STORMWATER REPORT

WARREN STEET PARK IMPROVEMENTS
WARREN STREET
UPTON, MASSACHUSETTS

JUNE 2024

Owner/Applicant:

TOWN OF UPTON
1 Main Street
Upton, Massachusetts 01568

BSC Job Number: 23462.00

Prepared by:

BSC GROUP

803 Summer Street
Boston, Massachusetts 02127

TABLE OF CONTENTS

SECTION 1.0

PROJECT INFORMATION

1.01 PROJECT DESCRIPTION

The Town of Upton (The Applicant) is seeking to construct The Warren Street Pocket Park in Upton, Massachusetts, hereinafter referred to as "the Project". The total property area is approximately 0.30 acres and is located off Warren Street near the intersection with North Main Street. The project is bounded on the north by a commercial building, on the east by North Main Street, on the south by Upton Town Hall and bounded on the west by a forested area.

The Project consists of clearing and grubbing of the northwest section of the property, improving the existing parking lot, and the construction of a stabilized stone dust walkway, underdrains, retaining walls, a stormwater management system and resetting existing structures.

1.02 PRE-DEVELOPMENT CONDITIONS

The existing site topography generally slopes northeast across the property towards the wetlands located on the property associated with a small stream. Slopes on site range from 0-30%. The current site is comprised of wooded area and a public parking lot. The primary soil classification identified by the NRCS Web Soil Survey is Merrimack fine sandy loam (254B), which accounts for the majority of the property with a small portion of the property identified as Canton fine sandy loam (420C & 422C). On July 19, 2022, BSC Group conducted hand auger borings on the site as part of the wetland delineations. These hand augers identified on-site soils as sandy loam. Based on the NRCS data and the soil materials identified during wetland delineations, runoff calculations have been performed using curve numbers corresponding to Hydrologic Soil Group (HSG) B.

The site has two existing catch basins where stormwater runoff from the parking area is directed. The remaining stormwater runoff flows overland to the wetlands and stream.

1.03 POST-DEVELOPMENT CONDITIONS

For stormwater management design, the proposed project has been divided into a new development portion and a redevelopment portion. The new development portion will consist of a stabilized stone dust walking path, a porous paver plaza, and associated landscape and grading improvements. The redevelopment portion of the project consists of the renovation of the existing parking lot.

For the new development portion, stormwater management has been designed to fully comply with the DEP's Stormwater Standards as detailed in the Wetlands Protection Act (the Act) and the Massachusetts Stormwater Handbook (the Handbook). Stormwater runoff from a portion of the stabilized stone dust walkway will be collected via a grassed swale discharging into a bioretention area that has been designed to completely provide recharge to groundwater and attenuate peak flow rates from the 2, 10, and 100-year storm events The stabilized stone dust path and porous paver plaza will allow stormwater runoff to infiltrate through the surface to groundwater, minimizing peak flow rate increases and maintaining existing groundwater recharge rates.

The redevelopment of the existing parking lot will result in a decrease of approximately 200-square feet of impervious surface. This decrease of impervious surface will result in a decrease to peak flow rates, an increase to groundwater recharge, and an improvement to the overall quality of stormwater runoff discharged. These renovations will generally maintain existing drainage patterns and the runoff from the parking lot will continue to enter the Town's stormwater system through the existing catch basins.

Specifics of the project's compliance with the Stormwater Standards are discussed in detail in the following sections.

SECTION 2.0

DRAINAGE SUMMARY

2.01 Stormwater Standard 1 – New Stormwater Conveyances

Per Massachusetts Stormwater Management Standard #1, no new outfalls may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. In the new development portion of the project, there is no addition of impervious surfaces. As such, there is no treatment required. Runoff from the stabilized stone dust path and porous paver plaza will sheet flow at low, non-erosive velocities towards the wetlands and stream. A portion of this runoff will be collected in a vegetated swale and routed to a bio-retention area for groundwater recharge and peak flow attenuation. This bio-retention area will discharge larger storm events over a level-spreader berm to promote low, non-erosive runoff velocities.

Runoff from the redeveloped parking lot will continue to discharge to the Town drainage system through the two existing catch basins on site.

2.02 Stormwater Standard 2 – Stormwater Runoff Rates

Watershed modeling was performed using HydroCAD Stormwater Modeling Software version 10.20, a computer aided design program that combines SCS runoff methodology with standard hydraulic calculations. A model of the site's hydrology was developed for both pre- and post-development conditions of the new development portion of the project to assess the effects of the proposed development on the project site and surrounding areas. Stormwater runoff was modeled using data from the TP-40 rainfall values in accordance with the Handbook and the Act. The following rainfall values have been used in our analysis:

Storm Frequency	TP-40 Rainfall (Inches)
2-year	3.10
10-year	4.60
25-year	5.30
100-year	6.80

The stormwater management system for the new development portion of the project has been designed such that the post-development conditions result in no increase to peak runoff rates off the property for the 2, 10, 25, and 100-year, 24-hour storm events for the new development portion of the Project area.

Node DP1 – Flow Towards Wetland (New Development)

Storm Event	Pre-Development Peak Discharge Rate (cfs)	Post-Development Peak Discharge Rate (cfs)	Change in Peak Discharge Rate (cfs)
2-Year	0.02	0.02	0.00
10-Year	0.18	0.10	-0.08
100-Year	0.56	0.28	-0.28

As the redeveloped parking lot results in approximately 200-square feet less impervious surface than existing, the peak flows to the existing Town drainage system will be reduced.

2.03 Stormwater Standard 3 – Groundwater Recharge

The new development portion of the project does not include the addition of impervious surfaces. The stabilized stone dust path and porous paver plaza will both allow runoff to infiltrate back to the groundwater.

In addition, a small bio-retention area will collect runoff from a portion of the path to attenuate peak flows. This bio-retention area will further promote infiltration to groundwater to ensure compliance with Standard 3.

By reducing the impervious surfaces on-site, the redeveloped parking lot will further increase groundwater recharge from the overall project.

2.04 Stormwater Standard 4 – TSS Removal

There are no proposed impervious surfaces within the new development portion of the Project, therefore no TSS removal is required as stated in Standard 4. A long-term pollution prevention plan complying with the requirements of Standard 4 is included in Section 4.0 of this Report.

While no additional stormwater treatment is proposed for the redeveloped parking lot, the reduction of impervious surface will improve the water quality of runoff discharging to the Town's drainage system and result in an improvement over existing conditions.

2.05 Stormwater Standard 5 – Land Uses with Higher Potential Pollutant Loads

This standard is not applicable as the project site is not a land use with higher potential pollutant loads (LUHPPL).

2.06 Stormwater Standard 6 – Stormwater Discharges to a Critical Area

This standard is not applicable as runoff from the project site does not discharge to a critical area.

2.07 Stormwater Standard 7 – Redevelopment Projects

This project is a mix of new and re-development. The improvements to the existing parking lot will propose a 167 square foot decrease in impervious area, therefore that portion of the project qualifies as a redevelopment project under Stormwater Standard 7. This redevelopment area will fully comply with all Stormwater Standards with the exception of Standard 4. The reduction of impervious surface associated with the parking lot redevelopment will result in an improvement to the stormwater discharged to the Town's drainage system and an improvement over existing conditions, meeting Standard 4 to the maximum extent practicable.

2.08 Stormwater Standard 8 – Sedimentation and Erosion Control Plan

Erosion and sedimentation controls are shown on the Project Plans. Additionally, a Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan is included in Section 3.0 of this Report.

2.09 Stormwater Standard 9 – Long Term Operation and Maintenance Plan

A Long-Term Operation and Maintenance Plan is included in Section 4.0 of this Report.

2.10 Stormwater Standard 10 – Illicit Discharges

There are no known illicit discharges on the project site, and none are proposed. An illicit discharge compliance statement is included in Section 6.0 and will be signed by the Applicant prior to issuance of any permits.

2.11 Conclusion

As a mixed new and re-development project, the project has been designed in accordance with DEP Stormwater Management Standards. The new development portion of the project will comply fully with the standards through the use of porous surface materials, a vegetated swale, and a bio-retention area. The

redeveloped parking area results in a decrease of approximately 200-square feet of impervious surfaces on site, reducing peak flows, increasing groundwater recharge, and improving water quality.

2.12 Compensatory Flood Storage

A portion of the project site is located within the 1% Chance Annual Flood as defined by FEMA, which is regulated under the Wetlands Protection Act as Bordering Land Subject to Flooding (BLSF). In order to protect the values provided by BLSF and prevent downstream flooding impacts, the project is required to provide compensatory flood storage on a 1-foot incremental basis to match whatever is lost due to the project's development. The site has been graded so there is no loss to BLSF, therefore, no compensatory flood storage is required.

Elevations	Existing Incremental Available Flood Storage (CU.FT.)	Proposed Incremental Flood Storage (CU.FT.)
293.0 – 294.0	**11,436**	**12,337**
294.0 – 295.0	**14,175**	**14,185**
295.0 – 296.0	**16,929**	**16,988**
296.0 – 297.0	**19,843**	**20,108**
297.0 – 298.0	**22,290**	**22,503**

As shown above, the incremental net flood storage volume will increase in proposed conditions. The project as proposed meets the applicable requirements for BLSF in the Wetlands Protection Act.

SECTION 3.0

CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN

3.0 CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN

This Section specifies requirements and suggestions for implementation of a Stormwater Pollution Prevention Plan (SWPPP) for **Warren Street Park Improvement, in Upton, Massachusetts**. The SWPPP shall be provided and maintained on-site by the Contractor(s) during all construction activities. The SWPPP shall be updated as required to reflect changes to construction activity.

The stormwater pollution prevention measures contained in the SWPPP shall be at least the minimum required by Local Regulations. The Contractor shall provide additional measures to prevent pollution from stormwater discharges in compliance with all local, state, and federal requirements.

The SWPPP shall include provisions for, but not be limited to, the following:

1. Construction Trailers (not expected)
2. Lay-down Areas
3. Equipment Storage Areas
4. Stockpile Areas
5. Disturbed Areas

The cost of any fines, construction delays and remedial actions resulting from the Contractor's failure to comply with all provisions of applicable regulations shall be paid for by the Contractor at no additional cost to the Owner.

Erosion and Sedimentation Control

The Contractor shall be solely responsible for erosion and sedimentation control at the site. The Contractor shall utilize a system of operations and all necessary erosion and sedimentation control measures, even if not specified herein or elsewhere, to minimize erosion damage at the site to prevent the migration of sediment into environmentally sensitive areas. Environmentally sensitive areas include all wetland resource areas within, and downstream of, the site, and those areas of the site that are not being altered.

Erosion and sedimentation control shall be in accordance with this Section, the design drawings, and the following:

- Massachusetts Stormwater Management Policy Handbook issued by the Massachusetts Department of Environmental Protection, January 2008.
- Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, A Guide for Planners, Designers and Municipal Officials, March 1997.

The BMP's presented herein should be used as a guide for erosion and sedimentation control and are not intended to be considered specifications for construction. The most important BMP is maintaining a rapid construction process, resulting in prompt stabilization of surfaces, thereby reducing erosion potential. Given the primacy of rapid construction, these guidelines have been designed to allow construction to progress with essentially no hindrance by the erosion control methods prescribed. These guidelines have also been designed with sufficient flexibility to allow the Contractor to modify the suggested methods as required to suit seasonal, atmospheric, and site-specific physical constraints.

Another important BMP is the prevention of concentrated water flow. Sheet flow does not have the erosive potential of a concentrated rivulet. These guidelines recommend construction methods that allow localized erosion control and a system of construction, which inhibits the development of shallow concentrated flow. These BMP's shall be maintained throughout the construction process.

CONTACT INFORMATION AND RESPONSIBLE PARTIES

The following is a list of all project-associated parties:

Owner
Town of Upton
1 Main Street
Upton, MA 01568

Contractor
To be determined

Environmental Consultant
BSC Group, Inc.
803 Summer Street
Boston, MA 02127

Contact: Dominic Rinaldi, P.E.
Phone: (617) 896–4300
Email: drinaldi@bscgroup.com

3.1 Existing Site and Soil Conditions

The total project area is approximately 0.30 acres and is located off Warren Street. The project is bounded on the north by a commercial building, bounded on the east by North Main Street, bounded on the south by Upton Town Hall and west by a forested area.

The existing site topography generally slopes northeast across the property towards the wetlands located on the property with slopes ranging from 0-30%. The current site is comprised of forest and a public parking lot, and the primary soil classification identified by the NRCS Web Soil Survey is Merrimack fine sandy loam (254B), which accounts for the majority of the property and a small portion of the property is identified as Canton fine sandy loam (420C & 422C). On July 19, 2022, BSC Group conducted hand auger borings on the site which consisted primarily of sandy loam. Based on the materials found during wetland delineations, runoff calculations have been performed using curve numbers corresponding to Hydrologic Soil Group (HSG) B.

3.2 Project Description and Intended Construction Sequence

The site is currently comprised of woods with a parking area to the west. The proposed activities will include the following major components:

- The renovation of the existing parking lot,
- The construction of walkways and retaining walls,
- The construction of bioretention areas, and

The proposed project will disturb a total of approximately 19,234± S.F. (0.44± acres).

Soil disturbing activities will include site demolition, installation of erosion and sedimentation controls, grading, a stormwater management system, and preparation for final landscaping.

3.3 Erosion and Sedimentation Control Best Management Practices

All construction activities will implement Best Management Practices (BMP's) in order to minimize overall site disturbance and impacts to the site's natural features. Please refer to the following sections for a detailed

description of site-specific BMP's. In addition, an Erosion and Sedimentation Control Plan is provided in the Site Plans.

3.4 Site Stabilization

Grubbing Stripping and Grading

- Erosion control devices shall be in place as shown on the design plans before grading commences.
- Stripping shall be done in a manner, which will not concentrate runoff. If precipitation is expected, earthen berms shall be constructed around the area being stripped, with a silt sock, silt fence or haybale dike situated in an arc at the low point of the berm.
- If intense precipitation is anticipated, silt socks, haybales, dikes and /or silt fences shall be used as required to prevent erosion and sediment transport. The materials required shall be stored on site at all times.
- If water is required for soil compaction, it shall be added in a uniform manner that does not allow excess water to flow off the area being compacted.
- Dust shall be held at a minimum by sprinkling exposed soil with an appropriate amount of water.

Maintenance of Disturbed Surfaces

- Runoff shall be diverted from disturbed side slopes in both cut and fill.
- Mulching may be used for temporary stabilization.
- Silt sock, haybale or silt fences shall be set where required to trap products of erosion and shall be maintained on a continuing basis during the construction process.

Loaming and Seeding

- Loam shall not be placed unless it is to be seeded directly thereafter.
- All disturbed areas shall have a minimum of 4" of loam placed before seeded and mulched.
- Consideration shall be given to hydro-mulching, especially on slopes in excess of 3 to 1.
- Loamed and seeded slopes shall be protected from washout by mulching or other acceptable slope protection until vegetation begins to grow.

Stormwater Collection System Installation

- The Stormwater drainage system shall be installed from the downstream end up and in a manner which will not allow runoff from disturbed areas to enter pipes.
- Excavation for the drainage system shall not be left open when rainfall is expected overnight. If left open under other circumstances, pipe ends shall be closed by a staked board or by an equivalent method.
- All catch basin openings shall be covered by a silt bag between the grate and the frame or protected from sediment by silt fence surrounding the catch basin grate.
- During the installation of the infiltration systems, ensure that loose material from the construction of the town home roof shingles is swept and removed from the area prior to connecting the roof drains to the infiltration systems. No roof drains shall be connected to the infiltration systems until all tributary roof areas have been thoroughly cleared of debris that could impact the infiltration system functions.

Completion of Paved Areas

- During the placement of sub-base and pavement, the entrance to the Stormwater drainage systems shall be sealed when rain is expected. When these entrances are closed, consideration must be given to the direction of run-off and measures shall be undertaken to minimize erosion and to provide for the collection of sediment.
- In some situations, it may be necessary to keep catch basins open.

- Appropriate arrangements shall be made downstream to remove all sediment deposition.

Stabilization of Surfaces

- Stabilization of surfaces includes the placement of pavement, rip-rap, wood bark mulch and the establishment of vegetated surfaces.
- Upon completion of construction, all surfaces shall be stabilized even though it is apparent that future construction efforts will cause their disturbance.
- Vegetated cover shall be established during the proper growing season and shall be enhanced by soil adjustment for proper pH, nutrients, and moisture content.
- Surfaces that are disturbed by erosion processes or vandalism shall be stabilized as soon as possible.
- Areas where construction activities have permanently or temporarily ceased shall be stabilized within 14 days from the last construction activity, except when construction activity will resume within 21 days (e.g., the total time period that construction activity is temporarily ceased is less than 21 days).
- Hydro-mulching of grass surfaces is recommended, especially if seeding of the surfaces is required outside the normal growing season.
- Hay mulch is an effective method of temporarily stabilizing surfaces, but only if it is properly secured by branches, weighted snow fences or weighted chicken wire.

3.5 Temporary Structural Erosion Control Measures

Temporary erosion control measures serve to minimize construction-associated impacts to wetland resource and undisturbed areas. Please refer to the following sections for a description of temporary erosion control measures implemented as part of the project and this sample SWPPP.

3.5.1 Silt Socks, Haybales, and Silt Fencing

The siltation barriers will demarcate the limit of work, form a work envelope, and provide additional assurance that construction equipment will not enter the adjacent wetlands or undisturbed portions of the site. All barriers will remain in place until disturbed areas are stabilized.

3.5.2 Temporary Stormwater Diversion Swale

A temporary diversion swale is an effective practice for temporarily diverting stormwater flows and to reduce stormwater runoff velocities during storm events. The swale channel can be installed before infrastructure construction begins at the site, or as needed throughout the construction process. The diversion swale should be routinely compacted or seeded to minimize the amount of exposed soil.

3.5.3 Dewatering Basins

Should the need for dewatering arise, groundwater will be pumped directly into a temporary settling basin, which will act as a sediment trap during construction. All temporary settling basins will be located within close proximity of daily work activities. Prior to discharge, all groundwater will be treated by means of the settling basin or acceptable substitute. Discharges from sediment basins will be free of visible floating, suspended and settleable solids that would impair the functions of a wetland or degrade the chemical composition of the wetland resource area receiving ground or surface water flows and will be to the combined system.

3.6 Permanent Structural Erosion Control Measures

Permanent erosion control measures serve to minimize post-construction impacts to wetland resource areas and undisturbed areas. Please refer to the Site Plans and Long-Term Operations and Maintenance Plan for a description of permanent erosion control measures implemented as part of the project and this SWPPP.

3.7 Good Housekeeping Best Management Practices

3.7.1 Street Sweeping

Warren Street in front of the project property shall be swept clean on a daily basis at the conclusion of the workday of any soils tracked onto it from the project site. All sweepings shall be disposed of off-site in accordance with all applicable laws and regulations.

3.7.2 Material Handling and Waste Management

Solid waste generation during the construction period will be primarily construction debris. The debris will be placed into roll-off containers (or dumpsters) and will be removed by a contract hauler to a properly licensed landfill. The roll-off containers will be covered with a properly secured tarp before the hauler exits the site. In addition to construction debris, the construction work force will generate some amount of household-type wastes (food packing, soft drink containers, and other paper). Trash containers for these wastes will be located around the site and will be emptied regularly so as to prevent wind-blown litter. This waste will also be removed by a contract hauler.

All hazardous waste material such as oil filters, petroleum products, paint and equipment maintenance fluids will be stored in structurally sound and sealed shipping containers away from regulated resource areas and segregated from other non-waste materials. Secondary containment will be provided for all hazardous materials and will consist of commercially available spill pallets. Additionally, all hazardous materials will be disposed of in accordance with federal, state, and municipal regulations.

A temporary sanitary facility (portable toilet) will be provided at the site for worker use. The toilet will be away from a concentrated flow path and traffic flow and will have collection pans underneath as secondary treatment. All sanitary waste will be collected from an approved party at a minimum of three times per week.

3.8.3 Equipment/Vehicle Maintenance and Fueling Areas

All major equipment/vehicle fueling and maintenance will be performed off-site. A small, 20-gallon pickup bed fuel tank may be kept on-site. When vehicle fueling must occur on-site, the fueling activity will occur away from all protected resource areas. Only minor equipment maintenance will occur on-site. All equipment fluids generated from maintenance activities will be disposed of into designated drums stored on spill pallets. Absorbent, spill-cleanup materials and spill kits will be available and drip pans will be placed under all equipment receiving maintenance and vehicles and equipment parked overnight.

3.8.4 Equipment/Vehicle Wash down Area

All equipment and vehicle washing will be performed off-site.

3.8.5 Spill Prevention Plan

A spill containment kit will be kept on-site throughout the duration of construction. Should there be an accidental release of petroleum product into a resource area, the appropriate agencies will be immediately notified.

3.8.6 Inspections

Maintenance of existing and proposed BMP's to address stormwater management facilities during construction is an on-going process. The purpose of the inspections is to observe all sources of stormwater or non-stormwater discharge as identified in the SWPPP as well as the status of the receiving waters and fulfill the requirements of the Order of Conditions. The following sections describe the appropriate inspection measures to adequately implement the project's SWPPP. A blank inspection form is provided at the end of this section. Completed inspection forms are to be maintained on site.

Inspection Personnel

The owner's appointed representative will be responsible for performing regular inspections of erosion controls and ordering repairs, as necessary.

Inspection Frequency

Inspections will be performed by qualified personnel once every 7 days, or as otherwise required by project permits. The inspections must be documented on the inspection form similar to that provided at the end of this section, and completed forms will be provided to the on-site supervisor and maintained at the Owner's office throughout the entire duration of construction.

Inspection Reporting

Each inspection report will summarize the scope of the inspection, name(s) and qualifications of personnel making the inspection, and major observations relating to the implementation of the SWPPP, including compliance and non-compliance items. Completed inspection reports will remain with the completed SWPPP on site.

The following form is an example to be used for SWPPP Inspection Reporting.

Stormwater Construction Site Inspection and Maintenance Report

TO BE COMPLETED AT LEAST EVERY 7 DAYS. AFTER SITE STABILIZATION, TO BE COMPLETED AT LEAST ONCE PER MONTH FOR THREE YEARS OR UNTIL A NOTICE OF TERMINATION IS FILED (IF APPLICABLE).

General Information			
Project Name	Warren Street Park Improvements		
NPDES Tracking No. (if applicable)		**Location**	Warren Street Upton, MA
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			
Type of Inspection: ❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? ❑Yes ❑No **If yes, provide:** Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):			
Weather at time of this inspection? ❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds ❑ Other: Temperature:			
Have any discharges occurred since the last inspection? ❑Yes ❑No **If yes, describe:**			
Are there any discharges at the time of inspection? ❑Yes ❑No **If yes, describe:**			

Site-specific BMPs

- *Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.*
- *Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.*

	BMP	**BMP Installed?**	**BMP Maintenance Required?**	**Corrective Action Needed and Notes Action required by whom and when**
1	Catch Basin Protection	❑Yes ❑No	❑Yes ❑No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes Action required by whom and when
2	Haybale & Silt Fencing	❑Yes ❑No	❑Yes ❑No	
3	Straw Wattles	❑Yes ❑No	❑Yes ❑No	
4	Construction Entrance	❑Yes ❑No	❑Yes ❑No	
5	Sediment Basins	❑Yes ❑No	❑Yes ❑No	
6	Dewatering Pit	❑Yes ❑No	❑Yes ❑No	
7		❑Yes ❑No	❑Yes ❑No	

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes Action required by whom and when
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
3	Are perimeter controls and sediment barriers adequately installed	❑Yes ❑No	❑Yes ❑No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes Action required by whom and when
	(keyed into substrate) and maintained?			
4	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
5	Are storm drain inlets properly protected?	❑Yes ❑No	❑Yes ❑No	
6	Is the construction exit preventing sediment from being tracked into the street?	❑Yes ❑No	❑Yes ❑No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	Vehicle Maintenance not allowed on site
10	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	
12	(Other)	❑Yes ❑No	❑Yes ❑No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: _____
(Qualified Person Performing the Inspection)

Signature:_____ **Date:** _____

Print name and title: _____
(Contractor/Operator)

Signature:_____ **Date:**_____

SECTION 4.0

LONG-TERM POLLUTION PREVENTION & OPERATION AND MAINTENANCE PLAN

4.0 Long-Term Pollution Prevention & Operation and Maintenance Plan

As required by Standard #4 of the Stormwater Management Policy, this Long-Term Pollution Prevention Plan has been developed for source control and pollution prevention at the site after construction.

Maintenance Responsibility

Ensuring that the provisions of the Long-Term Pollution Prevention Plan are followed will be the responsibility of The Applicant, The Town of Upton.

Good Housekeeping Practices

The site to be kept clean of trash and debris at all times. Trash, junk, etc. is not to be left outside.

Vehicle Washing Controls

The following BMP's, or equivalent measures, methods or practices are required if you are engaged in vehicle washing and/or steam cleaning:

> It is allowable to rinse down the body or a vehicle, including the bed of a truck, with just water without doing any wash water control BMP's.
>
> If you wash (with mild detergents) on an area that infiltrates water, such as gravel, grass, or loose soil, it is acceptable to let the wash water infiltrate as long as you only wash the body of vehicles.
>
> However, if you wash on a paved area and use detergents or other cleansers, or if you wash/rinse the engine compartment or the underside of vehicles, you must take the vehicles to a commercial vehicle wash.

Requirements for Routine Inspections and Maintenance of Stormwater BMPs

All stormwater BMPs are to be inspected and maintain as follows:

Haybales, Silt Fence, and other temporary measures

The temporary erosion control measures will be installed up gradient of any wetland resource area where any disturbance or alteration might otherwise allow for erosion or sedimentation. They will be regularly inspected to ensure that they are functioning adequately. Additional supplies of these temporary measures will be stockpiled on site for any immediate needs or routine replacement.

Catch Basins

Existing catch basins shall be maintained in accordance with the Town of Upton Department of Public Works stormwater maintenance programs.

Bioretention Areas

Bioretention areas require routine maintenance to ensure that the system functions well as a stormwater Best Management Practice (BMP) and maintain an aesthetic element. A landscaping contractor working elsewhere on the site can complete maintenance tasks in many cases.

Systems require careful attention while plants are being established and seasonal landscaping thereafter. Proper selection of plant species and support during establishment of vegetation should minimize, if not eliminate, the need for fertilizers and pesticides.

Bioretention areas should be inspected on a semi-annual basis and after major storm events. The system should be inspected monthly for erosion. Eroded areas shall be repaired by reseeding or mulching, as necessary. Vegetated areas should be properly maintained and mowed to a height of 2-inches. Accumulated liter and debris should be periodically removed to assure that the storage areas will function properly. Inlet

and outlet structures should be inspected periodically and after every storm to assure that they are functioning properly.

Vegetation will be inspected twice per year, at the beginning and end of the growing season. Dead and diseased vegetation should be removed and replaced. Weeds and invasive species shall be removed, and woody vegetation shall be pruned, as necessary.

Grassed Swale

Swale shall be mowed on an as-needed basis during the growing season so that the grass height does not exceed 6 inches. Set the mower blades no lower than 3 to 4 inches above the ground. Do not mow beneath the depth of the design flow during the storm associated with the water quality event (e.g., if the design flow is no more than 4 inches, do not cut the grass shorter than 4 inches).

The grassed swale shall be inspected semi-annually the first year, and at least once a year thereafter. Inspect the grass for growth and the side slopes for signs of erosion and formation of rills and gullies. Plant an alternative grass species if the original grass cover is not successfully established. If grass growth is impaired by winter road salt or other deicer use, re-establish the grass in the spring.

Accumulated trash and debris shall be removed from the swale prior to mowing. Hand methods (i.e., a person with a shovel) shall be used when cleaning to minimize the disturbance to vegetation and underlying soils. Check for sediment accumulation on a yearly basis and clean as needed.

Porous Pavers

The porous pavers shall be inspected and maintained regularly to ensure the porosity of the pavers is upheld so it functions as intended to infiltrate stormwater into the stone reservoir and soils below. Vacuum porous pavers a minimum of 2 times per year, especially after winter and fall seasons when debris accumulation and deposition is greatest. If pond water is present during precipitation events, cleaning is recommended.

The porous pavers shall be shoveled after every snowstorm once 2 or more inches of snow have accumulated. Apply anti-icing treatment prior to, during, and after storm as needed to control compact snow and ice not removed by plowing. Sanding shall not be used as it may cause clogging of the porous pavers.

If needed, porous pavers can be power washed to loosen and remove sediments that may have become embedded in the pores. All porous paver maintenance shall be performed by a contractor experienced in maintaining porous pavers to prevent unnecessary damage to the systems.

Stabilized Stone Dust

After installation, stabilized stone dust shall be monitored bi-monthly to ensure there is no damage to the path. After the pathway is exposed to foot traffic, particles may loosen. Once these particles exceed ¼-inch, the path shall be swept or shoveled to remove loosen particles. Accumulated debris from the path shall be removed by hand raking or mechanically blowing the area. To remove accumulated snow the blade of the plow shall be lifted ¼-inch off the surface of the pathway using either a shoe lift or rubber baffle so the snow is removed and the pathway remained undamanged.

PROVISIONS FOR SOLID WASTE MANAGEMENT (SITE TRASH)

Trash will be placed in on-site dumpsters and the Owner will make provisions for its regular and timely removal.

SNOW DISPOSAL AND PLOWING PLANS

The purpose of the snow and snowmelt management plan is to provide guidelines regarding snow disposal site selection, site preparation and maintenance that are acceptable to the Department of Environmental Protection. For the areas that require snow removal, snow storage onsite will largely be accomplished by using pervious areas along the shoulder of the roadway and development as windrowed by plows.

- Avoid dumping of snow into any water body, including rivers, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed of in open water can cause navigational hazards when it freezes into ice blocks.
- Avoid disposing of snow on top of storm drain catch basins or in stormwater basins. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.
- In significant storm events, the melting or off-site trucking of snow may be implemented. These activities shall be conducted in accordance with all local, state, and federal regulations.
- Snow shall be removed from the areas around on-site fire-hydrants to maintain emergency access to hydrants at all times. Removable flags or markers should be placed on hydrants to allow snow removal crews to more easily locate hydrants and not damage them with plows or other snow removal equipment.

WINTER ROAD SALT AND/OR SAND USE AND STORAGE RESTRICTIONS

The applicant will be responsible for sanding and salting the site. No storage on site.

STREET SWEEPING SCHEDULES

There are three types of sweepers: Mechanical, Regenerative Air, and Vacuum Filter.

1) Mechanical: Mechanical sweepers use brooms or rotary brushes to scour the pavement.
2) Regenerative Air: These sweepers blow air onto the road or parking lot surface, causing fines to rise where they are vacuumed.
3) Vacuum filter: These sweepers remove fines along roads. Two general types of vacuum filter sweepers are available - wet and dry. The dry type uses a broom in combination with the vacuum. The wet type uses water for dust suppression.

Regardless of the type chosen, the efficiency of street sweeping is increased when sweepers are operated in tandem.

This project has not included street sweeping as part of the TSS removal calculations. Street sweeping will occur in accordance with the Town of Upton's current street sweeping program.

Reuse and Disposal of Street Sweepings

Once removed from paved surfaces, the sweepings must be handled and disposed of properly. Mass DEP's Bureau of Waste Prevention has issued a written policy regarding the reuse and disposal of street sweepings. These sweepings are regulated as a solid waste, and can be used in three ways:

- In one of the ways already approved by Mass DEP (e.g., daily cover in a landfill, additive to compost, fill in a public way)
- If approved under a Beneficial Use Determination
- Disposed in a landfill.

TRAINING OF STAFF OR PERSONNEL INVOLVED WITH IMPLEMENTING LONG-TERM POLLUTION PREVENTION PLAN

The Long-Term Pollution Prevention Plan is to be implemented by property owner of the site. Trained and, if required, licensed Professionals are to be hired by the owner as applicable to implement the Long-Term Pollution Prevention Plan.

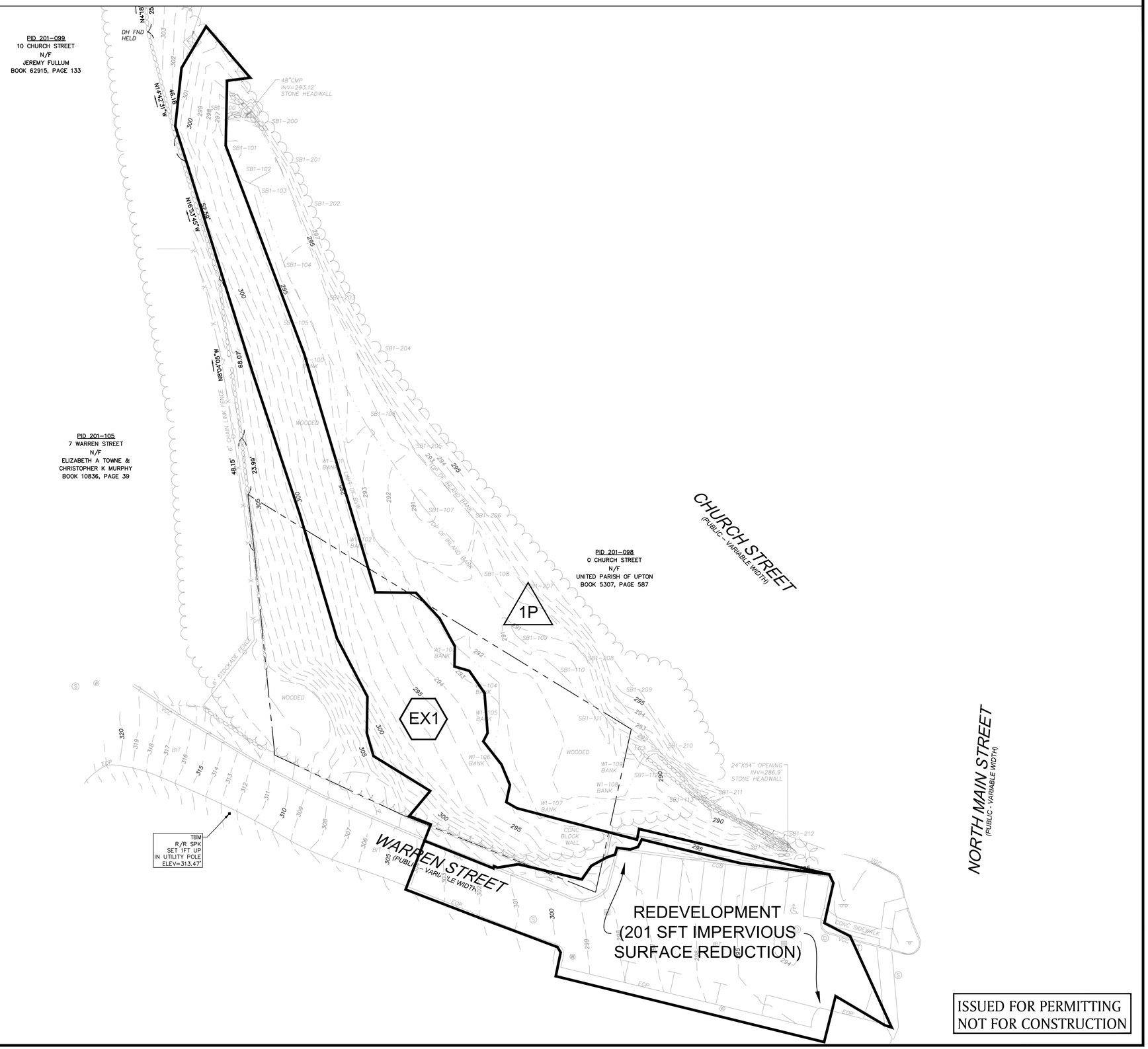
LIST OF EMERGENCY CONTACTS FOR IMPLEMENTING LONG-TERM POLLUTION PREVENTION PLAN

The applicant will be required to implement the Long-Term Pollution Prevention Plan and will create and maintain a list of emergency contacts.

SECTION 5.0

HYDROLOGY CALCULATIONS

5.01 EXISTING WATERSHED PLAN



ISSUED FOR PERMITTING
NOT FOR CONSTRUCTION

DOMINIC RINALDI
PROFESSIONAL ENGINEER
06/13/2024

WARREN STREET PARK IMPROVEMENTS

WARREN STREET

IN

UPTON
MA
(WORCESTER COUNTY)

EXISTING CONDITIONS WATERSHED MAP

JUNE 13, 2024

REVISIONS:

NO.	DATE	DESC.

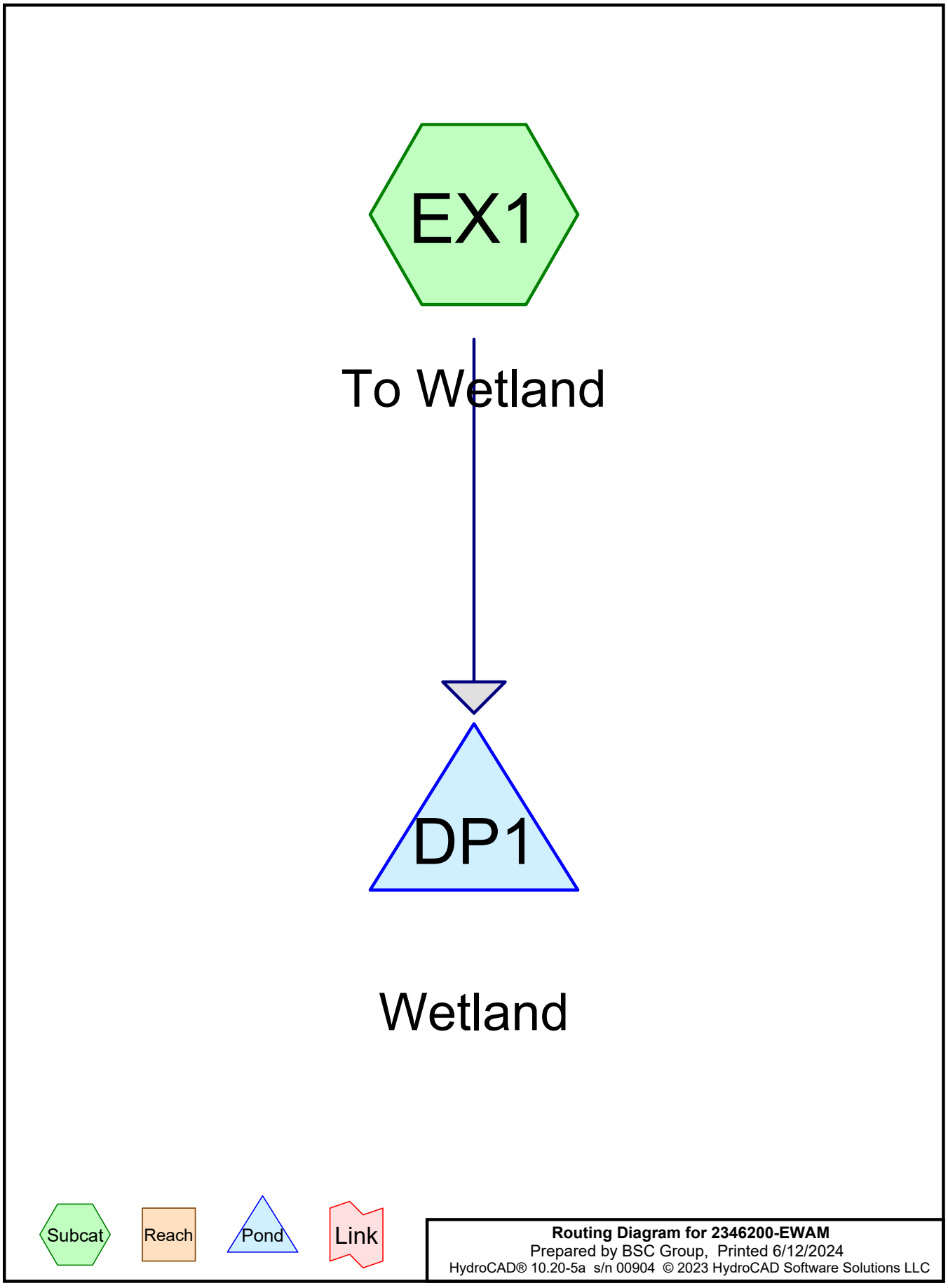
PREPARED FOR:
TOWN OF UPTON
1 MAIN STREET
UPTON, MA 01568

BSC GROUP
BUILD | SUPPORT | CONNECT
803 Summer Street
Boston, Massachusetts
02127
617 896 4300

SCALE: 1" = 20'
0 10 20 40 FEET

FILE: P:\2346200\LSC\DRAWINGS
DWG.:
JOB. NO: 24620.00
SHEET EWAM

5.02 EXISTING HYDROLOGY CALCULATIONS (HYDROCAD™ PRINTOUTS)



Routing Diagram for 2346200-EWAM
Prepared by BSC Group, Printed 6/12/2024

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
785	61	>75% Grass cover, Good, HSG B (EX1)
10,534	55	Woods, Good, HSG B (EX1)
11,319	**55**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
11,319	HSG B	EX1
0	HSG C	
0	HSG D	
0	Other	
11,319		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	785	0	0	0	785	>75% Grass cover, Good	
0	10,534	0	0	0	10,534	Woods, Good	
0	**11,319**	**0**	**0**	**0**	**11,319**	**TOTAL AREA**	

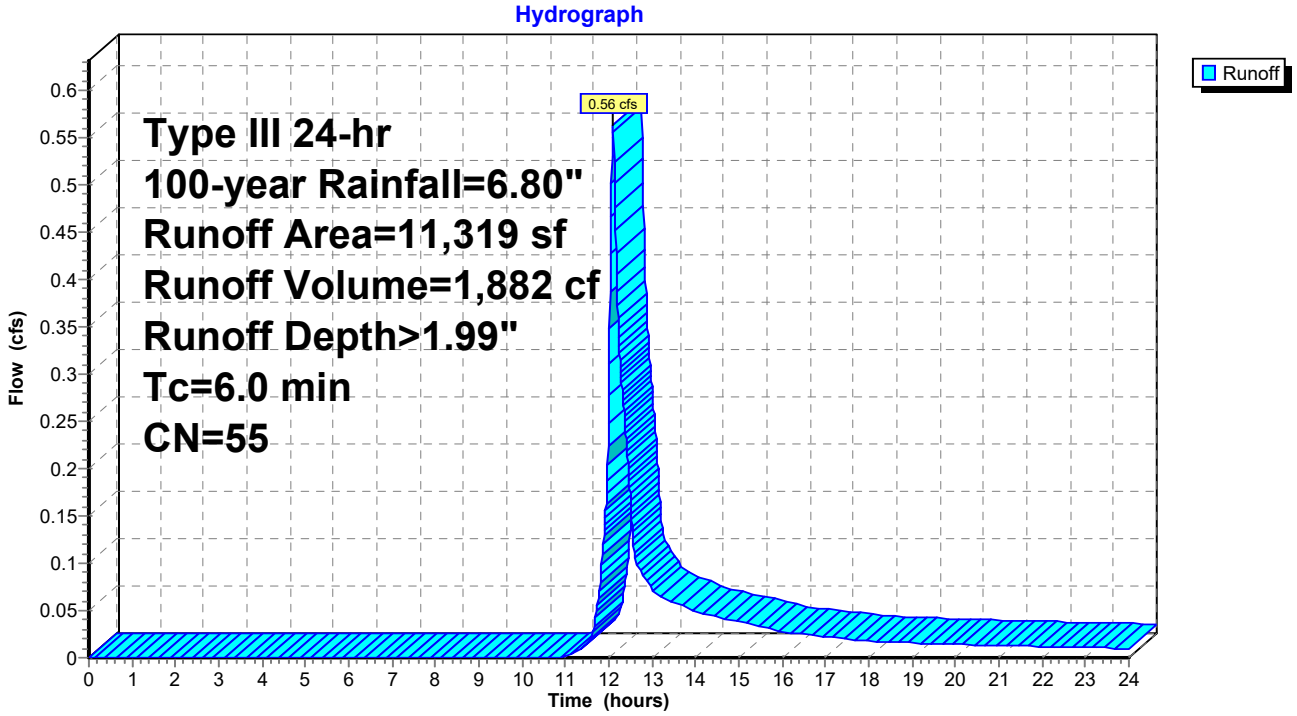
Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEX1: To Wetland Runoff Area=11,319 sf 0.00% Impervious Runoff Depth>1.99"
Tc=6.0 min CN=55 Runoff=0.56 cfs 1,882 cf

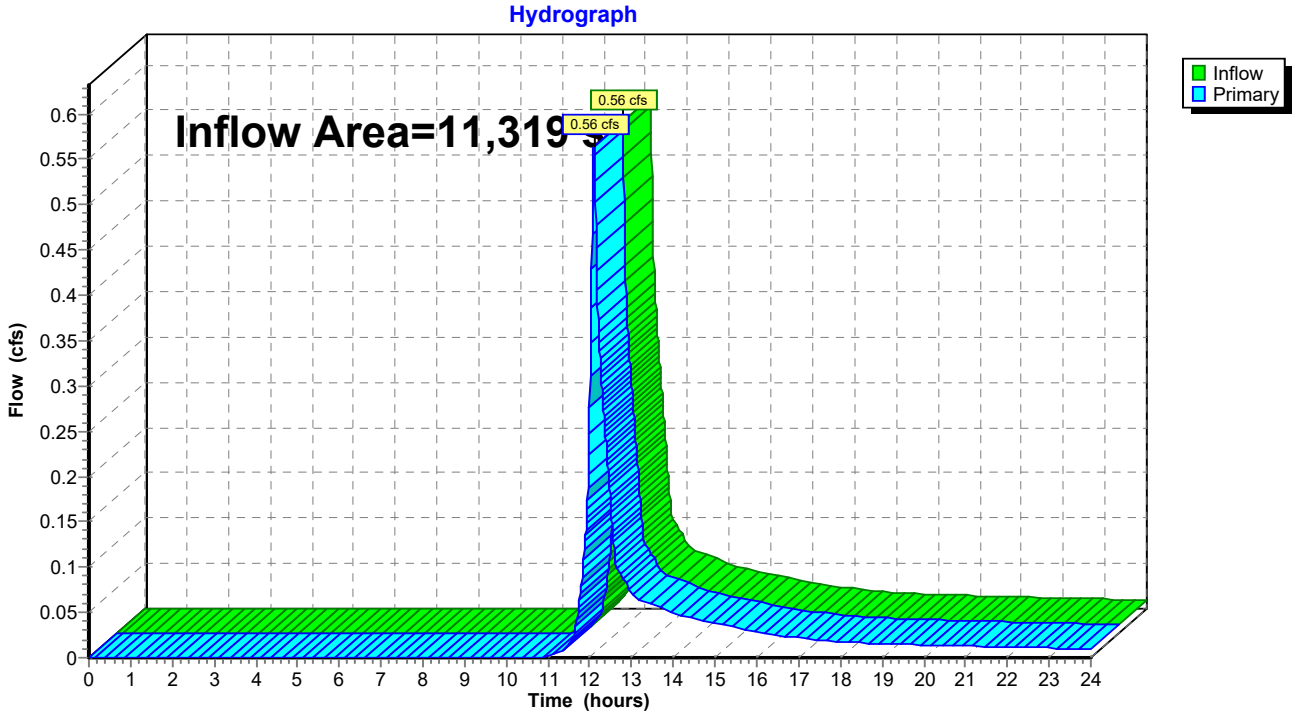
Pond DP1: Wetland Inflow=0.56 cfs 1,882 cf
Primary=0.56 cfs 1,882 cf

Total Runoff Area = 11,319 sf Runoff Volume = 1,882 cf Average Runoff Depth = 1.99"
100.00% Pervious = 11,319 sf 0.00% Impervious = 0 sf

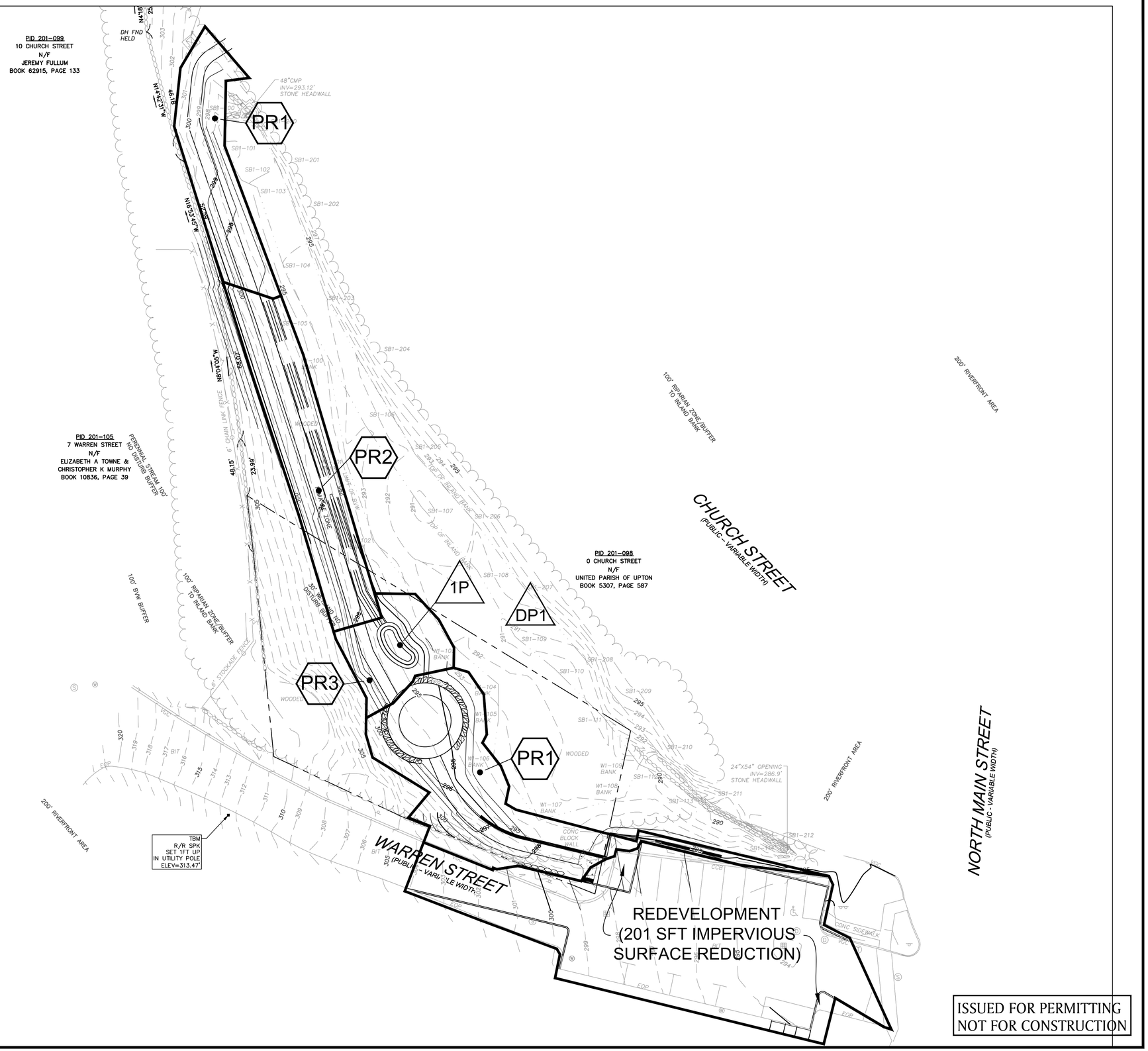
Subcatchment EX1: To Wetland



Pond DP1: Wetland



5.03 PROPOSED WATERSHED PLAN



ISSUED FOR PERMITTING
NOT FOR CONSTRUCTION

DOMINIC RINALDI
PROFESSIONAL ENGINEER
06/13/2024

WARREN STREET PARK IMPROVEMENTS

WARREN STREET

IN

UPTON
MA
(WORCESTER COUNTY)

PROPOSED CONDITIONS WATERSHED MAP

JUNE 13, 2024

REVISIONS:

NO.	DATE	DESC.

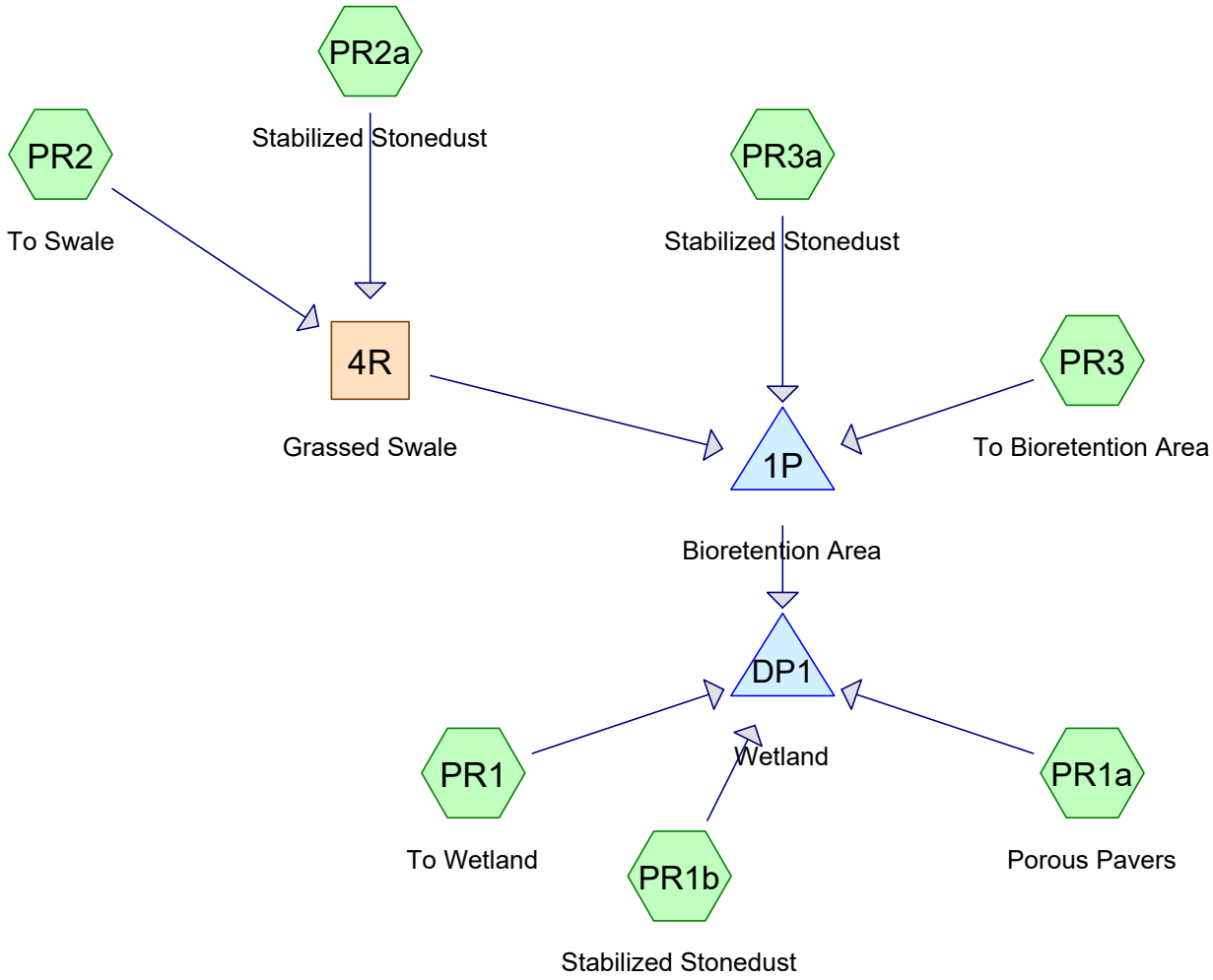
PREPARED FOR:
TOWN OF UPTON
1 MAIN STREET
UPTON, MA 01568

BSC GROUP
BUILD | SUPPORT | CONNECT
803 Summer Street
Boston, Massachusetts
02127
617 896 4300

SCALE: 1" = 20'
0 10 20 40 FEET

FILE: P:\2346200\LSC\DRAWINGS
DWG.:
JOB. NO: 24620.00
SHEET PWAM

5.04 PROPOSED HYDROLOGY CALCULATIONS (HYDROCAD™ PRINTOUTS)



Subcat Reach Pond Link

Routing Diagram for 2346200-PWAM
Prepared by BSC Group, Printed 6/12/2024

Project Notes

Rainfall events imported from "2346200-EWAM.hcp"

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
4,091	61	>75% Grass cover, Good, HSG B (PR1, PR2, PR3)
2,723	98	Unconnected pavement, HSG B (PR1, PR1a, PR1b, PR2a, PR3a)
4,505	55	Woods, Good, HSG B (PR1, PR2, PR3)
11,319	**68**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
11,319	HSG B	PR1, PR1a, PR1b, PR2, PR2a, PR3, PR3a
0	HSG C	
0	HSG D	
0	Other	
11,319		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	4,091	0	0	0	4,091	>75% Grass cover, Good	
0	2,723	0	0	0	2,723	Unconnected pavement	
0	4,505	0	0	0	4,505	Woods, Good	
0	**11,319**	**0**	**0**	**0**	**11,319**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR1: To Wetland Runoff Area=4,845 sf 0.97% Impervious Runoff Depth>2.18"
Tc=6.0 min CN=57 Runoff=0.27 cfs 879 cf

Subcatchment PR1a: Porous Pavers Runoff Area=804 sf 100.00% Impervious Runoff Depth>6.11"
Tc=308.0 min CN=98 Runoff=0.02 cfs 409 cf

Subcatchment PR1b: Stabilized Stonedust Runoff Area=958 sf 100.00% Impervious Runoff Depth>6.37"
Tc=173.0 min CN=98 Runoff=0.03 cfs 509 cf

Subcatchment PR2: To Swale Runoff Area=2,485 sf 0.00% Impervious Runoff Depth>2.36"
Tc=6.0 min CN=59 Runoff=0.15 cfs 490 cf

Subcatchment PR2a: Stabilized Stonedust Runoff Area=738 sf 100.00% Impervious Runoff Depth>6.37"
Tc=173.0 min CN=98 Runoff=0.02 cfs 392 cf

Subcatchment PR3: To Bioretention Area Runoff Area=1,313 sf 0.00% Impervious Runoff Depth>2.46"
Tc=6.0 min CN=60 Runoff=0.08 cfs 269 cf

Subcatchment PR3a: Stabilized Stonedust Runoff Area=176 sf 100.00% Impervious Runoff Depth>6.37"
Tc=173.0 min CN=98 Runoff=0.01 cfs 93 cf

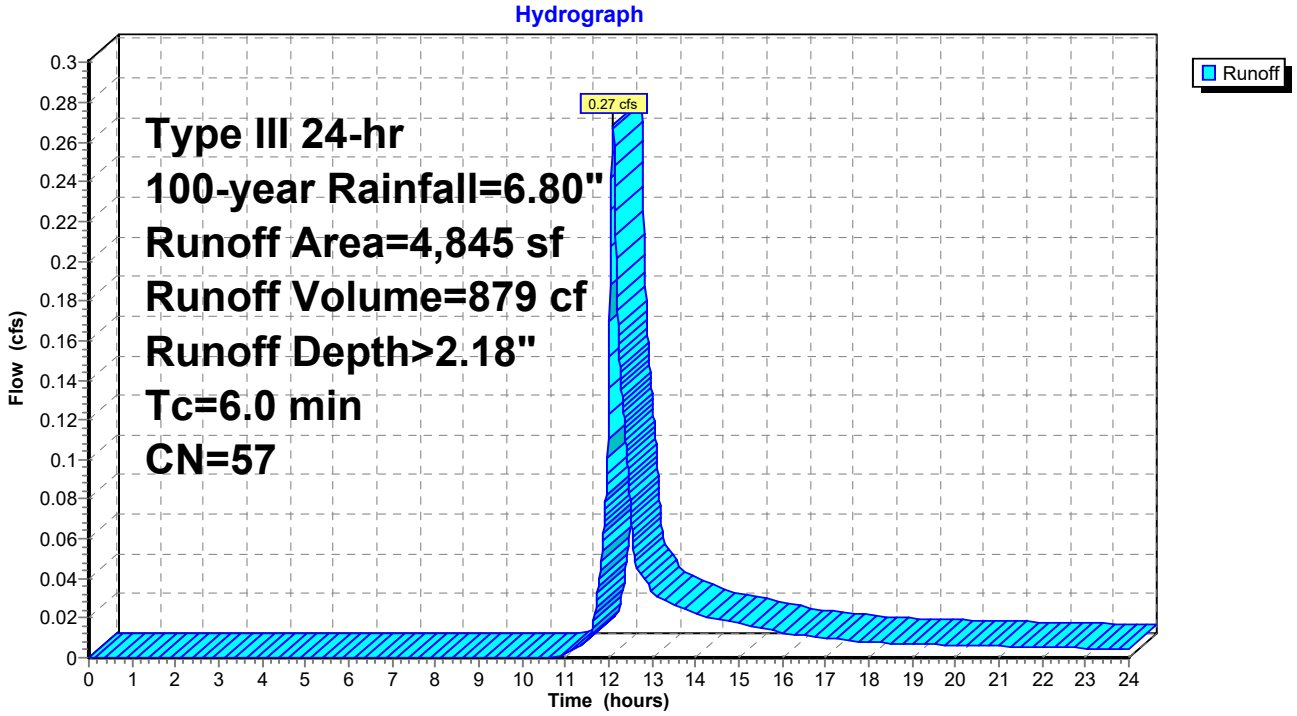
Reach 4R: Grassed Swale Avg. Flow Depth=0.11' Max Vel=1.05 fps Inflow=0.16 cfs 882 cf
n=0.022 L=190.0' S=0.0066 '/' Capacity=3.07 cfs Outflow=0.15 cfs 879 cf

Pond 1P: Bioretention Area Peak Elev=296.01' Storage=298 cf Inflow=0.21 cfs 1,241 cf
Discarded=0.01 cfs 470 cf Primary=0.07 cfs 434 cf Outflow=0.08 cfs 905 cf

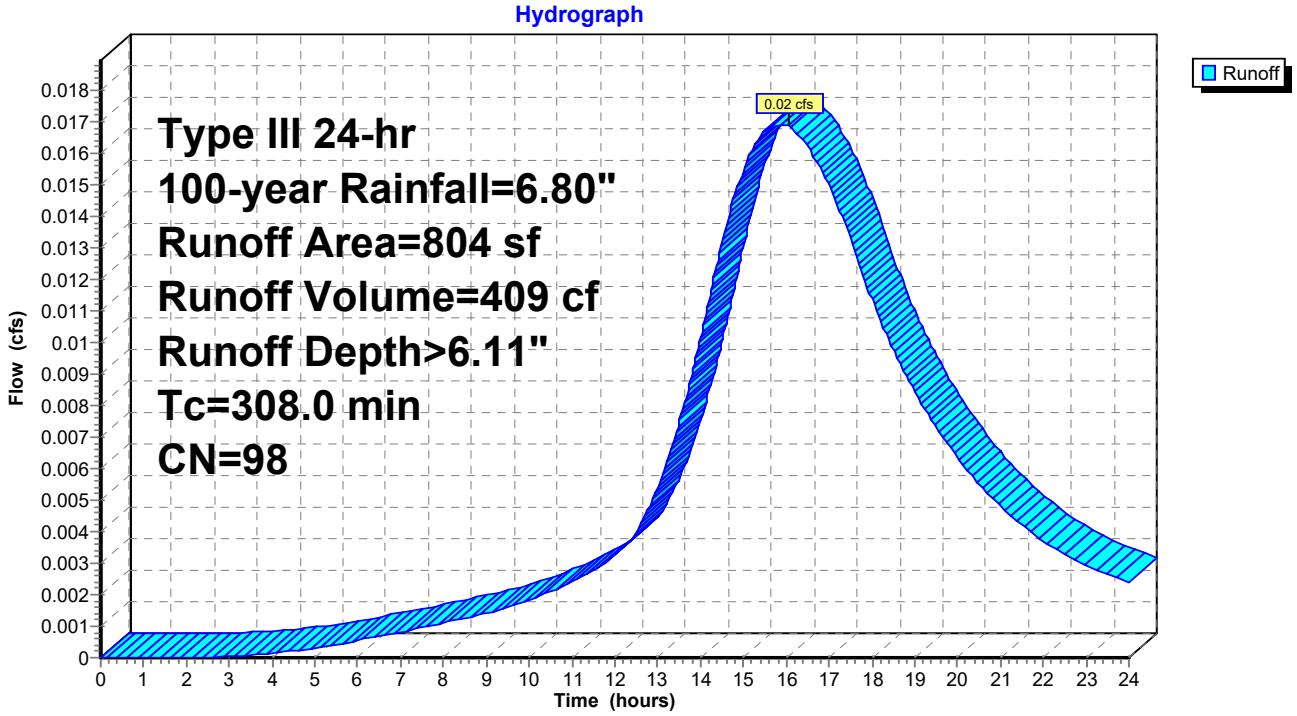
Pond DP1: Wetland Inflow=0.28 cfs 2,232 cf
Primary=0.28 cfs 2,232 cf

Total Runoff Area = 11,319 sf Runoff Volume = 3,042 cf Average Runoff Depth = 3.22"
75.94% Pervious = 8,596 sf 24.06% Impervious = 2,723 sf

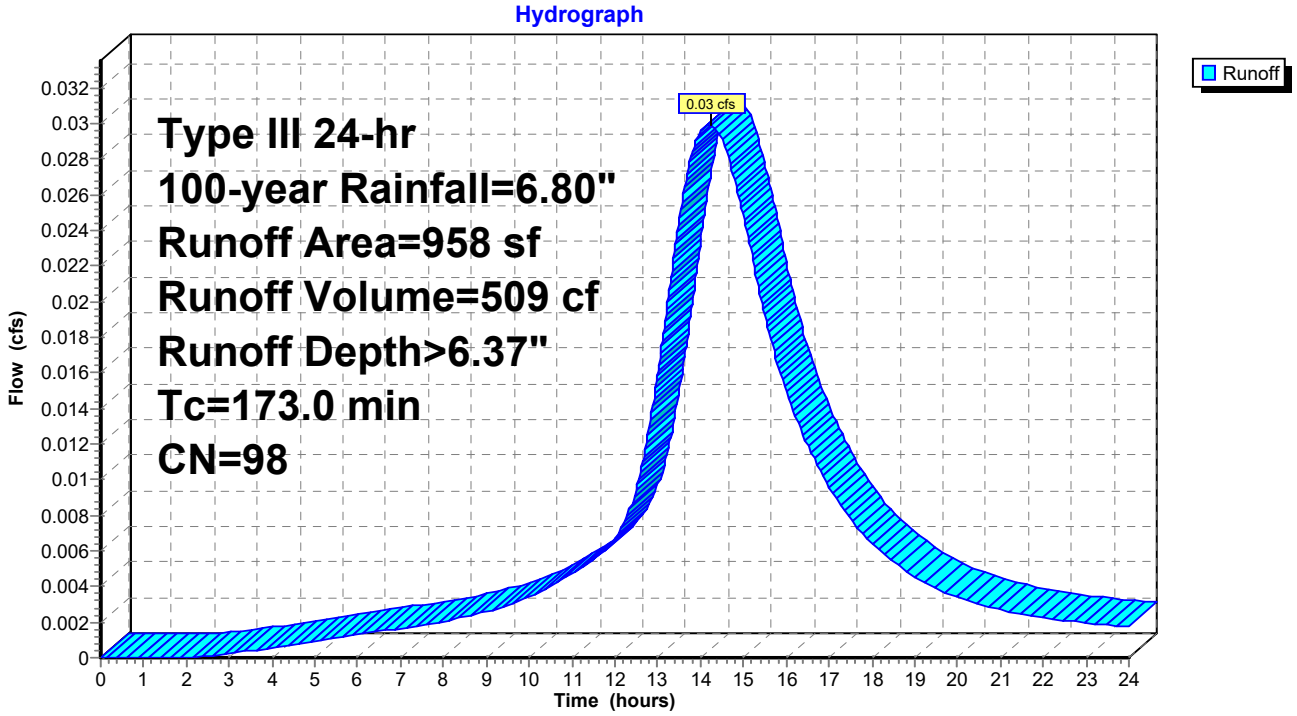
Subcatchment PR1: To Wetland



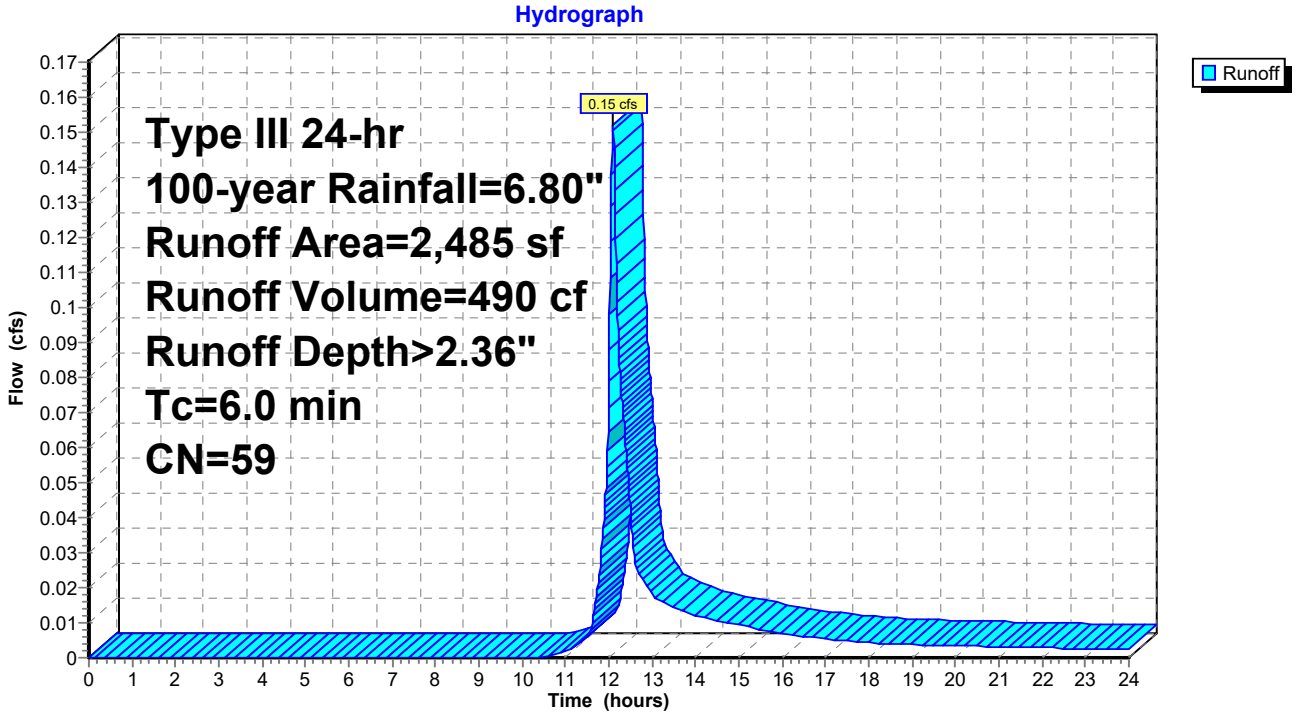
Subcatchment PR1a: Porous Pavers



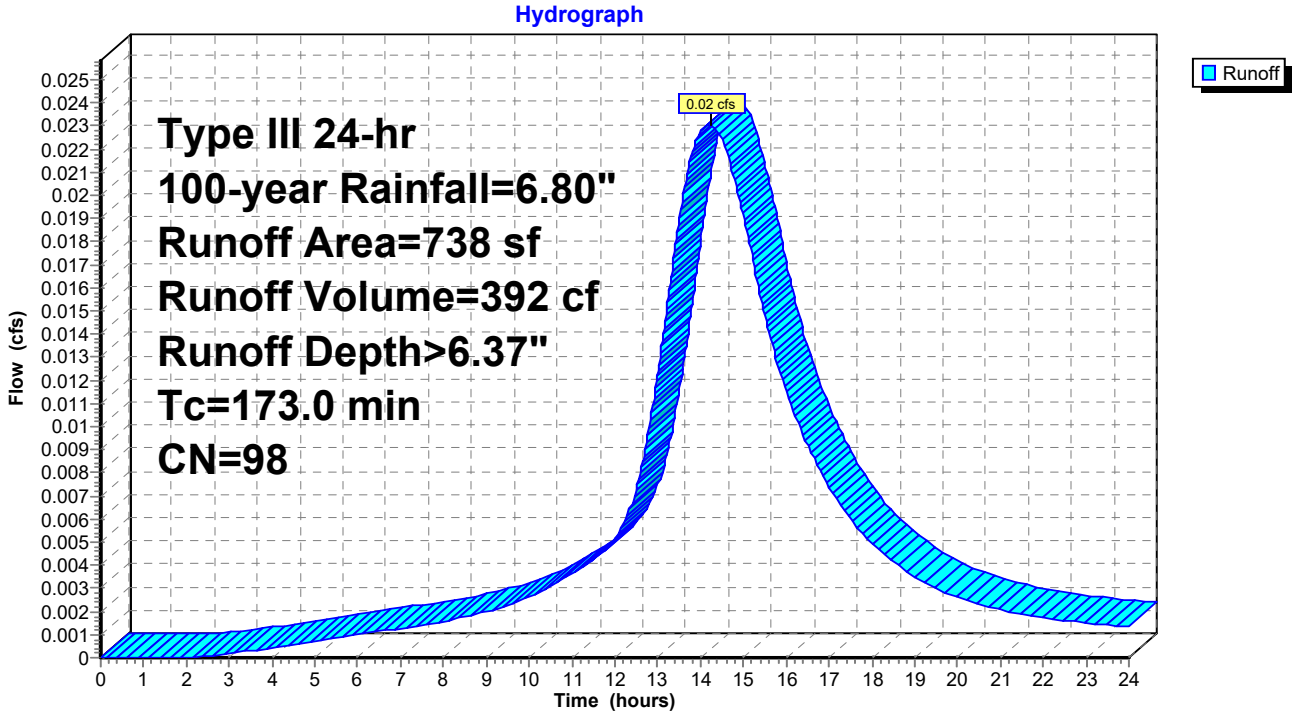
Subcatchment PR1b: Stabilized Stonedust



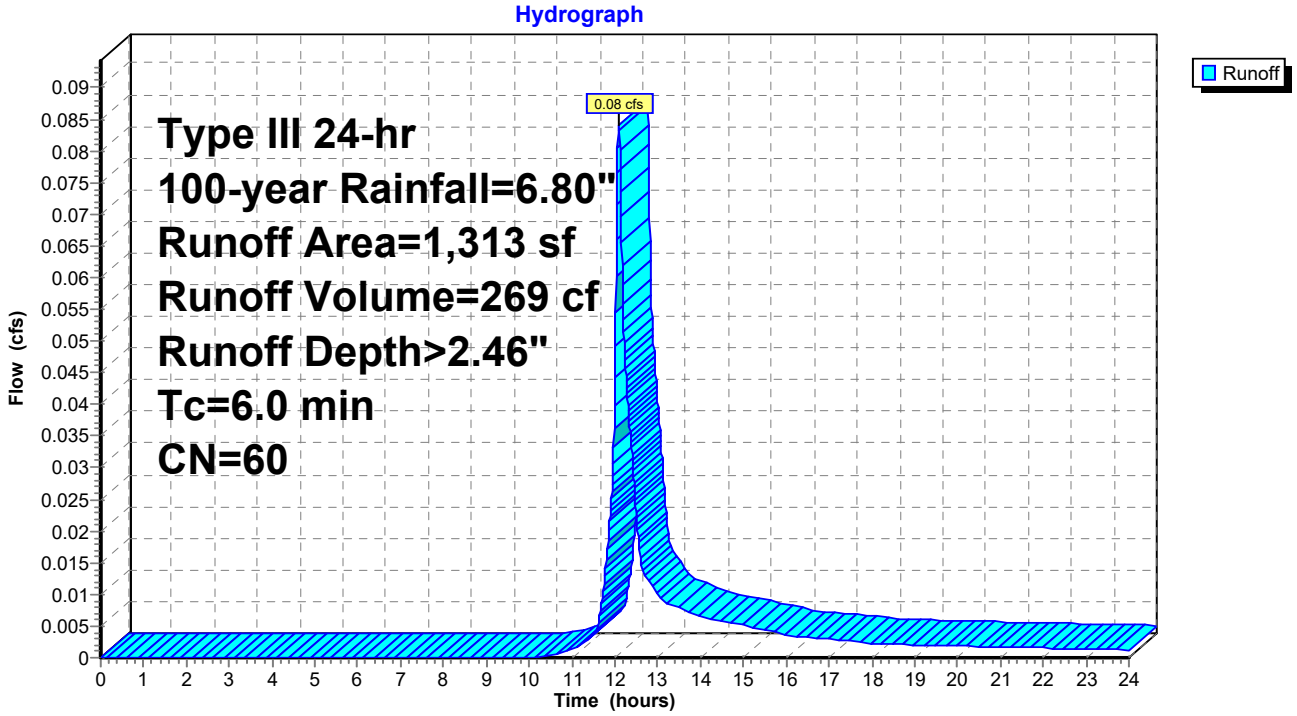
Subcatchment PR2: To Swale



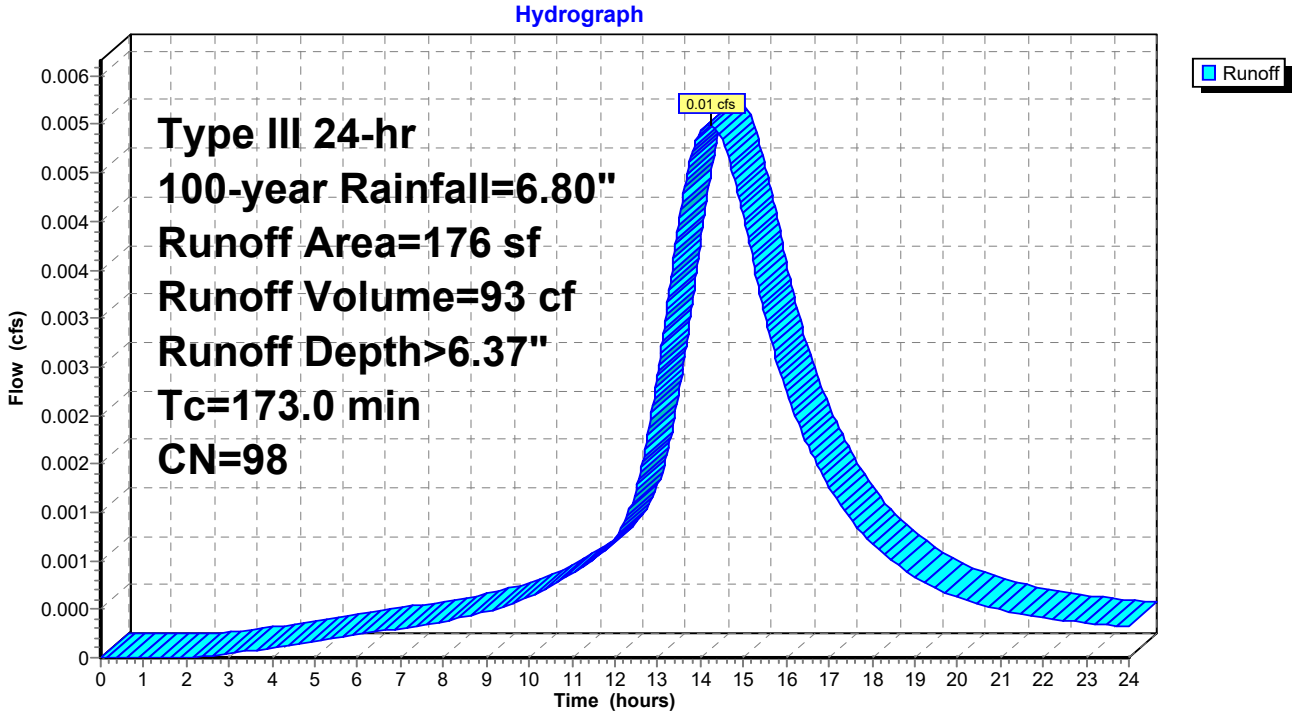
Subcatchment PR2a: Stabilized Stonedust



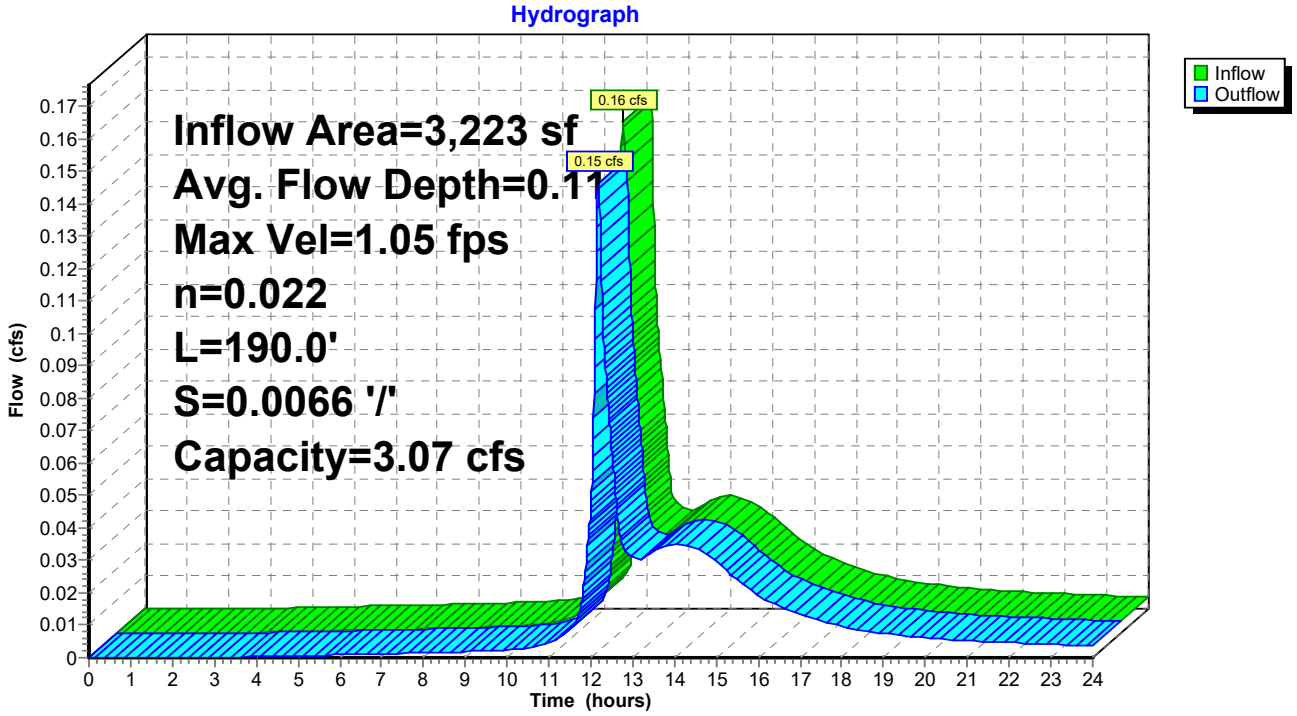
Subcatchment PR3: To Bioretention Area



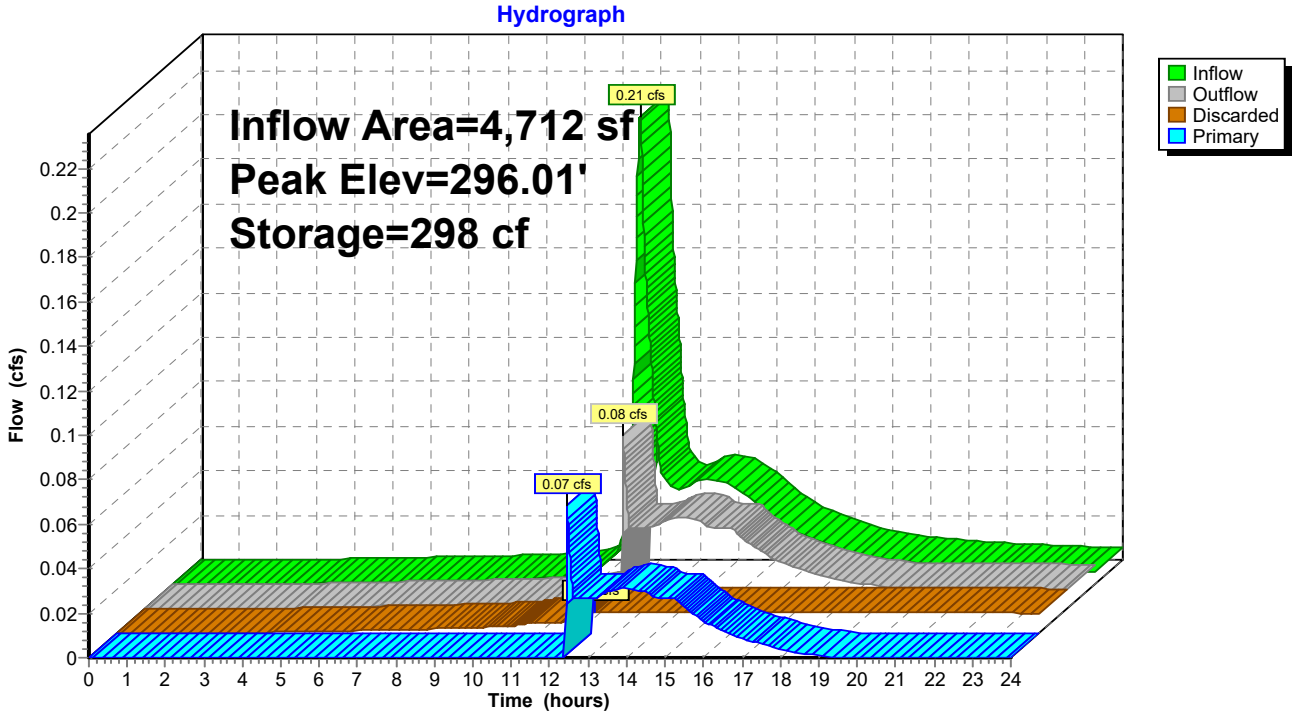
Subcatchment PR3a: Stabilized Stonedust



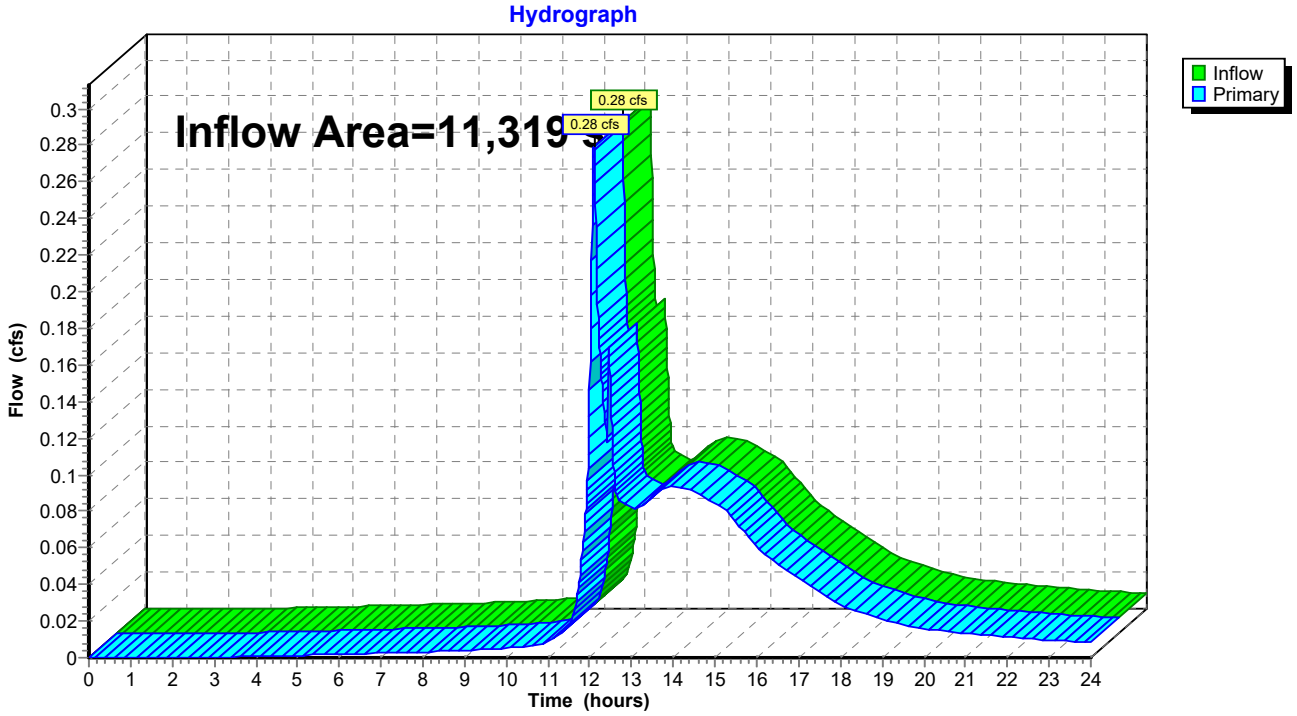
Reach 4R: Grassed Swale



Pond 1P: Bioretention Area



Pond DP1: Wetland



5.05 ILLICIT DISCHARGE COMPLIANCE STATEMENT

Illicit Discharge Compliance Statement

This statement is to document that, to the best of my knowledge and belief, there are no and will be no illicit discharges to the stormwater management systems or protected wetland resource areas for the Warren Street Park Improvements on Warren Street in Upton, Massachusetts.

_____
Authorized Signature/Title

_____
Date

APPENDIX A

USGS LOCUS MAP

PREPARED FOR:

TOWN OF UTPON
1 MAIN STREET
UPTON, MA 01568

USGS LOCUS MAP

WARREN STREET POCKET PARK
WARREN STREET
UPTON, MA

BSC GROUP
BUILD | SUPPORT | CONNECT
803 Summer Street
Boston, Massachusetts
02127
617 896 4300

Job No.: 23462.00 Date: 06/13/2024
Scale: 1"=1000' Revised:
Dwg. No: Figure:

File: 2346200/PRJCNTRL/R/SW/A

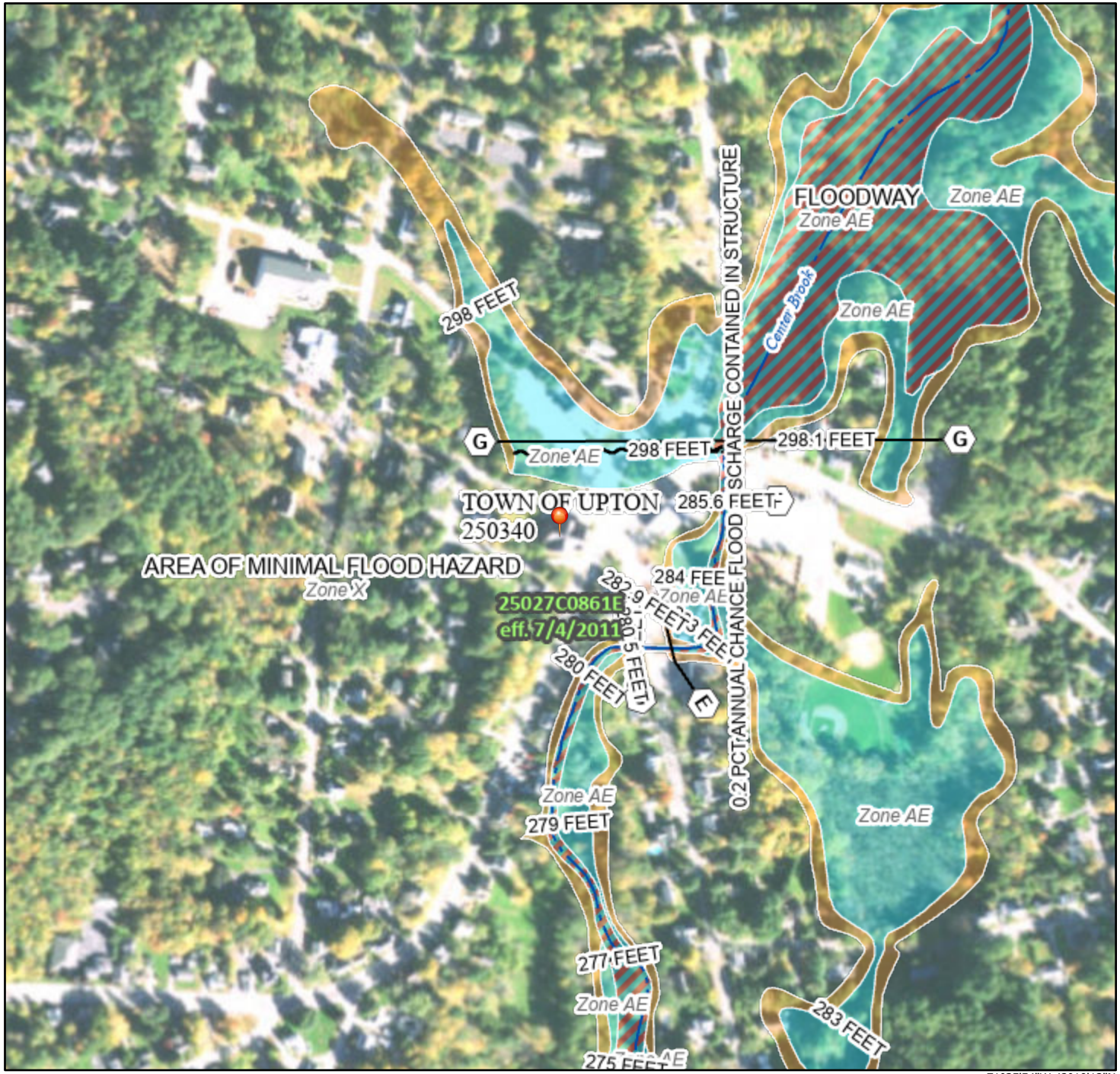
APPENDIX B

FEMA MAP

National Flood Hazard Layer FIRMette

FEMA

71°36'32"W 42°10'38"N



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

1:6,000

71°35'54"W 42°10'12"N

Basemap Imagery Source: USGS National Map 2023

Legend

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

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

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

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

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

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

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

N

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

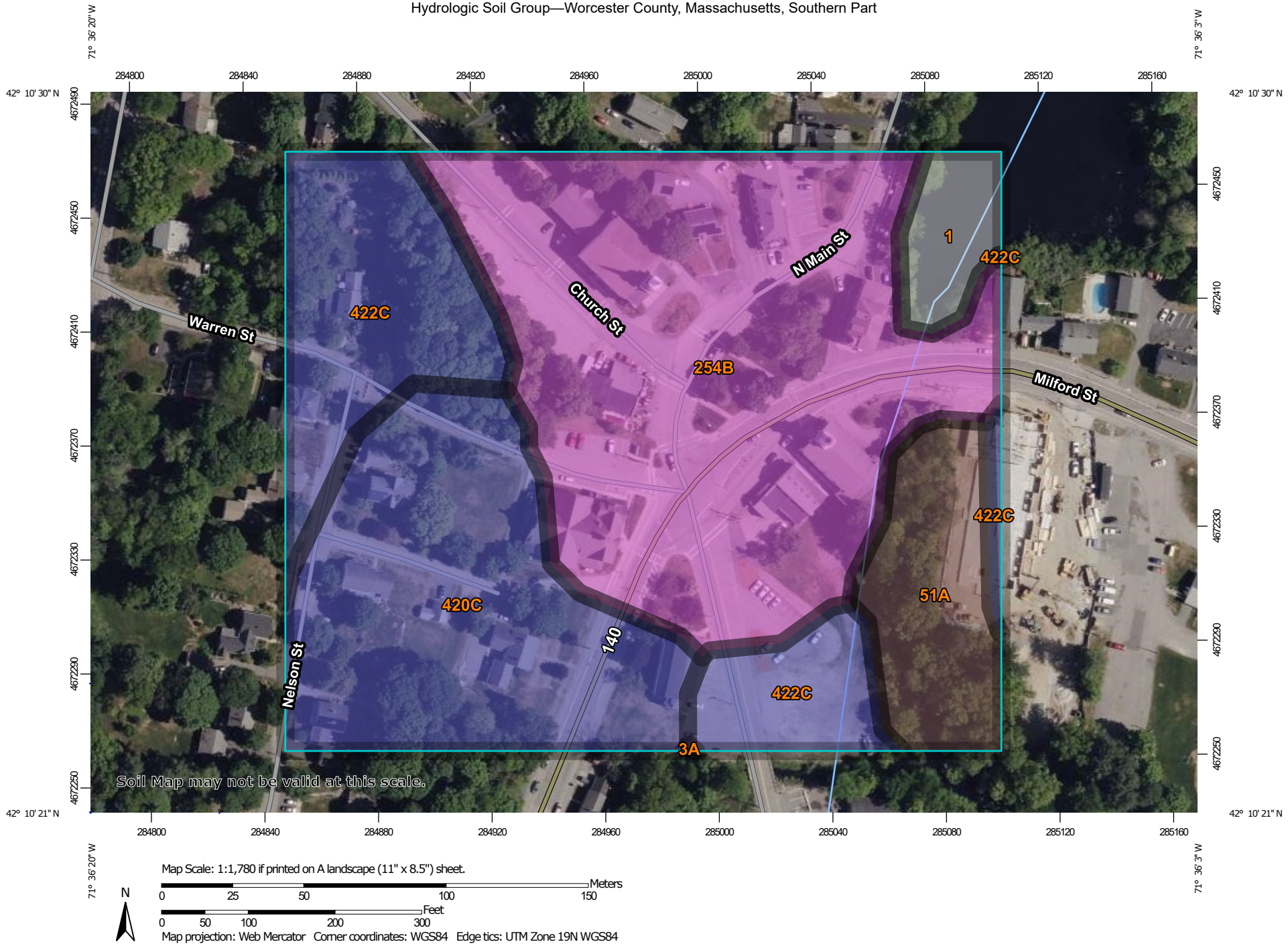
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/28/2024 at 11:22 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

APPENDIX C

WEB SOIL SURVEY



Map Scale: 1:1,780 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

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

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

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

Soil Survey Area: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 16, Sep 10, 2023

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

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

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		0.5	3.5%
3A	Scarboro and Walpole soils, 0 to 3 percent slopes	B/D	0.0	0.0%
51A	Swansea muck, 0 to 1 percent slopes	B/D	1.2	8.9%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	5.9	45.0%
420C	Canton fine sandy loam, 8 to 15 percent slopes	B	3.2	24.3%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	B	2.4	18.3%
Totals for Area of Interest			**13.2**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX D

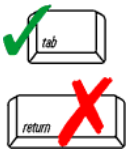
STORMWATER CHECKLIST

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

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.