unit using the vacuum hose. For large Stormceptor units, a flexible hose is often connected to the primary vacuum line for ease of movement in the lower chamber.
- Units that have not been maintained regularly, have surpassed the maximum recommended sediment capacity, or contain damaged components may require manned entry by trained personnel using safe and proper confined space entry procedures.

What is required for proper disposal?

The requirements for the disposal of material removed from Stormceptor units are similar to that of any other stormwater treatment Best Management Practices (BMP). Local guidelines should be consulted prior to disposal of the separator contents. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste. This could be site and pollutant dependent. In some cases, approval from the disposal facility operator/agency may be required.

What about oil spills?

Stormceptor is often implemented in areas where there is high potential for oil, fuel or other hydrocarbon or chemical spills. Stormceptor units should be cleaned immediately after a spill occurs by a licensed liquid waste hauler. You should also notify the appropriate regulatory agencies as required in the event of a spill.

What if I see an oil rainbow or sheen at the Stormceptor outlet?

With a steady influx of water with high concentrations of oil, a sheen may be noticeable at the Stormceptor outlet. This may occur because a hydrocarbon rainbow or sheen can be seen at very small oil concentrations ($<$ 10 ppm). Stormceptor is effective at removing 95% of free oil, and the appearance of a sheen at the outlet with high influent oil concentrations does not mean unit is not working to this level of removal. In addition, if the influent oil is emulsified, the Stormceptor will not be able to remove it. The Stormceptor is designed for free oil removal and not emulsified or dissolved oil conditions.

What factors affect the costs involved with inspection/maintenance?

The Vacuum Service Industry for stormwater drainage and sewer systems is a well-established sector of the service industry that cleans underground tanks, sewers and catch basins. Costs to clean Stormceptor units will vary. Inspection and maintenance costs are most often based on unit size, the number of units on a site, sediment/oil/hazardous material loads, transportation distances, tipping fees, disposal requirements and other local regulations.

What factors predict maintenance frequency?

Maintenance frequency will vary with the amount of pollution on your site (number of hydrocarbon spills, amount of sediment, site activity and use, etc.). It is recommended that the frequency of maintenance be increased or reduced based on local conditions. If the sediment load is high from an unstable site or sediment loads transported from upstream catchments, maintenance may be required semi-annually. Conversely once a site has stabilized, maintenance may be required less frequently (for example: two to seven year, site and situation dependent). Maintenance should be performed immediately after an oil spill or once the sediment depth in Stormceptor reaches the value specified in Table 3 based on the unit size.

Table 3. Recommended Sediment Depths Indicating Maintenance

STC Model	Maintenance Sediment Depth (in)
450	8
900	8
1200	10
1800	15
2400	12
3600	17
4800	15
6000	18
200	15
11000*	17
13000*	20
16000*	17

Notes:

1. The values above are for typical standard units.

** Per structure.*

Replacement parts

Since there are no moving parts during operation in a Stormceptor, broken, damaged, or worn parts are not typically encountered. Therefore, inspection and maintenance activities are generally focused on pollutant removal. However, if replacements parts are necessary, they may be purchased by contacting your local Contech Representative or call 800-338-1122.

The benefits of regular inspection and maintenance are many – from ensuring maximum operation efficiency, to keeping maintenance costs low, to the continued protection of natural waterways – and provide the key to Stormceptor's long and effective service life.

Stormceptor Inspection and Maintenance Log

Stormceptor Model No: _____

Allowable Sediment Depth: _____

Serial Number: _____

Installation Date: _____

Location Description of Unit: _____

Other Comments: _____

5 – Contact Information

Questions regarding the Stormceptor can be addressed by contacting your local Contech representative or by calling 800-338-1122.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, and earth stabilization products. For information, visit www.ContechES.com or call 800.338.1122

CONTECH ENGINEERED SOLUTIONS
800.925.5240
www.ContechES.com

APPENDIX I DRAWINGS

GENERAL NOTES

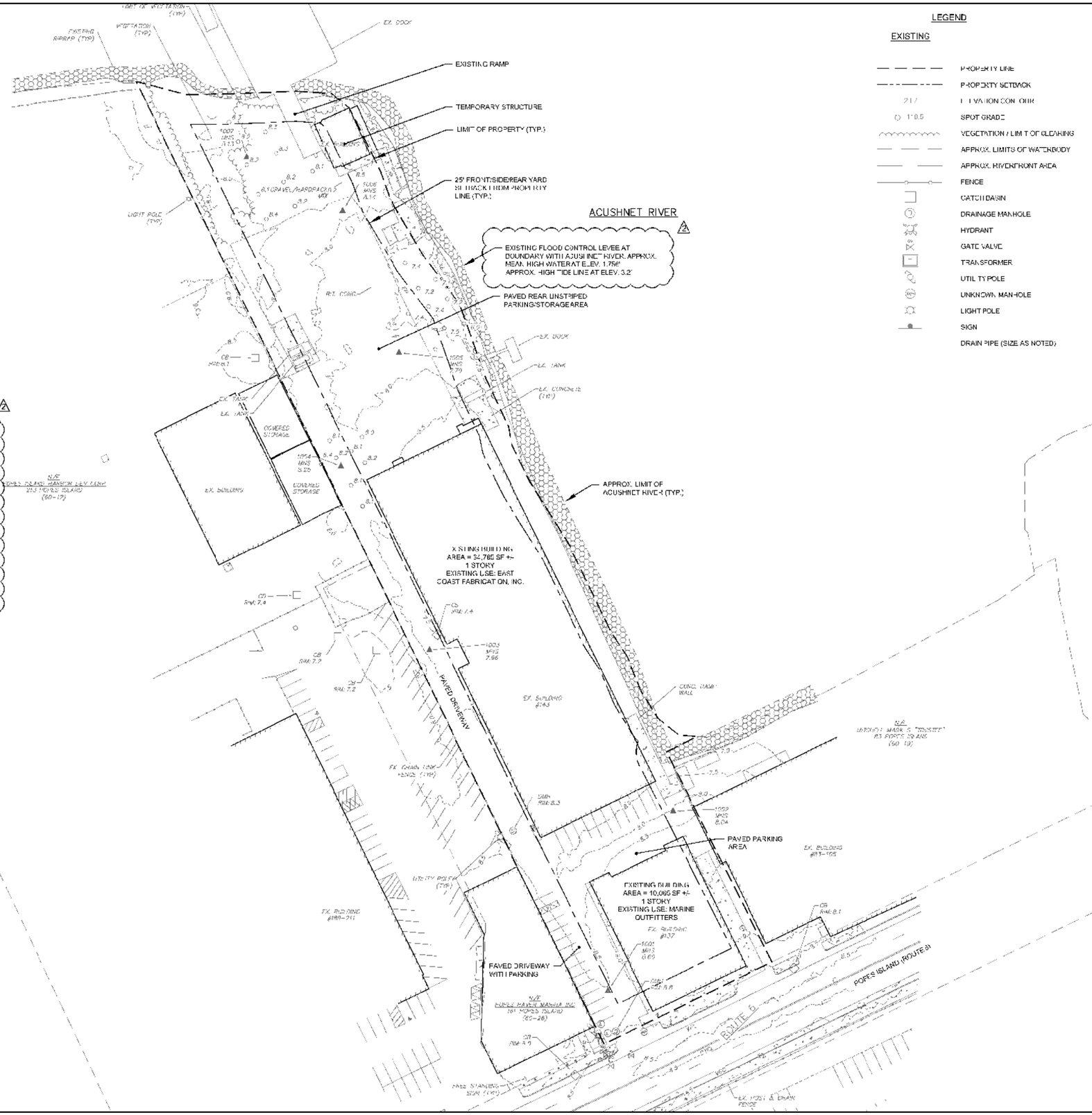
1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION LAYOUT SURVEYS.
2. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ADJOINING PROPERTIES AT ALL TIMES AND NOTIFY ALL ABUTTERS IN ADVANCE OF ANY INTERRUPTIONS TO ACCESS.
3. ALL AREAS OUTSIDE THE LIMITS OF THE PROPOSED WORK THAT HAVE BEEN DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE, TO THE SATISFACTION OF THE ENGINEER AND THE PROPERTY OWNER.
4. ALL WORK SHALL COMPLY WITH OSHA'S LATEST STANDARDS. ALL REQUIREMENTS OF OSHA'S SAFETY STANDARDS SHALL BE PROVIDED BY THE CONTRACTOR, INCLUDING BUT NOT LIMITED TO THE PROVISION OF A COMPETENT PERSON TO SERVE AS ONSITE SAFETY MANAGER.
5. ALL PERSONNEL WORKING THE JOB SITE ARE REQUIRED TO HAVE COMPLETED OSHA 10 HOUR TRAINING.
6. PRIOR TO COMMENCING ANY EXCAVATION, THE CONTRACTOR SHALL FIELD VERIFY EXISTING SITE CONDITIONS, WITH PARTICULAR ATTENTION TO SUBSURFACE AND ABOVE GRADE UTILITIES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION, SIZE, TYPE, DEPTH, ETC. OF ALL UNDERGROUND UTILITIES THAT MAY BE AFFECTED BY THE WORK.

PROPERTY LINE, TOPOGRAPHIC, AND WETLAND INFORMATION

1. EXISTING CONDITIONS SURVEY INFORMATION GENERATED FROM AERIAL AND SURVEY PERFORMED BY CIVILVIEW, INC. IN AUGUST OF 2019.
2. THE COORDINATES IN FEET ARE BASED UPON THE NORTH AMERICAN DATUM OF 1983 (NAD 83). THE VERTICAL DATUM IS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. THE PROPERTY LINE AND TOPOGRAPHIC INFORMATION ON THE EXISTING CONDITIONS PLAN ARE BASED ON EXISTING RECORD DATA AND ARE FIT ONTO THE PLAN USING PHYSICAL FEATURES VISIBLE ON AERIAL PHOTO. LOCATIONS OF PROPERTY LINES SHOULD BE CONSIDERED APPROXIMATE.
4. THIS PARCEL IS LOCATED WITHIN A ZONE 'X' DESIGNATED FLOOD ZONE PER FEMA FLOOD INSURANCE RATE MAP 25025C0393G DATED JULY 16, 2014.

JURISDICTIONAL RESOURCE AREAS

1. LAND SUBJECT TO COASTAL STORM FLOWAGE: INCLUDES PORTIONS OF THE SITE LOCATED BELOW THE BASE FLOOD ELEVATION OF 8 FT.
2. LAND SUBJECT TO TIDAL ACTION: INCLUDES PORTIONS OF THE SITE LOCATED BELOW THE EXTREME HIGH TIDE ELEVATION.
3. LAND UNDER THE OCEAN: INCLUDES PORTIONS OF THE SITE LOCATED BELOW THE MEAN LOW WATER ACT ELEVATION -1.84 FT.
4. DESIGNATED PORT AREA: INCLUDES ALL PORTIONS OF THE SITE.
5. COASTAL BEACH: INCLUDES THE PORTION OF THE SITE BETWEEN THE TOP OF THE 4:1 SLOPE ALONG THE ACUSHNET RIVER AND THE LANDWARD LIMIT OF THE ROCKY INTERTIDAL SHORE.
6. ROCKY INTERTIDAL SHORE: INCLUDES THE PORTION OF THE SITE BETWEEN THE MEAN HIGH WATER ELEVATION AT 1.78 FT AND THE MEAN LOW WATER ELEVATION AT -1.84 FT.
7. FISH RUN COINCIDENT WITH THE COASTAL BANK
8. LAND CONTAINING SHELLFISH: INCLUDES PORTIONS OF THE SITE BELOW THE MEAN LOW WATER ELEVATION AT -1.84 FT.



LEGEND

EXISTING

- PROPERTY LINE
- PROPERTY SETBACK
- 21.7 ELEVATION CONTOUR
- 1.0.5 SPOT GRADE
- VEGETATION / LIMIT OF CLEARING
- APPROX. LIMITS OF WATERBODY
- APPROX. RIVERFRONT AREA
- FENCE
- CATCH BASIN
- DRAINAGE MANHOLE
- HYDRANT
- GATE VALVE
- TRANSFORMER
- UTILITY POLE
- UNKNOWN MANHOLE
- LIGHT POLE
- SIGN
- DRAIN PIPE (SIZE AS NOTED)

PREPARED BY

BETA
www.BETA-Inc.com

PREPARED FOR:

True Value

Shoreline Resources, LLC
706 Acushnet Ave.
New Bedford, MA 02740

TRUE VALUE MARINE HARDWARE

137 - 143 Popes Island
New Bedford, MA

EXISTING CONDITIONS PLAN

NO.	REVISIONS	DATE
2	CORRECTED EXISTING TOPOGRAPHY AND RESOURCE AREAS	9/20/2019
1	NO CHANGES ON THIS SHEET	9/6/2019

DRAWN BY:	SLB
DESIGNED BY:	SLB
CHECKED BY:	DPR
ISSUE DATE:	SEPTEMBER 6, 2019
BETA JOB NO.:	6727

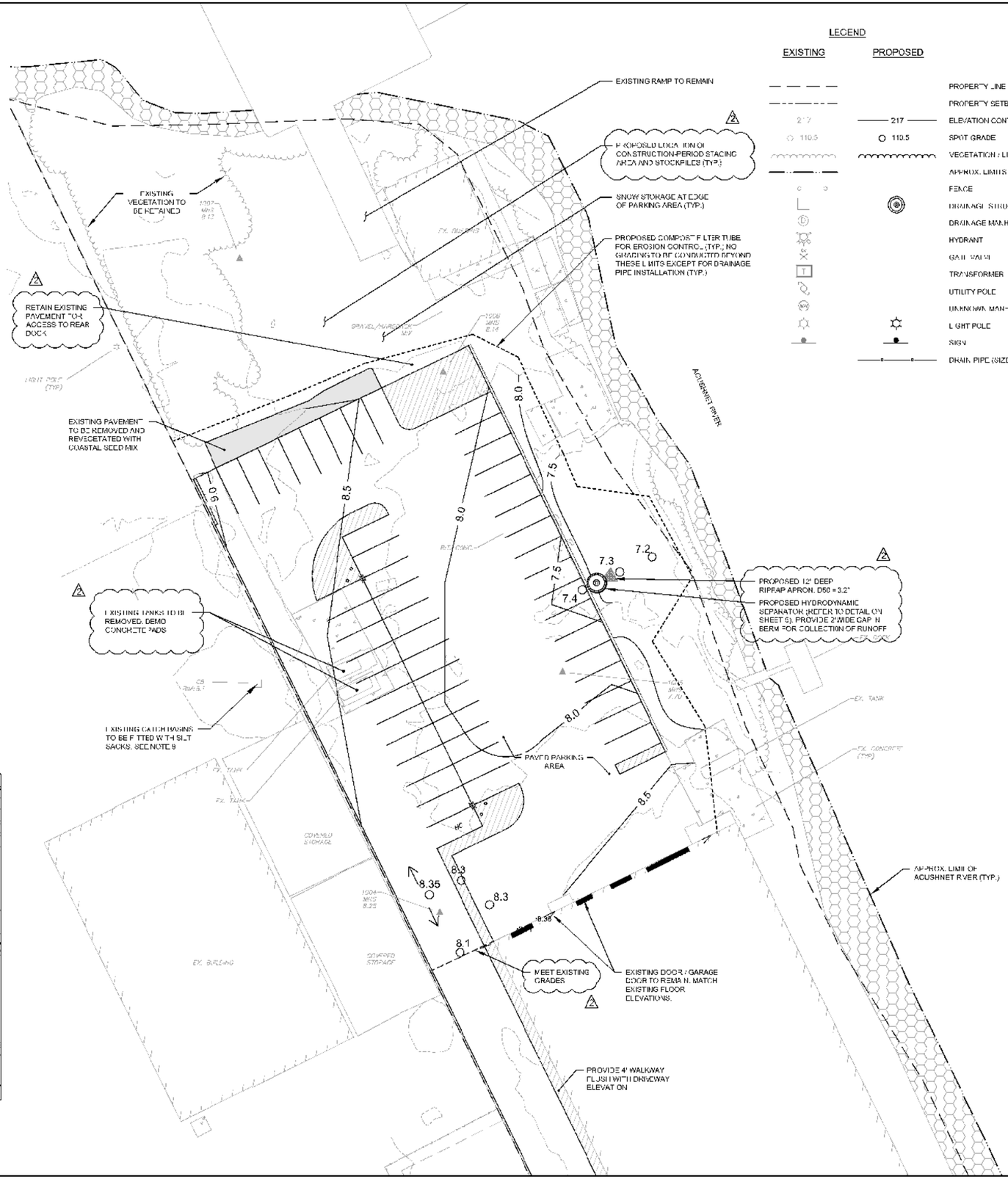
40 0 40 80
SCALE IN FEET: 1"=40'

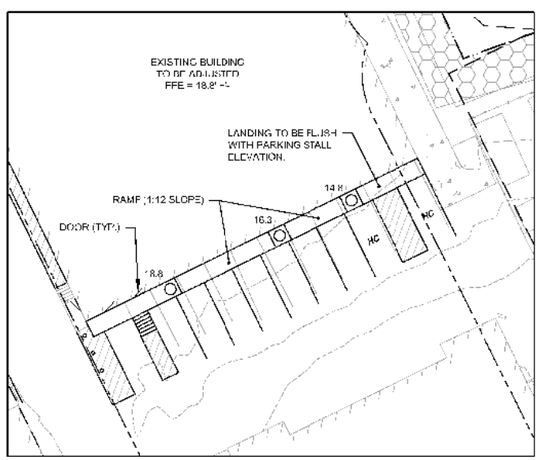
SHEET NO.

2

SITE PREPARATION AND EROSION CONTROL

1. THE CONTRACTOR SHALL NOTIFY DIG SAFE 72 HOURS PRIOR TO COMMENCING WORK.
2. THE CONTRACTOR'S ACCESS, STAGING, AND STORAGE AREAS SHALL BE LOCATED WITHIN THE LIMITS OF THE WORK AREA. NO WORK, STOCKPILING OF MATERIALS, STORAGE OF EQUIPMENT, OR OTHER OPERATIONS OF THE CONTRACTOR SHALL TAKE PLACE OUTSIDE THE LIMITS OF WORK UNLESS AUTHORIZED IN WRITING BY THE ENGINEER.
3. EROSION CONTROL DEVICES SHALL BE FULLY INSTALLED PRIOR TO THE START OF ANY SITE WORK, AND SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION. THESE DEVICES SHALL BE REMOVED AND LEGALLY DISPOSED OF UPON COMPLETION OF ALL WORK WHEN ALL DISTURBED AREAS ARE STABILIZED AND PERMANENT GROUND COVER IS ESTABLISHED. TO THE SATISFACTION OF THE ENGINEER AND THE TOWN. ALL EROSION CONTROL BMPS SHALL CONFORM TO US EPA, NPDES, MA DEP, AND MASSACHUSETTS EROSION AND SEDIMENTATION CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS.
4. THE CONTRACTOR SHALL MONITOR ALL AREAS WITHIN AND AROUND THE LIMIT OF THE WORK FOR SIGNS OF EROSION, AND REPAIR/STABILIZE ANY ERODED AREAS, AS REQUIRED UNTIL FINAL STABILIZATION CAN BE ACHIEVED.
5. THE CONTRACTOR IS RESPONSIBLE FOR MONITORING DOWNSTREAM CONDITIONS THROUGHOUT THE CONSTRUCTION PERIOD AND CLEARING ANY DEBRIS AND/OR SEDIMENT IMPEDING PROPER DRAINAGE DURING CONSTRUCTION.
6. NO SEDIMENT SHALL BE PERMITTED TO LEAVE THE SITE DURING CONSTRUCTION. IF HEAVY RAIN AND/OR UNUSUAL SITE CONDITIONS RESULT IN THE POLLUTION OF ROADWAYS, BUFFER ZONES, RESOURCE AREAS, OR ADJACENT PARCELS, CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY. CONTRACTOR SHALL CLEAN ANY DISTURBED AREAS AS SOON AS PRACTICABLE AND RESTORE THEIR ORIGINAL CONDITIONS. CLEANING AND RESTORATION WITHIN BUFFER ZONES AND RESOURCE AREAS MUST BE PERFORMED UNDER THE SUPERVISION OF A WETLAND CONSULTANT, AS COORDINATED BY ENGINEER. WORK MAY ALSO BE OBSERVED BY THE CONSERVATION COMMISSION.
7. WHEN WORKING NEXT TO EXISTING TREES, WALLS, OR FENCES DESIGNATED TO REMAIN, THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION NOT TO DISTURB THESE STRUCTURES. IF THE CONTRACTOR DOES DAMAGE ANY EXISTING TREES, WALLS OR FENCES AS A RESULT OF THE CONSTRUCTION PROCESS, IT SHALL BE THEIR RESPONSIBILITY (THE CONTRACTOR) TO REPAIR ALL DAMAGES AS DIRECTED BY THE ENGINEER. ALL WORK ASSOCIATED WITH THE REPAIR OR REPLACEMENT OF EXISTING TREES, WALLS, OR FENCES SHALL BE COMPLETED AT NO ADDITIONAL COMPENSATION.
8. CONTRACTOR SHALL SWEEP POPES ISLAND AND THE EXISTING ACCESS DRIVEWAY AT THE END OF EACH WORK DAY (OR MORE FREQUENTLY AS REQUESTED BY THE CITY OR ITS AGENT) TO REMOVE SEDIMENT TRACKING CAUSED BY PROJECT-RELATED CONSTRUCTION VEHICLES.
9. SILT SACKS SHALL BE INSTALLED WITHIN ANY CATCH BASINS AND DRAIN INLETS WITHIN THE LOT AND WITHIN THE VICINITY OF THE LIMIT OF WORK AS NECESSARY TO PREVENT SILT-LADEN RUNOFF FROM ENTERING THE TOWN'S STORM DRAIN SYSTEM.
10. ALL DISTURBED AREAS SHALL BE STABILIZED NO LATER THAN 14 DAYS AFTER A CONSTRUCTION ACTIVITY HAS TEMPORARILY OR PERMANENTLY CEASED ON THAT PORTION OF THE SITE.
11. ANY DISTURBED AREA EXPOSED FOR MORE THAN 7 DAYS SHALL BE STABILIZED WITH PERENNIAL RYE GRASS SEEDING OR APPROVED EQUIVALENT. ADDITIONALLY, A ROW OF STRAW WATTLES SHALL BE PLACED AND STAKED ON THE DOWNGRADIENT SIDE OF ALL SUCH AREAS. SEEDED AREAS SHALL BE RE-SEEDED AS NECESSARY TO ENSURE VEGETATION ESTABLISHMENT.
12. ALL STOCKPILES AND DISTURBED AREAS TO BE STABILIZED IF EXPOSED FOR MORE THAN 7 DAYS. ALL STOCKPILES SHALL BE SURROUNDED BY COMPOST FILTER TUBES, AND COVERED IN A MANNER THAT STORMWATER DOES NOT INFILTRATE THE MATERIAL. ALL STOCKPILES OVER 10' IN HEIGHT SHALL BE SURROUNDED BY SAFETY FENCING. NO STOCKPILE SHALL BE PLACED NORTH OF EAST OF THE PERIMETER EROSION CONTROLS.





INSET A
GRADING AT PROPOSED WHEELCHAIR RAMP
SCALE: 1" = 2'

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New Bedford, MA 02740

TRUE VALUE MARINE HARDWARE

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New Bedford, MA

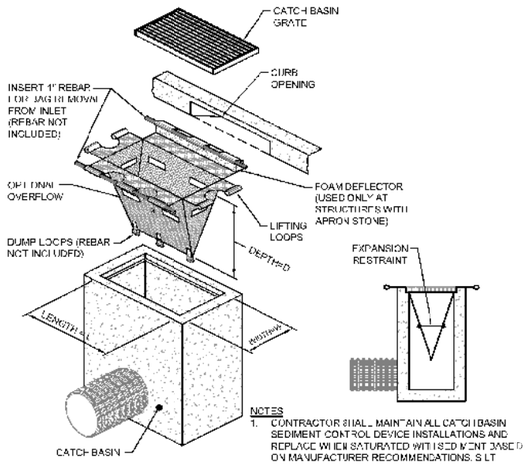
GRADING, DRAINAGE, UTILITY, LANDSCAPE, AND EROSION CONTROL PLAN

NO.	REVISIONS	DATE
2	CORRECTED EXISTING TOPOGRAPHY AND RESOURCE AREAS. ADJUSTED GRADING & STORMWATER DESIGN.	9/20/2019
1	ADDED INSET A	9/6/2019

DRAWN BY:	SLB
DESIGNED BY:	SLB
CHECKED BY:	DPR
ISSUE DATE:	SEPTEMBER 6, 2019
BETA JOB NO.:	6727

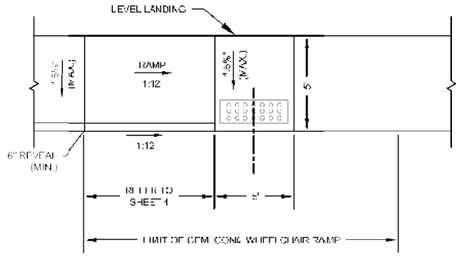
20 0 20 40
SCALE IN FEET: 1"=20'

SHEET NO.
4

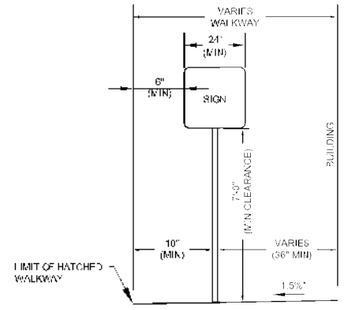


NOTES
1. CONTRACTOR SHALL MAINTAIN ALL CATCH BASIN SEDIMENT CONTROL DEVICE INSTALLATIONS AND REPLACE WHEN SATURATED WITH SEDIMENT BASED ON MANUFACTURER RECOMMENDATIONS. SILT SACK SHALL BE INSPECTED AFTER EVERY RAIN EVENT BUT NO LONGER THAN EVERY TWO WEEKS.
2. SILT SACK SHALL BE DOUBLE WEIGHT SPUN POLYPROPYLENE GEOTEXTILE FABRIC AND RATED FOR HIGH FLOW UNLESS OTHERWISE DIRECTED
3. CONTRACTOR SHALL PROVIDE CURB OPENING DEFLECTOR AT ALL CATCH BASINS AS NECESSARY.

CATCH BASIN SEDIMENT CONTROL PROTECTION
NOT TO SCALE



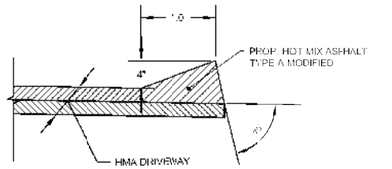
WHEELCHAIR RAMP
NOT TO SCALE



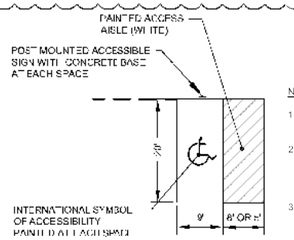
NOTES
1. MINIMUM CLEAR PATH ON ALL SIDEWALKS SHALL BE 36 INCHES, EXCLUDING THE CURB.
2. CONTRACTOR SHALL VERIFY LOCATION OF ALL OBJECTS (SIGNS, POLES, ETC.) TO BE SET WITHIN SIDEWALK PRIOR TO FINAL PLACEMENT TO PROVIDE A MINIMUM CLEAR PATH OF 36 INCHES NOT INCLUDING CURB. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY LOCATION WHICH CANNOT MEET THE CLEARANCE REQUIREMENTS.

* TOLERANCE FOR CONSTRUCTION ±0.5%

WALKWAY MINIMUM CLEARANCE DETAILS
NOT TO SCALE

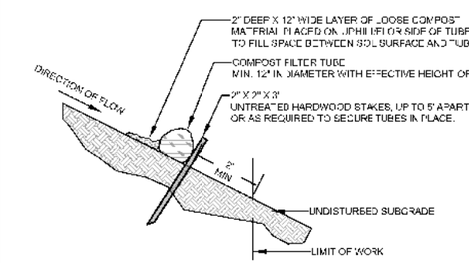


HMA BERM TYPE A MODIFIED (CAPE COD BERM)
NOT TO SCALE

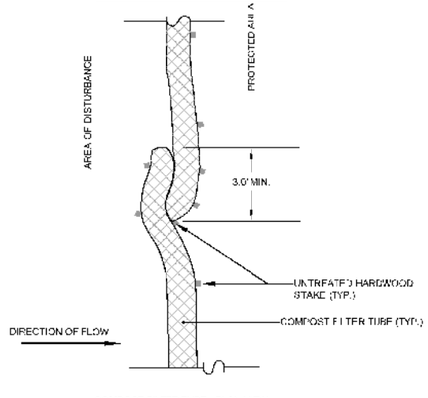


NOTES:
1. PAVEMENT SLOPE WITHIN ACCESSIBLE SPACE OR AISLE SHALL NOT EXCEED 2% GRADE.
2. PARKING SIGNS SHALL BE DESIGNED TO MEET ALL REQUIREMENTS OF ADA, INCLUDING "VAN ACCESSIBLE" DESIGNATION WHERE SPECIFIED IN THE PLANS.
3. ALL PARKING SPACE STRIPING SHALL BE 4" PAINTED WHITE LINES.

ACCESSIBLE PARKING SPACE
NOT TO SCALE



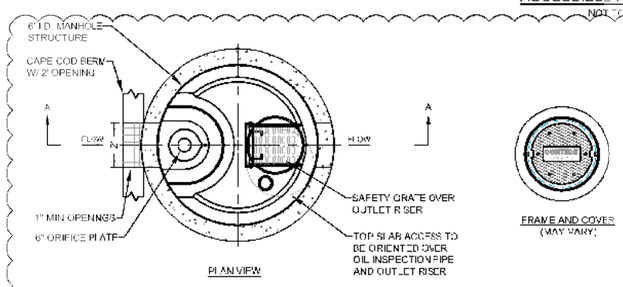
COMPOST FILTER TUBE - SECTION VIEW



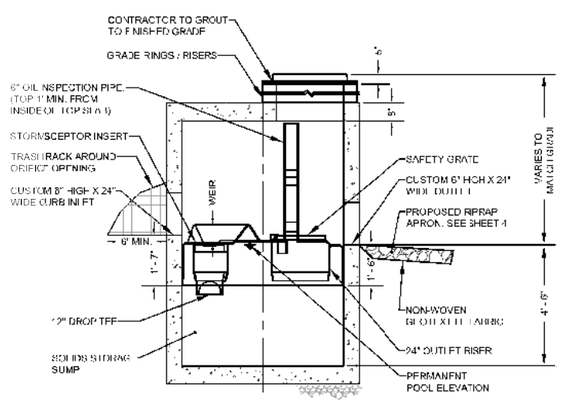
COMPOST FILTER TUBE - PLAN VIEW

COMPOST FILTER TUBE NOTES:
1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES FOR SLOPES UP TO 50 FEET IN LENGTH WITH A SLOPE RATIO OF 5H:1V OR STEEPER. LONGER SLOPES OR SLOPES MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURERS RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN-OFF.
5. TUBES FOR COMPOST FILTERS SHALL BE JUTE MESH OR APPROVED BIODEGRADABLE MATERIAL. ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.
6. TAMP TUBES IN PLACE TO ENSURE GOOD CONTACT WITH SOIL SURFACE. IT IS NOT NECESSARY TO TRENCH TUBES INTO EXISTING GRADE.
7. WHEN STAKING IS NOT POSSIBLE, SUCH AS WHEN TUBES MUST BE PLACED ON PAVEMENT, HEAVY CONCRETE OR CINDER BLOCKS CAN BE USED BEHIND TUBES UP TO 5' APART OR AS REQUIRED TO SECURE TUBES IN PLACE.
8. PROVIDE A 3' MINIMUM OVERLAP AT ENDS OF TUBES TO JOIN IN A CONTINUOUS BARRIER AND MINIMIZE UNIMPEDED FLOW. STAKE JOINING TUBES SNUGLY AGAINST EACH OTHER TO PREVENT UNFILTERED FLOW BETWEEN THEM. SECURE ENDS OF TUBES WITH STAKES SPACED 18" APART THROUGH TOPS OF TUBES. DO NOT PUNCTURE TUBES WITH STAKES.

SINGLE COMPOST FILTER TUBE FOR EROSION CONTROL
NOT TO SCALE



PLAN VIEW



SECTION A-A

GENERAL NOTES
1. STRUCTURE SHALL MEET AASHTO H20 AND CASTINGS SHALL MEET H20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
2. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
3. HYDRODYNAMIC SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE / BACKFILL DEPTH AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOW INTO INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

HYDRODYNAMIC SEPARATOR
NOT TO SCALE

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New Bedford, MA

DETAILS

NO.	REVISIONS	DATE
2	REVISED HYDRODYNAMIC SEPARATOR DESIGN, ADDED SIGN AND RAMP DETAILS	9/20/2019
1	NO CHANGES ON THIS SHEET	6/6/2019

DRAWN BY:	SLB
DESIGNED BY:	SLB
CHECKED BY:	DPR
ISSUE DATE:	SEPTEMBER 6, 2019
BETA JOB NO.:	6727

SHEET NO.
5

9/9/2019 10:54 AM C:\6727\05\6727 - SHORELINE RESOURCES - LSP\DRAWING FILES\PLANSET\143PUPESISLAND DETAILS.DWG

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