STORMWATER MANAGEMENT REPORT

for:

UPTOWN
Franklin & Mt. Wayte Streets
Framingham, Massachusetts

Project Proponent:

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February / 2014

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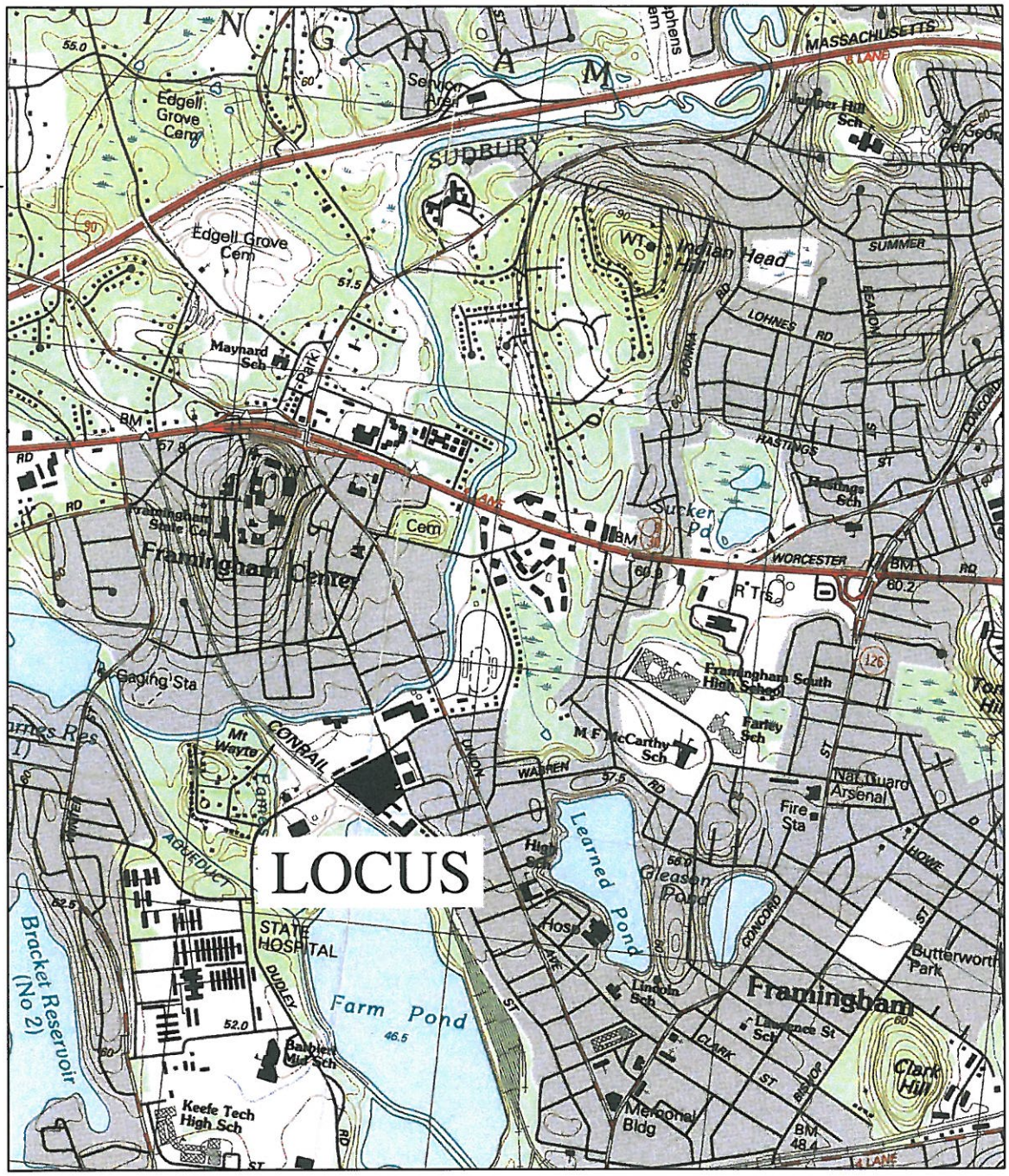

LOCUS MAP

SCALE: 1" = 2,000'+/-

PURPOSE

Hydrologic, hydraulic, and water quality calculations have been performed as part of the Site Plan Application for 444-480 Franklin Street, a proposed redevelopment of the Mt. Wayte Plaza property. The calculations were performed to design stormwater collection and attenuation facilities for the site and to demonstrate that the project will meet the standards of the Town of Framingham and the Massachusetts Department of Environmental Protection (MA DEP) Stormwater Management Standards.

This report describes the existing project site, the proposed project, and analyses performed to develop a stormwater management system that will protect public safety and convenience and minimize environmental impacts.

PROJECT SITE

The subject site contains approximately 6.7 acres and is located on the southeast side of Mt. Wayte Avenue and the west side of Franklin Street. The site consists of a vacant, one-story gas station, an existing one story shopping center, multiple driveways to Mt. Wayte Avenue, and multiple driveways to Franklin Street. A bordering vegetated wetland is located off site to the southeast the property and the buffer is located on the southeastern corner of the property. The bordering vegetated wetland was flagged and survey located by Waterman Design Associates, Inc. between February and May 2013. The part of the site in front of the shopping center generally drains from the southwest to the northeast and the part of the site behind the shopping center generally drains from the northeast to the southwest. Elevations range from 164' to 172' (datum derived from Record Plan for Franklin Street reconstruction, March 19, 2012, Sheet 61/AB-58).

United States Department of Agriculture Natural Resources Conservation Service (NRCS) mapping identifies the soils of the subject site as urban land and surrounding soils as Udorthents/Sandy and Merrimac-Urban Complex (Hydrologic Soil Group A, HSG A). Soil testing was performed on September 16th through the 18th by New Hampshire Boring, Inc. and was logged by McArdle Gannon Associates, Inc. A geotechnical report of their findings was given to Waterman Design Associates, Inc. in October 2013. Borings do depths of 20± to 34± feet below the existing ground surface were performed in the area of the proposed new building and in the area of the building proposed to be two stories. Sand, silty sand, and sand and gravel were observed at each boring location directly below the fill at a thickness of 5.5± to 26± feet. Glacial till was also found at five of the boring locations below the sand, silty sand, and sand/gravel. Please refer to the attached Existing Hydrology Plan.

No portion of the subject site contains an area of Priority Habitat of Rare Species or Estimated Habitat of Rare Wildlife as shown on Massachusetts Natural Heritage Atlas, 13th Edition, effective October 1, 2008. No portion of the subject site is shown within a Special Flood Hazard Area (SFHA) as shown on FEMA Firm Map (Map Number 25017C0516C, Effective Date June 4, 2010).

The attached Existing Hydrology Plan shows the project design points and contributing drainage areas. The analyzed design points are the northeast and southwest property lines common with Franklin Street respectively and The Penn Central Transportation Company abutter/Farm Pond.

PROPOSED PROJECT

The project proposal includes the demolition and removal of the existing gas station building, fuel pumps and dispenser stations followed by the construction of a new two story 18932± square foot building near the corner of Franklin and Mt. Wayte Streets. Additionally, the northern portion of the existing shopping center will be demolished and a new two story building will be constructed in its place along with the reconstruction of associated parking areas and the installation of a modern drainage system and new utility services. The redevelopment will result in roughly 0.76 acres of open space, or 11.3% of the site, an increase over that which currently exists.

All stormwater runoff from the eastern parking areas will be collected in hooded catch basins and conveyed to existing design points at a rate equal to or less than existing conditions for the 2-, 10-, and 100-year, 24-hour design storms. Stormwater runoff from the western parking and loading areas will flow to the existing catch basins, but the drainage system will be fitted with new water quality structures (Stormceptor 450 and 900), prior to discharging offsite. In addition, rooftop runoff from the new two-story building fronting on Franklin Street will be directed to a subsurface infiltration system to infiltrate over two (2) inches of run off and rooftop runoff from the new two-story building replacing the northeast corner of the existing shopping mall will be directed to infiltrate over one (1) inch of runoff. The overflow of the rooftop runoff from the new two story building replacing the northeast portion of the shopping mall will be directed to the Franklin Street design point.

Stormwater runoff from the overland areas not tributary to the stormwater management facilities will drain by sheet flow or shallow concentrated flow along the existing flow patterns to the design points.

STORMWATER MANAGEMENT STANDARDS

STANDARD #1 – NO NEW UNTREATED DISCHARGES

The stormwater collection system has been designed so that all stormwater runoff from the parking areas are treated through a treatment train consisting of hooded catch basins and/or water quality structures. Please refer to attached Stormwater Standards calculations.

STANDARD #2 – PEAK RATE ATTENUATION

METHODOLOGY

United States Soil Conservation Service, "Urban Hydrology for Small Watersheds, Technical Release Number 55" (TR-55) methods (HydroCAD 10.00) were utilized to develop runoff hydrographs for watershed areas affected by the proposed development. Existing and proposed runoff hydrographs were developed for the 2-, 10-, and 100-year, 24-hour rainfall events for the purpose of developing a stormwater management system that will limit post-development peak runoff rates to equal or less than pre-development levels.

The proposed stormwater management system has been designed to meet the requirements of the Town of Framingham and the MA DEP Stormwater Management Standards. The project will limit peak rates of runoff from the site and will infiltrate runoff to approximate existing groundwater recharge.

ANALYSIS SUMMARY

In order to assess the impact of the proposed development on peak runoff rates onto down-gradient properties, hydrologic calculations were performed for each of three design storms at the design points. Calculations relative to existing watershed conditions are included and the peak runoff rates are summarized in Table I. The calculations refer to runoff quantities at the design points, Franklin Street (to the east) respectively and The Penn Central Transportation Company/Farm Pond (to the west).

Calculations of peak runoff rates for proposed site conditions are also included and summarized in Table I. The design points are the same as in the existing conditions calculations. A Proposed Hydrology Plan is provided showing the various sub-watersheds draining to the design points and subsurface infiltration system.

Table I allows for comparison of existing and proposed conditions peak runoff rates for the design points for the three design storms. This table demonstrates that the proposed stormwater management system will be effective in limiting peak rates of runoff from the subject property to levels less than pre-development.

TABLE I: EXISTING AND PROPOSED PEAK RUNOFF

DRAINAGE AREA	DESIGN STORM EVENT / PEAK RUNOFF (cfs)		
	2-Year	10-Year	100-Year
Existing DP-1	6.2	9.6	14.4
Proposed DP-1	5.3	8.4	12.7
Existing DP-2	9.5	15.1	22.7
Proposed DP-2	7.5	14.1	22.0

TABLE II: EXISTING AND PROPOSED RUNOFF VOLUMES

DRAINAGE AREA	DESIGN STORM EVENT / VOLUME (af)		
	2-Year	10-Year	100-Year
Existing DP-1	0.52	0.83	1.27
Proposed DP-1	0.45	0.73	1.12
Existing DP-2	0.81	1.32	2.03
Proposed DP-2	0.61	1.08	1.78

TABLE III: MAXIMUM WATER ELEVATION

STORMWATER FACILITY	100-YEAR STORM EVENT WATER ELEVATION	TOP ELEVATION
Infiltration System 104	165.5	165.5
Infiltration System 105	166.4	166.4

STANDARD #3 – STORMWATER RECHARGE

Groundwater recharge is provided within the subsurface infiltration systems. The limited geotechnical assessment of the site and the soils as mapped by NRCS for the site indicate sandy/gravelly soils are present across the site. Neighboring soils are also mapped as well drained, loamy sand with the characteristics of Hydrologic Soil Group A, (HSG A) soils. To be consistent with the Rawls Rates for Loamy Sand, an exfiltration rate of 2.41 in/hr was used in our hydrologic model for the infiltration system. The Static Method was used in sizing the infiltration system.

The table below provides a summary of the attached groundwater recharge calculations. Calculations are based on HSG A. The required volume of groundwater recharge is equal to 0.6" over the proposed impervious area.

REQUIRED (CF)	PROVIDED (CF)
0*	6,316†

* not required as there is less impervious as a result of construction
† 2-year volume exfiltrated

DRAWDOWN CALCULATIONS

$$Time = \frac{Rv}{(K)(BottomArea)}$$

Rv = Storage Volume (cubic feet)
K = Saturated Hydraulic Conductivity (inches per hour)

$$Time = \frac{6316cf}{(2.41in/hr)(1ft/12in)(3{,}475sf)}$$

Time = 9 hours < 72 hours required

STANDARD #4 – WATER QUALITY

Water quality measures are designed to provide Total Suspended Solids (TSS) removal, and to treat runoff prior to discharging off site. Over 80% TSS removal is provided at the southwest corner design point through the use of two STC 450i and one STC 900. Please refer to the attached Stormceptor design summaries for the one (1) inch runoff event. Some water quality measures are provided for the Franklin Street design point including hooded catch basins and a subsurface infiltration facility for roof runoff.

REQUIRED (CF)	PROVIDED (CF)
0*	6,316†

* not required as there is less impervious as a result of construction
† 2-year volume exfiltrated

STANDARD #5 – LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS (LUHPPLS)

The proposed development is considered a Land Use with Higher Potential Pollutant Loads because there will likely be more than one-thousand (1,000) vehicle trips per day. The stormwater management system will be upgraded to improve water quality prior to discharge. Only "clean" roof top runoff will be recharged on site.

STANDARD #6 – CRITICAL AREAS

The proposed development is not discharging near or to a Critical Area, therefore, Standard #6 is not applicable.

STANDARD #7 – REDEVELOPMENT PROJECT

This is considered a redevelopment project and it has been designed to meet the Stormwater Management Standards to the extent practicable.

STANDARD #8 – CONSTRUCTION POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL

As the total project area is over one acre, the proponent must file a Notice of Intent (NOI) with the US EPA and a Stormwater Pollution Prevention Plan (SWPPP) shall be retained on-site during construction. The project SWPPP has been developed in accordance with the MA Construction General Permit (CGP). A draft SWPPP is included as part of this Stormwater Management Report for compliance with the Standards.

STANDARD #9 – OPERATION AND MAINTENANCE PLAN

The attached Operation and Maintenance Plan describes the requisite long-term operation and maintenance of all on-site stormwater Best Management Practices (BMPs) and hydraulic drainage system as well as source control for the prevention of pollution.

STANDARD #10 – PROHIBITION OF ILLICIT DISCHARGES

An Illicit Discharge Compliance Statement will be provided by the Applicant / Owner prior to the discharge of stormwater to post-construction BMPs.

MASSACHUSETTS STORMWATER REPORT CHECKLIST (Attached)

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.

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[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

COMMONWEALTH OF MASSACHUSETTS
MICHAEL J. SCOTT
CIVIL
No. 40863
REGISTERED PROFESSIONAL ENGINEER

2-10-14

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): proprietary treatment devices

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.

HYDRAULIC ANALYSIS

METHODOLOGY

Rational Method calculations were performed for a 25-year design storm to size collection system components. The Rational Method (Q = C i A) was used to estimate peak runoff rates to each inlet. Drainage areas and cover types were delineated to determine weighted runoff coefficients (C) to each inlet of the proposed collection system. Time of concentration paths (Tc) were estimated to determine storm intensities; a minimum Tc of 10 minutes was used. Massachusetts Department of Transportation (MassDOT) Intensity-Duration-Frequency (IDF) curves for Worcester, MA were used to determine the storm intensity for each inlet. The pipes were sized utilizing Manning's equation and a backwater analysis was performed (StormCAD V8i) to determine pipe capacity.

ANALYSIS SUMMARY

The proposed hydraulic system is designed adequately to convey runoff from the 25-year storm. Additionally, the collection system was oversized to accommodate runoff from the 100-year storm in order to convey the runoff without significant flooding and/or bypassing of the system. During the 100-year storm the proposed hydraulic system may operate under surcharge conditions: however, no adverse flooding conditions will be realized. Catch basin grates at the low points will operate under orifice conditions and will pond before all runoff can be conveyed to the piping system.

STORMWATER MANAGEMENT SYSTEM OPERATION AND MAINTENANCE PLAN UPTOWN 444-480 Franklin Street Framingham, MA

February 2014

APPLICANT:

Framingham Franklin LLC
29 Sunderland Road
Worcester, Massachusetts

RESPONSIBILITY:

Framingham Franklin LLC, or assigns will be responsible for implementation of the Operation and Maintenance Plan for 444-480 Franklin Street, in Framingham and for any corrective action required.

SITE CONDITIONS:

The stormwater management system for the site includes hooded catch basins, closed drainage system, and underground infiltration system.

SNOW MANAGEMENT:

1. Snow shall be stockpiled in pervious areas as indicated on the plans where it can slowly infiltrate.

2. The Owner shall be responsible to manage snow storage on-site. The Conservation Commission reserves the right to require the owner to remove snow from the premises at their discretion, if excessive amounts of snow have accumulated and present potential impacts to resource areas.

3. Sediments deposited from the snow storage areas shall be removed every spring.

SWEEPING OF PAVED SURFACES:

1. All paved surfaces on-site including driveways, loading areas, and parking areas shall be swept at least once annually to remove accumulations of sand, silt, leaves, and other debris.

2. Sweeping should occur in March/April after snowmelt has occurred and thaw has begun. Sweepings shall be disposed of at an appropriate location.

SUBSURFACE INFILTRATION SYSTEM:

1. Inspection ports are provided at the ends of each pipe in the system to allow for observation and cleaning of underground facilities.

2. Facilities shall be inspected at least twice per year and after the first several rainfall events and after all major storms. Ponded water inside the infiltration facilities after several days

often indicates that the bottom of the trench is clogged and all stone aggregate and filter fabric must be removed and replaced.

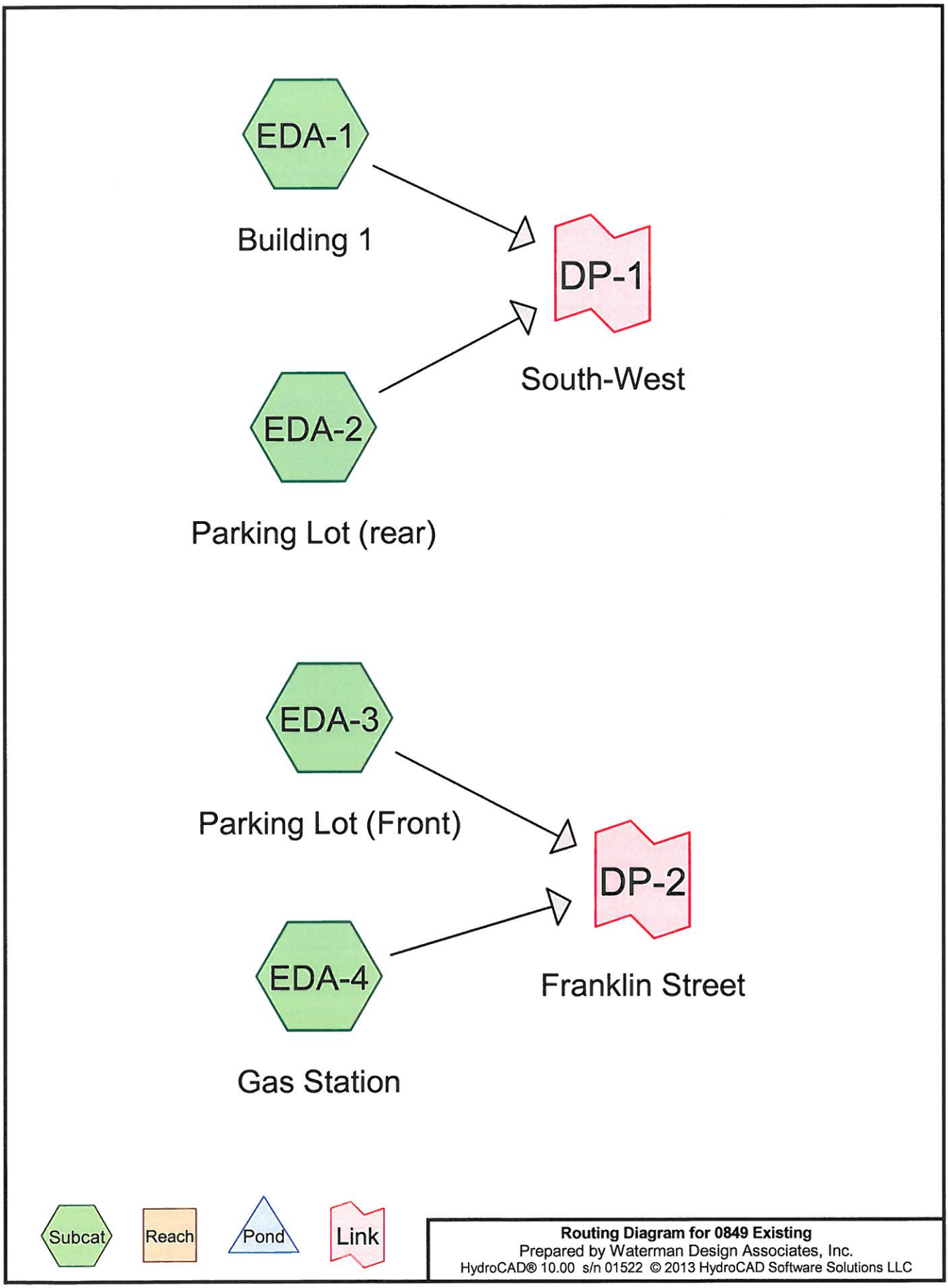
3. Corrective action for system failure shall include removal and replacement of all stone aggregate and filter fabric. Accumulated sediment shall be removed from the trench bottom and the bottom shall be scarified or tilled to help induce infiltration.

WATER QUALITY STRUCTURES AND INLETS (SOUTHWEST SIDE OF SITE):

1. Water Quality Structures and Inlets (Stormceptor 450 and 900 units) shall be inspected four 4) times per year and cleaned whenever the depth of sediment is greater than twenty-four (24) inches, or as required by the manufacturer.

2. All sediments and hydrocarbons shall be properly handled and disposed in accordance with local, state, and federal guidelines and regulations.

EXISTING AND PROPOSED HYDROLOGY



Routing Diagram for 0849 Existing
Prepared by Waterman Design Associates, Inc.
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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-1: Building 1 Runoff Area=53,593 sf 100.00% Impervious Runoff Depth>2.97"
Tc=6.0 min CN=98 Runoff=3.7 cfs 0.304 af

Subcatchment EDA-2: Parking Lot (rear) Runoff Area=50,660 sf 88.32% Impervious Runoff Depth>2.25"
Tc=10.0 min CN=91 Runoff=2.6 cfs 0.219 af

Subcatchment EDA-3: Parking Lot (Front) Runoff Area=169,972 sf 91.74% Impervious Runoff Depth>2.44"
Tc=10.0 min CN=93 Runoff=9.4 cfs 0.794 af

Subcatchment EDA-4: Gas Station Runoff Area=2,170 sf 100.00% Impervious Runoff Depth>2.97"
Tc=6.0 min CN=98 Runoff=0.2 cfs 0.012 af

Link DP-1: South-West Inflow=6.2 cfs 0.523 af
Primary=6.2 cfs 0.523 af

Link DP-2: Franklin Street Inflow=9.5 cfs 0.806 af
Primary=9.5 cfs 0.806 af

Total Runoff Area = 6.345 ac Runoff Volume = 1.329 af Average Runoff Depth = 2.51"
7.22% Pervious = 0.458 ac 92.78% Impervious = 5.887 ac

Summary for Subcatchment EDA-1: Building 1

Runoff = 3.7 cfs @ 12.09 hrs, Volume= 0.304 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
*	53,593	98	Building
	53,593		100.00% Impervious Area

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

Summary for Subcatchment EDA-2: Parking Lot (rear)

Runoff = 2.6 cfs @ 12.14 hrs, Volume= 0.219 af, Depth> 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
44,743	98	Paved parking, HSG A
5,917	39	>75% Grass cover, Good, HSG A
50,660	91	Weighted Average
5,917		11.68% Pervious Area
44,743		88.32% Impervious Area

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

Summary for Subcatchment EDA-3: Parking Lot (Front)

Runoff = 9.4 cfs @ 12.14 hrs, Volume= 0.794 af, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
155,933	98	Paved parking, HSG A
14,039	39	>75% Grass cover, Good, HSG A
169,972	93	Weighted Average
14,039		8.26% Pervious Area
155,933		91.74% Impervious Area

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

Summary for Subcatchment EDA-4: Gas Station

Runoff = 0.2 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
2,170	98	Roofs, HSG A
2,170		100.00% Impervious Area

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

Summary for Link DP-1: South-West

Inflow Area = 2.393 ac, 94.32% Impervious, Inflow Depth > 2.62" for 2-year event
Inflow = 6.2 cfs @ 12.10 hrs, Volume= 0.523 af
Primary = 6.2 cfs @ 12.10 hrs, Volume= 0.523 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Franklin Street

Inflow Area = 3.952 ac, 91.84% Impervious, Inflow Depth > 2.45" for 2-year event
Inflow = 9.5 cfs @ 12.14 hrs, Volume= 0.806 af
Primary = 9.5 cfs @ 12.14 hrs, Volume= 0.806 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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

Subcatchment EDA-1: Building 1 Runoff Area=53,593 sf 100.00% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=98 Runoff=5.6 cfs 0.468 af

Subcatchment EDA-2: Parking Lot (rear) Runoff Area=50,660 sf 88.32% Impervious Runoff Depth>3.78"
Tc=10.0 min CN=91 Runoff=4.3 cfs 0.367 af

Subcatchment EDA-3: Parking Lot (Front) Runoff Area=169,972 sf 91.74% Impervious Runoff Depth>4.00"
Tc=10.0 min CN=93 Runoff=14.9 cfs 1.300 af

Subcatchment EDA-4: Gas Station Runoff Area=2,170 sf 100.00% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=98 Runoff=0.2 cfs 0.019 af

Link DP-1: South-West Inflow=9.6 cfs 0.834 af
Primary=9.6 cfs 0.834 af

Link DP-2: Franklin Street Inflow=15.1 cfs 1.318 af
Primary=15.1 cfs 1.318 af

Total Runoff Area = 6.345 ac Runoff Volume = 2.153 af Average Runoff Depth = 4.07"
7.22% Pervious = 0.458 ac 92.78% Impervious = 5.887 ac

Summary for Subcatchment EDA-1: Building 1

Runoff = 5.6 cfs @ 12.09 hrs, Volume= 0.468 af, Depth> 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
*	53,593	98	Building
	53,593		100.00% Impervious Area

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

Summary for Subcatchment EDA-2: Parking Lot (rear)

Runoff = 4.3 cfs @ 12.14 hrs, Volume= 0.367 af, Depth> 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
44,743	98	Paved parking, HSG A
5,917	39	>75% Grass cover, Good, HSG A
50,660	91	Weighted Average
5,917		11.68% Pervious Area
44,743		88.32% Impervious Area

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

Summary for Subcatchment EDA-3: Parking Lot (Front)

Runoff = 14.9 cfs @ 12.14 hrs, Volume= 1.300 af, Depth> 4.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
155,933	98	Paved parking, HSG A
14,039	39	>75% Grass cover, Good, HSG A
169,972	93	Weighted Average
14,039		8.26% Pervious Area
155,933		91.74% Impervious Area

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

Summary for Subcatchment EDA-4: Gas Station

Runoff = 0.2 cfs @ 12.09 hrs, Volume= 0.019 af, Depth> 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
2,170	98	Roofs, HSG A
2,170		100.00% Impervious Area

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

Summary for Link DP-1: South-West

Inflow Area = 2.393 ac, 94.32% Impervious, Inflow Depth > 4.18" for 10-year event
Inflow = 9.6 cfs @ 12.10 hrs, Volume= 0.834 af
Primary = 9.6 cfs @ 12.10 hrs, Volume= 0.834 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Franklin Street

Inflow Area = 3.952 ac, 91.84% Impervious, Inflow Depth > 4.00" for 10-year event
Inflow = 15.1 cfs @ 12.14 hrs, Volume= 1.318 af
Primary = 15.1 cfs @ 12.14 hrs, Volume= 1.318 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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

Subcatchment EDA-1: Building 1 Runoff Area=53,593 sf 100.00% Impervious Runoff Depth>6.76"
Tc=6.0 min CN=98 Runoff=8.3 cfs 0.693 af

Subcatchment EDA-2: Parking Lot (rear) Runoff Area=50,660 sf 88.32% Impervious Runoff Depth>5.93"
Tc=10.0 min CN=91 Runoff=6.6 cfs 0.575 af

Subcatchment EDA-3: Parking Lot (Front) Runoff Area=169,972 sf 91.74% Impervious Runoff Depth>6.16"
Tc=10.0 min CN=93 Runoff=22.5 cfs 2.004 af

Subcatchment EDA-4: Gas Station Runoff Area=2,170 sf 100.00% Impervious Runoff Depth>6.76"
Tc=6.0 min CN=98 Runoff=0.3 cfs 0.028 af

Link DP-1: South-West Inflow=14.4 cfs 1.268 af
Primary=14.4 cfs 1.268 af

Link DP-2: Franklin Street Inflow=22.7 cfs 2.032 af
Primary=22.7 cfs 2.032 af

Total Runoff Area = 6.345 ac Runoff Volume = 3.300 af Average Runoff Depth = 6.24"
7.22% Pervious = 0.458 ac 92.78% Impervious = 5.887 ac

Summary for Subcatchment EDA-1: Building 1

Runoff = 8.3 cfs @ 12.09 hrs, Volume= 0.693 af, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

	Area (sf)	CN	Description
*	53,593	98	Building
	53,593		100.00% Impervious Area

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

Summary for Subcatchment EDA-2: Parking Lot (rear)

Runoff = 6.6 cfs @ 12.14 hrs, Volume= 0.575 af, Depth> 5.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
44,743	98	Paved parking, HSG A
5,917	39	>75% Grass cover, Good, HSG A
50,660	91	Weighted Average
5,917		11.68% Pervious Area
44,743		88.32% Impervious Area

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

Summary for Subcatchment EDA-3: Parking Lot (Front)

Runoff = 22.5 cfs @ 12.14 hrs, Volume= 2.004 af, Depth> 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
155,933	98	Paved parking, HSG A
14,039	39	>75% Grass cover, Good, HSG A
169,972	93	Weighted Average
14,039		8.26% Pervious Area
155,933		91.74% Impervious Area

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

Summary for Subcatchment EDA-4: Gas Station

Runoff = 0.3 cfs @ 12.09 hrs, Volume= 0.028 af, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
2,170	98	Roofs, HSG A
2,170		100.00% Impervious Area

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

Summary for Link DP-1: South-West

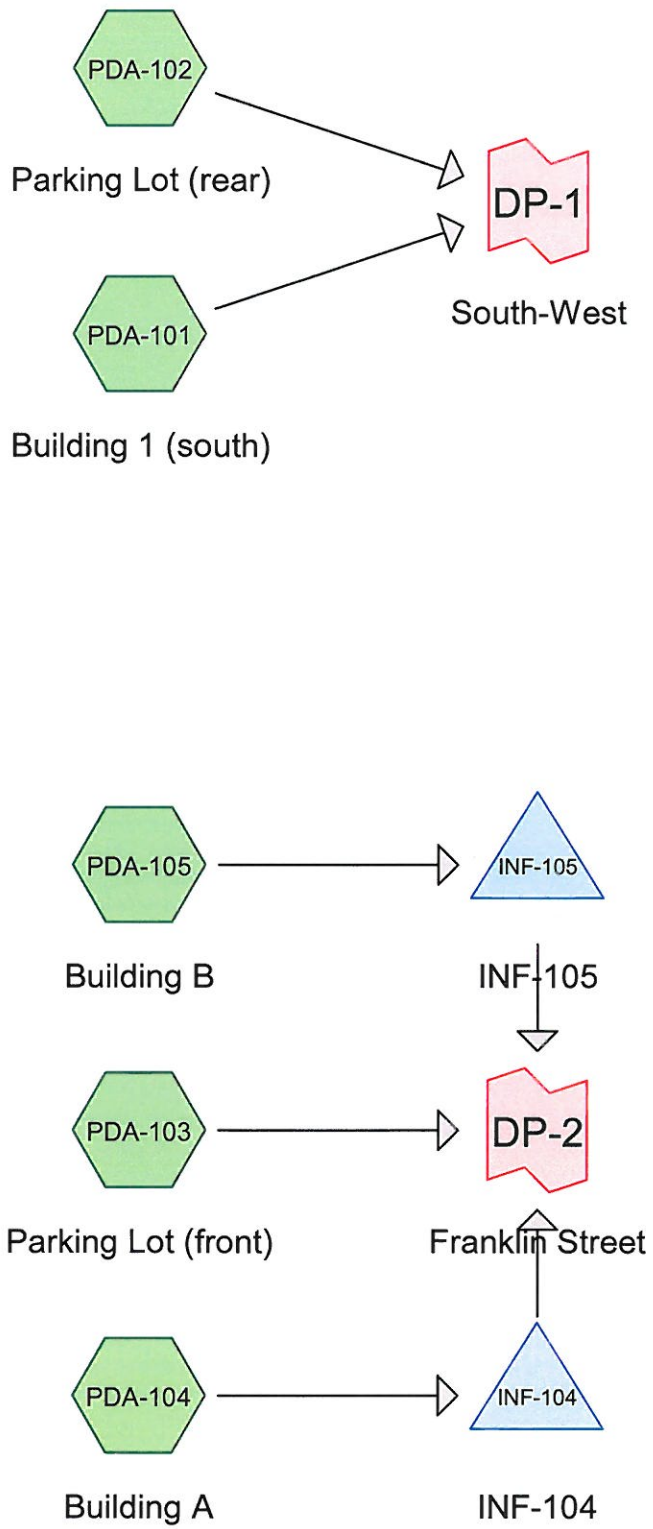
Inflow Area = 2.393 ac, 94.32% Impervious, Inflow Depth > 6.36" for 100-year event
Inflow = 14.4 cfs @ 12.10 hrs, Volume= 1.268 af
Primary = 14.4 cfs @ 12.10 hrs, Volume= 1.268 af, Atten= 0%, Lag= 0.0 min

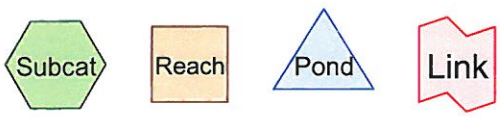
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Franklin Street

Inflow Area = 3.952 ac, 91.84% Impervious, Inflow Depth > 6.17" for 100-year event
Inflow = 22.7 cfs @ 12.14 hrs, Volume= 2.032 af
Primary = 22.7 cfs @ 12.14 hrs, Volume= 2.032 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs





Routing Diagram for 0849 proposed
Prepared by Waterman Design Associates, Inc.
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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-101: Building 1 (south) Runoff Area=41,711 sf 100.00% Impervious Runoff Depth>2.97"
Tc=6.0 min CN=98 Runoff=2.9 cfs 0.237 af

Subcatchment PDA-102: Parking Lot (rear) Runoff Area=52,996 sf 85.07% Impervious Runoff Depth>2.08"
Tc=10.0 min CN=89 Runoff=2.5 cfs 0.211 af

Subcatchment PDA-103: Parking Lot (front) Runoff Area=151,564 sf 83.31% Impervious Runoff Depth>1.99"
Tc=10.0 min CN=88 Runoff=7.0 cfs 0.578 af

Subcatchment PDA-104: Building A Runoff Area=13,932 sf 100.00% Impervious Runoff Depth>2.97"
Tc=6.0 min CN=98 Runoff=1.0 cfs 0.079 af

Subcatchment PDA-105: Building B Runoff Area=16,241 sf 100.00% Impervious Runoff Depth>2.97"
Tc=6.0 min CN=98 Runoff=1.1 cfs 0.092 af

Pond INF-104: INF-104 Peak Elev=164.84' Storage=736 cf Inflow=1.0 cfs 0.079 af
Discarded=0.1 cfs 0.063 af Primary=0.6 cfs 0.016 af Outflow=0.6 cfs 0.079 af

Pond INF-105: INF-105 Peak Elev=165.64' Storage=1,038 cf Inflow=1.1 cfs 0.092 af
Discarded=0.1 cfs 0.082 af Primary=0.3 cfs 0.010 af Outflow=0.4 cfs 0.092 af

Link DP-1: South-West Inflow=5.3 cfs 0.447 af
Primary=5.3 cfs 0.447 af

Link DP-2: Franklin Street Inflow=7.5 cfs 0.605 af
Primary=7.5 cfs 0.605 af

Total Runoff Area = 6.346 ac Runoff Volume = 1.197 af Average Runoff Depth = 2.26"
12.01% Pervious = 0.762 ac 87.99% Impervious = 5.584 ac

Summary for Subcatchment PDA-101: Building 1 (south)

Runoff = 2.9 cfs @ 12.09 hrs, Volume= 0.237 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
41,711	98	Roofs, HSG A
41,711		100.00% Impervious Area

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

Summary for Subcatchment PDA-102: Parking Lot (rear)

Runoff = 2.5 cfs @ 12.14 hrs, Volume= 0.211 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
45,084	98	Paved parking, HSG A
7,912	39	>75% Grass cover, Good, HSG A
52,996	89	Weighted Average
7,912		14.93% Pervious Area
45,084		85.07% Impervious Area

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

Summary for Subcatchment PDA-103: Parking Lot (front)

Runoff = 7.0 cfs @ 12.14 hrs, Volume= 0.578 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
126,273	98	Paved parking, HSG A
25,291	39	>75% Grass cover, Good, HSG A
151,564	88	Weighted Average
25,291		16.69% Pervious Area
126,273		83.31% Impervious Area

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

Summary for Subcatchment PDA-104: Building A

Runoff = 1.0 cfs @ 12.09 hrs, Volume= 0.079 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
13,932	98	Roofs, HSG A
13,932		100.00% Impervious Area

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

Summary for Subcatchment PDA-105: Building B

Runoff = 1.1 cfs @ 12.09 hrs, Volume= 0.092 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
16,241	98	Roofs, HSG A
16,241		100.00% Impervious Area

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

Summary for Pond INF-104: INF-104

Inflow Area = 0.320 ac,100.00% Impervious, Inflow Depth > 2.97" for 2-year event
Inflow = 1.0 cfs @ 12.09 hrs, Volume= 0.079 af
Outflow = 0.6 cfs @ 12.19 hrs, Volume= 0.079 af, Atten= 34%, Lag= 6.2 min
Discarded = 0.1 cfs @ 11.20 hrs, Volume= 0.063 af
Primary = 0.6 cfs @ 12.19 hrs, Volume= 0.016 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 164.84' @ 12.19 hrs Surf.Area= 1,375 sf Storage= 736 cf

Plug-Flow detention time= 40.1 min calculated for 0.079 af (100% of inflow)
Center-of-Mass det. time= 39.9 min (795.8 - 756.0)

Volume	Invert	Avail.Storage	Storage Description
#1	163.50'	1,100 cf	**25.00'W x 55.00'L x 2.00'H Prismatoid** 2,750 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	163.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	164.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.1 cfs @ 11.20 hrs HW=163.52' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.6 cfs @ 12.19 hrs HW=164.83' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.6 cfs @ 1.97 fps)

Summary for Pond INF-105: INF-105

Inflow Area = 0.373 ac,100.00% Impervious, Inflow Depth > 2.97" for 2-year event
Inflow = 1.1 cfs @ 12.09 hrs, Volume= 0.092 af
Outflow = 0.4 cfs @ 12.34 hrs, Volume= 0.092 af, Atten= 63%, Lag= 15.1 min
Discarded = 0.1 cfs @ 11.45 hrs, Volume= 0.082 af
Primary = 0.3 cfs @ 12.34 hrs, Volume= 0.010 af

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

Peak Elev= 165.64' @ 12.34 hrs Surf.Area= 2,100 sf Storage= 1,038 cf

Plug-Flow detention time= 43.5 min calculated for 0.092 af (100% of inflow)
Center-of-Mass det. time= 43.2 min (799.2 - 756.0)

Volume	Invert	Avail.Storage	Storage Description
#1	164.40'	1,680 cf	**30.00'W x 70.00'L x 2.00'H Prismatoid** 4,200 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	164.40'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	165.40'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.1 cfs @ 11.45 hrs HW=164.42' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.3 cfs @ 12.34 hrs HW=165.63' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.3 cfs @ 1.65 fps)

Summary for Link DP-1: South-West

Inflow Area = 2.174 ac, 91.65% Impervious, Inflow Depth > 2.47" for 2-year event
Inflow = 5.3 cfs @ 12.11 hrs, Volume= 0.447 af
Primary = 5.3 cfs @ 12.11 hrs, Volume= 0.447 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Franklin Street

Inflow Area = 4.172 ac, 86.08% Impervious, Inflow Depth > 1.74" for 2-year event
Inflow = 7.5 cfs @ 12.15 hrs, Volume= 0.605 af
Primary = 7.5 cfs @ 12.15 hrs, Volume= 0.605 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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

Subcatchment PDA-101: Building 1 (south) Runoff Area=41,711 sf 100.00% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=98 Runoff=4.4 cfs 0.364 af

Subcatchment PDA-102: Parking Lot (rear) Runoff Area=52,996 sf 85.07% Impervious Runoff Depth>3.58"
Tc=10.0 min CN=89 Runoff=4.3 cfs 0.363 af

Subcatchment PDA-103: Parking Lot (front) Runoff Area=151,564 sf 83.31% Impervious Runoff Depth>3.47"
Tc=10.0 min CN=88 Runoff=12.0 cfs 1.007 af

Subcatchment PDA-104: Building A Runoff Area=13,932 sf 100.00% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=98 Runoff=1.5 cfs 0.122 af

Subcatchment PDA-105: Building B Runoff Area=16,241 sf 100.00% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=98 Runoff=1.7 cfs 0.142 af

Pond INF-104: INF-104 Peak Elev=165.11' Storage=884 cf Inflow=1.5 cfs 0.122 af
Discarded=0.1 cfs 0.081 af Primary=1.1 cfs 0.041 af Outflow=1.2 cfs 0.122 af

Pond INF-105: INF-105 Peak Elev=165.93' Storage=1,281 cf Inflow=1.7 cfs 0.142 af
Discarded=0.1 cfs 0.106 af Primary=1.0 cfs 0.035 af Outflow=1.1 cfs 0.142 af

Link DP-1: South-West Inflow=8.4 cfs 0.726 af
Primary=8.4 cfs 0.726 af

Link DP-2: Franklin Street Inflow=14.1 cfs 1.083 af
Primary=14.1 cfs 1.083 af

Total Runoff Area = 6.346 ac Runoff Volume = 1.997 af Average Runoff Depth = 3.78"
12.01% Pervious = 0.762 ac 87.99% Impervious = 5.584 ac

Summary for Subcatchment PDA-101: Building 1 (south)

Runoff = 4.4 cfs @ 12.09 hrs, Volume= 0.364 af, Depth> 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
41,711	98	Roofs, HSG A
41,711		100.00% Impervious Area

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

Summary for Subcatchment PDA-102: Parking Lot (rear)

Runoff = 4.3 cfs @ 12.14 hrs, Volume= 0.363 af, Depth> 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
45,084	98	Paved parking, HSG A
7,912	39	>75% Grass cover, Good, HSG A
52,996	89	Weighted Average
7,912		14.93% Pervious Area
45,084		85.07% Impervious Area

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

Summary for Subcatchment PDA-103: Parking Lot (front)

Runoff = 12.0 cfs @ 12.14 hrs, Volume= 1.007 af, Depth> 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
126,273	98	Paved parking, HSG A
25,291	39	>75% Grass cover, Good, HSG A
151,564	88	Weighted Average
25,291		16.69% Pervious Area
126,273		83.31% Impervious Area

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

Summary for Subcatchment PDA-104: Building A

Runoff = 1.5 cfs @ 12.09 hrs, Volume= 0.122 af, Depth> 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
13,932	98	Roofs, HSG A
13,932		100.00% Impervious Area

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

Summary for Subcatchment PDA-105: Building B

Runoff = 1.7 cfs @ 12.09 hrs, Volume= 0.142 af, Depth> 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
16,241	98	Roofs, HSG A
16,241		100.00% Impervious Area

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

Summary for Pond INF-104: INF-104

Inflow Area = 0.320 ac,100.00% Impervious, Inflow Depth > 4.56" for 10-year event
Inflow = 1.5 cfs @ 12.09 hrs, Volume= 0.122 af
Outflow = 1.2 cfs @ 12.15 hrs, Volume= 0.122 af, Atten= 18%, Lag= 3.6 min
Discarded = 0.1 cfs @ 10.25 hrs, Volume= 0.081 af
Primary = 1.1 cfs @ 12.15 hrs, Volume= 0.041 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 165.11' @ 12.15 hrs Surf.Area= 1,375 sf Storage= 884 cf

Plug-Flow detention time= 37.0 min calculated for 0.122 af (100% of inflow)
Center-of-Mass det. time= 36.8 min (785.1 - 748.3)

Volume	Invert	Avail.Storage	Storage Description
#1	163.50'	1,100 cf	**25.00'W x 55.00'L x 2.00'H Prismatoid** 2,750 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	163.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	164.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.1 cfs @ 10.25 hrs HW=163.52' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=1.1 cfs @ 12.15 hrs HW=165.10' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 1.1 cfs @ 2.86 fps)

Summary for Pond INF-105: INF-105

Inflow Area = 0.373 ac,100.00% Impervious, Inflow Depth > 4.56" for 10-year event
Inflow = 1.7 cfs @ 12.09 hrs, Volume= 0.142 af
Outflow = 1.1 cfs @ 12.19 hrs, Volume= 0.142 af, Atten= 35%, Lag= 6.1 min
Discarded = 0.1 cfs @ 10.90 hrs, Volume= 0.106 af
Primary = 1.0 cfs @ 12.19 hrs, Volume= 0.035 af

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

Peak Elev= 165.93' @ 12.19 hrs Surf.Area= 2,100 sf Storage= 1,281 cf

Plug-Flow detention time= 39.5 min calculated for 0.141 af (100% of inflow)
Center-of-Mass det. time= 39.1 min (787.4 - 748.3)

Volume	Invert	Avail.Storage	Storage Description
#1	164.40'	1,680 cf	**30.00'W x 70.00'L x 2.00'H Prismatoid** 4,200 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	164.40'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	165.40'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.1 cfs @ 10.90 hrs HW=164.42' (Free Discharge)
↑└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=1.0 cfs @ 12.19 hrs HW=165.92' (Free Discharge)
↑└**2=Orifice/Grate** (Orifice Controls 1.0 cfs @ 2.51 fps)

Summary for Link DP-1: South-West

Inflow Area = 2.174 ac, 91.65% Impervious, Inflow Depth > 4.01" for 10-year event
Inflow = 8.4 cfs @ 12.11 hrs, Volume= 0.726 af
Primary = 8.4 cfs @ 12.11 hrs, Volume= 0.726 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Franklin Street

Inflow Area = 4.172 ac, 86.08% Impervious, Inflow Depth > 3.12" for 10-year event
Inflow = 14.1 cfs @ 12.14 hrs, Volume= 1.083 af
Primary = 14.1 cfs @ 12.14 hrs, Volume= 1.083 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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

Subcatchment PDA-101: Building 1 (south) Runoff Area=41,711 sf 100.00% Impervious Runoff Depth>6.76"
Tc=6.0 min CN=98 Runoff=6.4 cfs 0.539 af

Subcatchment PDA-102: Parking Lot (rear) Runoff Area=52,996 sf 85.07% Impervious Runoff Depth>5.70"
Tc=10.0 min CN=89 Runoff=6.7 cfs 0.578 af

Subcatchment PDA-103: Parking Lot (front) Runoff Area=151,564 sf 83.31% Impervious Runoff Depth>5.59"
Tc=10.0 min CN=88 Runoff=18.9 cfs 1.620 af

Subcatchment PDA-104: Building A Runoff Area=13,932 sf 100.00% Impervious Runoff Depth>6.76"
Tc=6.0 min CN=98 Runoff=2.1 cfs 0.180 af

Subcatchment PDA-105: Building B Runoff Area=16,241 sf 100.00% Impervious Runoff Depth>6.76"
Tc=6.0 min CN=98 Runoff=2.5 cfs 0.210 af

Pond INF-104: INF-104 Peak Elev=165.47' Storage=1,082 cf Inflow=2.1 cfs 0.180 af
Discarded=0.1 cfs 0.099 af Primary=1.6 cfs 0.081 af Outflow=1.7 cfs 0.180 af

Pond INF-105: INF-105 Peak Elev=166.38' Storage=1,660 cf Inflow=2.5 cfs 0.210 af
Discarded=0.1 cfs 0.133 af Primary=1.6 cfs 0.077 af Outflow=1.7 cfs 0.210 af

Link DP-1: South-West Inflow=12.7 cfs 1.117 af
Primary=12.7 cfs 1.117 af

Link DP-2: Franklin Street Inflow=22.0 cfs 1.777 af
Primary=22.0 cfs 1.777 af

Total Runoff Area = 6.346 ac Runoff Volume = 3.127 af Average Runoff Depth = 5.91"
12.01% Pervious = 0.762 ac 87.99% Impervious = 5.584 ac

Summary for Subcatchment PDA-101: Building 1 (south)

Runoff = 6.4 cfs @ 12.09 hrs, Volume= 0.539 af, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
41,711	98	Roofs, HSG A
41,711		100.00% Impervious Area

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

Summary for Subcatchment PDA-102: Parking Lot (rear)

Runoff = 6.7 cfs @ 12.14 hrs, Volume= 0.578 af, Depth> 5.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
45,084	98	Paved parking, HSG A
7,912	39	>75% Grass cover, Good, HSG A
52,996	89	Weighted Average
7,912		14.93% Pervious Area
45,084		85.07% Impervious Area

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

Summary for Subcatchment PDA-103: Parking Lot (front)

Runoff = 18.9 cfs @ 12.14 hrs, Volume= 1.620 af, Depth> 5.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
126,273	98	Paved parking, HSG A
25,291	39	>75% Grass cover, Good, HSG A
151,564	88	Weighted Average
25,291		16.69% Pervious Area
126,273		83.31% Impervious Area

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

Summary for Subcatchment PDA-104: Building A

Runoff = 2.1 cfs @ 12.09 hrs, Volume= 0.180 af, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
13,932	98	Roofs, HSG A
13,932		100.00% Impervious Area

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

Summary for Subcatchment PDA-105: Building B

Runoff = 2.5 cfs @ 12.09 hrs, Volume= 0.210 af, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.00"

Area (sf)	CN	Description
16,241	98	Roofs, HSG A
16,241		100.00% Impervious Area

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

Summary for Pond INF-104: INF-104

Inflow Area = 0.320 ac,100.00% Impervious, Inflow Depth > 6.76" for 100-year event
Inflow = 2.1 cfs @ 12.09 hrs, Volume= 0.180 af
Outflow = 1.7 cfs @ 12.15 hrs, Volume= 0.180 af, Atten= 22%, Lag= 4.1 min
Discarded = 0.1 cfs @ 8.95 hrs, Volume= 0.099 af
Primary = 1.6 cfs @ 12.15 hrs, Volume= 0.081 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 165.47' @ 12.15 hrs Surf.Area= 1,375 sf Storage= 1,082 cf

Plug-Flow detention time= 35.1 min calculated for 0.180 af (100% of inflow)
Center-of-Mass det. time= 34.9 min (777.4 - 742.5)

Volume	Invert	Avail.Storage	Storage Description
#1	163.50'	1,100 cf	**25.00'W x 55.00'L x 2.00'H Prismatoid** 2,750 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	163.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	164.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.1 cfs @ 8.95 hrs HW=163.52' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=1.6 cfs @ 12.15 hrs HW=165.46' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 1.6 cfs @ 4.06 fps)

Summary for Pond INF-105: INF-105

Inflow Area = 0.373 ac,100.00% Impervious, Inflow Depth > 6.76" for 100-year event
Inflow = 2.5 cfs @ 12.09 hrs, Volume= 0.210 af
Outflow = 1.7 cfs @ 12.17 hrs, Volume= 0.210 af, Atten= 31%, Lag= 5.2 min
Discarded = 0.1 cfs @ 9.85 hrs, Volume= 0.133 af
Primary = 1.6 cfs @ 12.17 hrs, Volume= 0.077 af

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

Peak Elev= 166.38' @ 12.17 hrs Surf.Area= 2,100 sf Storage= 1,660 cf

Plug-Flow detention time= 37.4 min calculated for 0.209 af (100% of inflow)
Center-of-Mass det. time= 37.1 min (779.7 - 742.5)

Volume	Invert	Avail.Storage	Storage Description
#1	164.40'	1,680 cf	**30.00'W x 70.00'L x 2.00'H Prismatoid** 4,200 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	164.40'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	165.40'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.1 cfs @ 9.85 hrs HW=164.42' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=1.6 cfs @ 12.17 hrs HW=166.36' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 1.6 cfs @ 4.06 fps)

Summary for Link DP-1: South-West

Inflow Area = 2.174 ac, 91.65% Impervious, Inflow Depth > 6.17" for 100-year event
Inflow = 12.7 cfs @ 12.11 hrs, Volume= 1.117 af
Primary = 12.7 cfs @ 12.11 hrs, Volume= 1.117 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link DP-2: Franklin Street

Inflow Area = 4.172 ac, 86.08% Impervious, Inflow Depth > 5.11" for 100-year event
Inflow = 22.0 cfs @ 12.14 hrs, Volume= 1.777 af
Primary = 22.0 cfs @ 12.14 hrs, Volume= 1.777 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

STORMWATER STANDARDS CALCULATIONS

Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	12/16/2013
Project Name	0849
Project Number	0849
Location	N/A

Designer Information

Company	Waterman Design Associates Inc.
Contact	N/A

Notes

CB-21

Drainage Area

Total Area (ac)	0.24
Imperviousness (%)	100

The Stormceptor System model STC 450i achieves the water quality objective removing 86% TSS for a NJDEP (clay, silt, sand) particle size distribution.

Rainfall

Name	WORCESTER WSO AP
State	MA
ID	9923
Years of Records	1948 to 2005
Latitude	42°16'2"N
Longitude	71°52'34"W

Water Quality Objective

TSS Removal (%)	80

Upstream Storage

Storage (ac-ft)	Discharge (cfs)
0	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %
STC 450i	86
STC 900	91
STC 1200	91
STC 1800	91
STC 2400	93
STC 3600	94
STC 4800	95
STC 6000	96
STC 7200	96
STC 11000	98
STC 13000	98
STC 16000	98

Stormceptor®

Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

NJDEP (clay, silt, sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s
1	5	2.65	0.0012					
4	15	2.65	0.0012					
29	25	2.65	0.0025					
75	15	2.65	0.0133					
175	30	2.65	0.0619					
375	5	2.65	0.1953					
750	5	2.65	0.4266					

Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 450i	STC 900 to STC 7200	STC 11000 to STC 16000
Single inlet pipe	3 in.	1 in.	3 in.
Multiple inlet pipes	3 in.	3 in.	Only one inlet pipe.

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 www.rinkerstormceptor.com

Rinker MATERIALS™

Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	12/16/2013
Project Name	0849
Project Number	0849
Location	N/A

Designer Information

Company	Waterman Design Associates Inc.
Contact	N/A

Notes

DMH-22

Drainage Area

Total Area (ac)	0.3
Imperviousness (%)	100

The Stormceptor System model STC 450i achieves the water quality objective removing 84% TSS for a NJDEP (clay, silt, sand) particle size distribution.

Rainfall

Name	WORCESTER WSO AP
State	MA
ID	9923
Years of Records	1948 to 2005
Latitude	42°16'2"N
Longitude	71°52'34"W

Water Quality Objective

TSS Removal (%)	80

Upstream Storage

Storage (ac-ft)	Discharge (cfs)
0	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %
STC 450i	84
STC 900	90
STC 1200	90
STC 1800	90
STC 2400	92
STC 3600	93
STC 4800	95
STC 6000	95
STC 7200	96
STC 11000	97
STC 13000	97
STC 16000	98

Stormceptor®

Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

NJDEP (clay, silt, sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s
1	5	2.65	0.0012					
4	15	2.65	0.0012					
29	25	2.65	0.0025					
75	15	2.65	0.0133					
175	30	2.65	0.0619					
375	5	2.65	0.1953					
750	5	2.65	0.4266					

Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 450i	STC 900 to STC 7200	STC 11000 to STC 16000
Single inlet pipe	3 in.	1 in.	3 in.
Multiple inlet pipes	3 in.	3 in.	Only one inlet pipe.

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 www.rinkerstormceptor.com

Rinker MATERIALS™

Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	12/16/2013
Project Name	0849
Project Number	0849
Location	N/A

Designer Information

Company	Waterman Design Associates Inc.
Contact	N/A

Notes

DMH-23

Drainage Area

Total Area (ac)	0.64
Imperviousness (%)	80

The Stormceptor System model STC 450i achieves the water quality objective removing 80% TSS for a NJDEP (clay, silt, sand) particle size distribution.

Rainfall

Name	WORCESTER WSO AP
State	MA
ID	9923
Years of Records	1948 to 2005
Latitude	42°16'2"N
Longitude	71°52'34"W

Water Quality Objective

TSS Removal (%)	80

Upstream Storage

Storage (ac-ft)	Discharge (cfs)
0	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %
STC 450i	80
STC 900	86
STC 1200	86
STC 1800	86
STC 2400	89
STC 3600	90
STC 4800	92
STC 6000	92
STC 7200	94
STC 11000	96
STC 13000	96
STC 16000	97

Stormceptor®

Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

NJDEP (clay, silt, sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s
1	5	2.65	0.0012					
4	15	2.65	0.0012					
29	25	2.65	0.0025					
75	15	2.65	0.0133					
175	30	2.65	0.0619					
375	5	2.65	0.1953					
750	5	2.65	0.4266					

Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 450i	STC 900 to STC 7200	STC 11000 to STC 16000
Single inlet pipe	3 in.	1 in.	3 in.
Multiple inlet pipes	3 in.	3 in.	Only one inlet pipe.

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 www.rinkerstormceptor.com

Rinker MATERIALS™

HYDRAULICS

Label	Start Node	Upper Rim (ft)	Hydraulic Grade Line In (ft)	Stop Node	Lower Rim (ft)	`	Upstream Inlet Area (ft^2)	Rational Coeff	System CA (ft^2)	System Intensity (in/h)	System Rational Flow (ft^3/s)	Full Capacity (ft^3/s)	Average Velocity (ft/s)	Section Size (in)	Manning's n	Length (ft)	Invert Upper (ft)	Invert Lower (ft)	Slope (ft/ft)
D-1	DMH-1	164.00	160.15	OF-1	163.88	160.10	(N/A)	(N/A)	87696	4.82	9.79	13.60	8.58	18	0.012	7	158.70	158.60	0.01
D-2	DMH-2	167.70	165.2	DMH-1	164.00	160.46	(N/A)	(N/A)	75010	4.85	8.43	10.93	12.09	18	0.012	141	160.00	158.70	0.01
D-3	DMH-3	167.50	166.4	DMH-2	167.70	165.52	(N/A)	(N/A)	68987	5.08	8.10	10.51	5.32	18	0.012	129	161.10	160.00	0.01
D-4	DMH-4	170.60	167.03	DMH-3	167.50	166.62	(N/A)	(N/A)	35385	5.22	4.27	13.84	3.15	18	0.012	169	163.60	161.10	0.02
D-5	CB-5	170.00	167.41	DMH-4	170.60	167.11	30169	0.78	23491	5.26	2.86	6.72	3.64	12	0.012	56	165.30	163.60	0.03
D-6	CB-6	170.30	168.81	DMH-4	170.60	167.11	13403	0.89	11894	5.26	1.45	5.54	11.72	12	0.012	34	164.30	163.60	0.02
D-7	CB-7	167.00	166.79	DMH-3	167.50	166.62	18228	0.82	14853	5.26	1.81	6.10	2.30	12	0.012	76	163.00	161.10	0.03
D-8	CB-8	166.90	166.69	DMH-3	167.50	166.62	21605	0.87	18749	5.26	2.28	4.85	2.91	12	0.012	19	162.90	162.60	0.02
D-9	CB-9	166.80	165.57	DMH-2	167.70	165.52	7373	0.82	6023	5.26	0.73	5.42	0.93	12	0.012	142	162.80	160.00	0.02
D-10	CB-10	165.00	160.47	DMH-1	164.00	160.46	9701	0.81	7853	5.26	0.96	8.91	7.41	12	0.012	15	159.50	158.70	0.05
D-11	CB-11	166.30	162.27	DMH-13	164.20	161.16	6611	0.73	4805	5.26	0.58	5.60	5.72	12	0.012	57	161.80	160.60	0.02
D-12	CB-12	165.00	160.47	DMH-1	164.00	160.46	6983	0.69	4833	5.26	0.59	8.37	6.15	12	0.012	17	159.50	158.70	0.05
D-13	DMH-13	164.20	161.07	OF-2	165.27	160.34	(N/A)	(N/A)	4805	5.23	0.58	4.85	5.16	12	0.012	38	160.60	160.00	0.02
D-14	CB-14	166.30	162.96	DMH-15	166.30	162.00	19584	0.72	14044	5.26	1.71	4.95	6.23	12	0.012	67	162.30	161.20	0.02
D-15	DMH-15	166.30	161.86	OF-2	165.27	160.39	(N/A)	(N/A)	14044	5.23	1.70	8.29	9.08	12	0.012	26	161.20	160.00	0.05
D-105	INF-105	170.70	168.71	DMH-4	170.60	167.11	(N/A)	(N/A)	0	6.60	0.00	1.17	6.62	6	0.012	35	164.90	163.60	0.04

APPENDICES

Zoom to location: FRANKLIN STREET, FRAMINGHAM, MA Go!

Map Unit Legend

Area (Ac)	Map Symbol	Map Unit
191.2	626B	Merrimac-Urban land complex, 0 to 8 percent slopes
53.4	1	Water
36.5	602	Urban land
29.2	622C	Paxton-Urban land complex, 3 to 15 percent slopes
23.9	52A	Freetown muck, 0 to 1 percent slopes
22.6	251A	Haven silt loam, 0 to 3 percent slopes
21.1	653	Udorthents, sandy
15.5	251B	Haven silt loam, 3 to 8 percent slopes
12.7	98A	Winooski very fine sandy loam, 0 to 3 percent slopes
12.0	255B	Windsor loamy sand, 3 to 8 percent slopes
11.9	656	Udorthents-Urban land complex
11.2	655	Udorthents, wet substratum
11.2	652	Udorthents, refuse substratum
7.1	654	Udorthents, loamy
7.0	223B	Scio very fine sandy loam, 3 to 8 percent slopes
6.9	53A	Freetown muck, ponded, 0 to 1 percent slopes
5.7	36A	Saco mucky silt loam, 0 to 1 percent slopes
5.7	253D	Hinckley loamy sand, 15 to 25 percent slopes
4.5	420D	Canton fine sandy loam, 15 to 25 percent slopes
2.1	255C	Windsor loamy sand, 8 to 15 percent slopes
1.9	305D	Paxton fine sandy loam, 15 to 25 percent slopes
0.1	51A	Swansea muck, 0 to 1 percent slopes

Map Unit Composition

Map units consist of 1 or more soil types, commonly referred to as "components".

Component Name	Geomorphic Position	Area Fraction	Component Type	Horizon Data
Soil Type 1 ***Urban land***		*85%*	*Major Soil Type*	*None*
Soil Type 2 ***Udorthents***		*5%*	*Inclusion*	*Similar Data [1] **
Soil Type 3 ***Rock outcrop***		*5%*	*Inclusion*	*None*
Soil Type 4 ***Udorthents***		*5%*	*Inclusion*	*Similar Data [1] **

*Note: links to horizon data marked with an * are approximate.*

Map Unit Data *What is a Map Unit?*

Cartographic information about this map unit.

Map Unit Name: *Urban land*
Map Unit Type: *Consociation*
Map Unit Symbol: *602*
Map Unit Area: *18718 acres total in survey area*

Raw Map Unit Data
Raw Component Data (All Components)

Map Unit Aggregated Data

Generalized soils information within this map unit.

Farmland Class: *Not prime farmland*
Available Water Storage (0-100cm): *cm*
Max Flood Freq: *None*
Drainage Class (Dominant Condition):
Drainage Class (Wettest Component):
Hydric Conditions: *Unknown*
[Annual] Min. Water Table Depth: *n/a*
[April-June] Min. Water Table Depth: *n/a*
Min Bedrock Depth: *n/a*

Raw Aggregated Map Unit Data

Associated Point Data

Links to any NSSL point data within this map unit.

Map Unit Composition

Map units consist of 1 or more soil types, commonly referred to as "components".

Component Name	Geomorphic Position	Area Fraction	Component Type	Horizon Data
Soil Type 1 Merrimac	plains / Footslope terraces	40%	Major Soil Type	YES
Soil Type 2 Urban land		40%	Major Soil Type	None
Soil Type 3 Sudbury	plains / Footslope terraces	10%	Inclusion	YES
Soil Type 4 Windsor	terraces flats deltas / Footslope terraces	5%	Inclusion	YES
Soil Type 5 Hinckley	ridges eskers / Backslope	5%	Inclusion	YES

*Note: links to horizon data marked with an * are approximate.*

Map Unit Data What is a Map Unit?

Cartographic information about this map unit.

Map Unit Name: Merrimac-Urban land complex, 0 to 8 percent slopes
Map Unit Type: Complex
Map Unit Symbol: 626B
Map Unit Area: 30072 acres total in survey area

Raw Map Unit Data
Raw Component Data (All Components)

Map Unit Aggregated Data

Generalized soils information within this map unit.

Farmland Class: Not prime farmland
Available Water Storage (0-100cm): 9.89 cm
Max Flood Freq: None
Drainage Class (Dominant Condition): Somewhat excessively drained
Drainage Class (Wettest Component): Somewhat excessively drained
Hydric Conditions: Unknown
[Annual] Min. Water Table Depth: n/a
[April-June] Min. Water Table Depth: n/a
Min Bedrock Depth: n/a

Raw Aggregated Map Unit Data

Associated Point Data

Links to any NSSL point data within this map unit.

McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST BORING LOG

BORING B-1

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: New Hampshire Boring, Inc.

MGA NO. : W0403
SHEET NO. : 1 of 1
LOCATION N : See Plan
E :
ELEVATION : 167.5'±
DATE START : 9/16/13
END : 9/16/13
DRILLER : Mark D'Ambrosio
ENGINEER : Gina Romano

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	Split Spoon	---
9/16/13	0900	---	10'	22'	Size I.D.	4"	1-3/8"	---
					Hammer Wt.	300#	140#	- - - -
					Hammer Fall	24"	30"	- - - -

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0							167.3	-ASPHALT-
							0.2	
			18 15	S-1	1.0 2.0	6		Tan-brown, fine to medium SAND, little (+) fine to coarse Gravel, little Silt.
							165.5	
			13 13	S-1A	2.0 3.0	6	2.0	-FILL-
								Tan, fine to coarse SAND, trace (+) fine Gravel, trace (-) Silt.
4			11 14 13 9	S-2	3.0 5.0	13		Medium dense, light tan, fine to coarse SAND, trace (+) fine Gravel, trace (-) Silt.
			10 9 9 12	S-3	5.0 7.0	11		Medium dense, light tan, fine to medium SAND, trace Silt, trace (-) fine Gravel.
								-SAND-
							160.5	
8							7.0	
			8 8 9 9	S-4	10.0 12.0	12		Medium dense, beige, fine to medium SAND, some (+) Silt, trace fine to coarse Gravel.
12								
16			9 7 11 11	S-5	15.0 17.0	16		Medium dense, beige, fine to medium SAND, little Silt.
								-SILTY SAND-
20			6 4 2 3	S-6	20.0 22.0	21		Loose, beige, fine to medium SAND, some Silt.
							145.5	
							22.0	BOTTOM OF BORING AT 22 FEET.

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	**BORING B-1**
		30+	Hard		

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McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST BORING LOG

BORING B-2

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: New Hampshire Boring, Inc.

MGA NO. : W0403
SHEET NO. : 1 of 2
LOCATION N : See Plan
E :
ELEVATION : 167'±
DATE START : 9/16/13
END : 9/16/13
DRILLER : Mark D'Ambrosio
ENGINEER : Gina Romano

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	Split Spoon	---
9/16/13	1030	---	10'	32'	Size I.D.	4"	1-3/8"	---
					Hammer Wt.	300#	140#	----
					Hammer Fall	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0							166.9	-ASPHALT-
							0.1	-FILL-
			7 8 7 7	S-1	1.0 3.0	14	166.0 1.0	Medium dense, tan, fine to coarse SAND, little fine Gravel, trace Silt. -SAND-
4			6 6	S-2	3.0 4.0	7	163.0	Tan, fine to coarse SAND, little fine Gravel, trace Silt.
			6 7	S-2A	4.0 5.0	7	4.0 162.0	Beige, fine to medium SAND, some Silt. -SILTY SAND-
			5 5 6 9	S-3	5.0 7.0	12	5.0 160.0	Medium dense, tan-beige, fine to coarse SAND, little fine Gravel, trace Silt. -SAND-
8							7.0	
12			7 10 8 8	S-4	10.0 12.0	10		Medium dense, beige-tan, fine to medium SAND, little (+) Silt. -SILTY SAND-
16			6 7 9 10	S-5	15.0 17.0	12		Medium dense, beige, fine to medium SAND, little (+) Silt.
20			5 9 4 6	S-6	20.0 22.0	21		Medium dense, beige, fine to medium SAND, some (+) Silt.

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	**BORING B-2**
		30+	Hard		

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McArdle Gannon Associates, Inc. Engineers & Consultants	TEST BORING LOG	BORING B-2

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC

MGA NO. : W0403
SHEET NO. : 2 of 2

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
24								
			4 4 6 5	S-7	25.0 27.0	24		Loose to medium dense, beige, fine to medium SAND, some (+) Silt. -SILTY SAND-
							140.0 27.0	[Strata change based on increase in drilling resistance]
28								-GLACIAL TILL-
			17 19 30 29	S-8	30.0 32.0	16		Dense, beige, fine to medium SAND, some fine to coarse Gravel, little Silt.
32							135.0 32.0	BOTTOM OF BORING AT 32 FEET.
36								
40								
44								
48								

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	BORING B-2
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	
		30+	Hard		

McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST BORING LOG

BORING B-3

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: New Hampshire Boring, Inc.

MGA NO. : W0403
SHEET NO. : 1 of 1
LOCATION N : See Plan
E :
ELEVATION : 167'±
DATE START : 9/16/13
END : 9/16/13
DRILLER : Mark D'Ambrosio
ENGINEER : Gina Romano

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	Split Spoon	---
9/16/13	1300	---	10'	22'	Size I.D.	4"	1-3/8"	---
					Hammer Wt.	300#	140#	- - - -
					Hammer Fall	24"	30"	- - - -

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0							166.8 / 0.2	-ASPHALT-
			9 5 5 4	S-1	1.0 3.0	14		Loose to medium dense, tan, fine to medium SAND, some Silt, little fine Gravel.
4			5 3 5 4	S-2	3.0 5.0	9		Loose, tan, fine to medium SAND, some (+) Silt. -FILL-
			7 7 8 9	S-3	5.0 7.0	8	162.0 / 5.0	Medium dense, tan to light brown, fine to coarse SAND, little (+) fine Gravel, trace Silt.
8								
12			6 7 8 9	S-4	10.0 12.0	8		Medium dense, beige, fine to coarse SAND, little fine Gravel, trace Silt. -SAND-
16			9 9 12 11	S-5	15.0 17.0	17	152.0 / 15.0	Medium dense, beige, fine to medium SAND, some (+) Silt. -SILTY SAND-
20			11 16 22 16	S-6	20.0 22.0	12	145.0 / 22.0	Dense, beige, fine to medium SAND, some (-) Silt. BOTTOM OF BORING AT 22 FEET.

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	BORING B-3
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	
		30+	Hard		

McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST BORING LOG

BORING B-4

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: New Hampshire Boring, Inc.

MGA NO. : W0403
SHEET NO. : 1 of 2
LOCATION N : See Plan
E :
ELEVATION : 167.5'±
DATE START : 9/16/13
END : 9/16/13
DRILLER : Mark D'Ambrosio
ENGINEER : Gina Romano

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	Split Spoon	---
9/16/13	1400	---	15'	27'	Size I.D.	4"	1-3/8"	---
					Hammer Wt.	300#	140#	----
					Hammer Fall	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0							167.3 / 0.2	-ASPHALT-
			10 5 10 11	S-1	1.0 3.0	16		Medium dense, tan-brown, fine to medium SAND, some (-) Silt, some (-) fine to coarse Gravel.
4			11 7 4 5	S-2	3.0 5.0	1		Gray, coarse GRAVEL. [Gravel stuck in tip of split spoon]
			6 9	S-3	5.0 6.0	7	161.5	-FILL- Brown, fine to medium SAND, some (+) fine to coarse Gravel, some Silt, trace Asphalt.
			8 9	S-3A	6.0 7.0	8	6.0	Beige-tan, fine to coarse SAND, trace Silt.
8								-SAND-
			5 13 15 15	S-4	10.0 12.0	13	157.5 / 10.0	Medium dense, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt.
12								-SAND & GRAVEL-
			18 14 13 15	S-5	15.0 17.0	8	152.5 / 15.0	Medium dense, beige, fine to medium SAND, some Silt, some fine to coarse Gravel.
16								-GLACIAL TILL-
20			22 21 23 24	S-6	20.0 22.0	9		Dense, beige, fine to medium SAND, some Silt, some fine to coarse Gravel.

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	**BORING B-4**
		30+	Hard		

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TEST BORING LOG

BORING B-4

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC

MGA NO. : W0403
SHEET NO. : 2 of 2

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recov-ery (in)	Elev-ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
24								
			25 17 16 15	S-7	25.0 27.0	8		Dense, beige, fine to medium SAND, some (+) Silt, some (+) fine to coarse Gravel. -GLACIAL TILL-
							140.5 27.0	BOTTOM OF BORING AT 27 FEET.
28								
32								
36								
40								
44								
48								

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	**BORING B-4**
		30+	Hard		

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TEST BORING LOG

BORING B-5

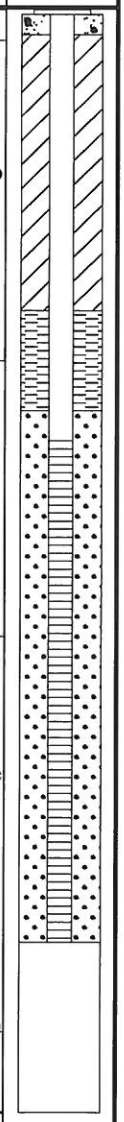
PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: New Hampshire Boring, Inc.

MGA NO. : W0403
SHEET NO. : 1 of 1
LOCATION N : See Plan
E :
ELEVATION : 166'±
DATE START : 9/17/13
END : 9/17/13
DRILLER : Mark D'Ambrosio
ENGINEER : Gina Romano

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	Split Spoon	---
9/17/13	0900	---	15'	22'	Size I.D.	4"	1-3/8"	---
9/25/13	1030	15.5'	MW		Hammer Wt.	300#	140#	----
					Hammer Fall	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0							165.8	-ASPHALT-
							0.2	
			17 30 15 18	S-1	1.0 3.0	8		Dense, dark brown, fine to coarse GRAVEL and fine to coarse SAND, little (-) Silt.
4			18 17 14 8	S-2	3.0 5.0	9		Dense, brown, fine to medium SAND, some (-) Silt, little fine to coarse Gravel.
			6 4 5 5	S-3	5.0 7.0	12		Loose, beige to dark brown, fine to medium SAND and SILT.
							159.0	-FILL-
8			7 5 4 5	S-4	7.0 9.0	1	7.0	Gray, coarse GRAVEL. [Gravel stuck in tip of split spoon]
			6	S-5	9.0	3		Orange-brown, fine to medium SAND, some Silt.
			6	S-5A	9.5	5		Brown, fine to coarse SAND, some Silt, some (-) fine to coarse Gravel.
			7	S-5B	9.5 10.5	6		Beige, fine to medium SAND, some Silt.
12			6		10.5 11.0			
							153.5	-SILTY SAND-
							12.5	[Strata change based on increase in drilling resistance]
16			23 26 51 100/4"	S-6	15.0 16.8	7		Very dense, brown, fine to medium SAND, some Silt, some fine to coarse Gravel.
								-GLACIAL TILL-
20			90 48 48 25	S-7	20.0 22.0	9		Very dense, gray, fine to coarse GRAVEL, some fine to medium Sand, some Silt.
							144.0	
							22.0	BOTTOM OF BORING AT 22 FEET.

Well Schematic



BLOWS/FT.	DENSITY
0 - 4	Very Loose
4 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

BLOWS/FT.	CONSISTENCY
0 - 2	Very Soft
2 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
15 - 30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample

SUMMARY
Overburden:
Rock:
Samples:

BORING B-5

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TEST BORING LOG

BORING B-6

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: New Hampshire Boring, Inc.

MGA NO. : W0403
SHEET NO. : 1 of 2
LOCATION N : See Plan
E :
ELEVATION : 173'±
DATE START : 9/17/13
END : 9/17/13
DRILLER : Mark D'Ambrosio
ENGINEER : Gina Romano

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	Split Spoon	---
9/17/13	1200	---	20'	23.5'	Size I.D.	4"	1-3/8"	---
					Hammer Wt.	300#	140#	----
					Hammer Fall	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0							172.9	-ASPHALT-
							0.1	-FILL-
			8 8 5 8	S-1	1.0 3.0	12	172.0 1.0	Medium dense, beige, fine to coarse SAND, little (-) fine Gravel, trace Silt.
4			8 4 5 5	S-2	3.0 5.0	12		Medium dense, beige, fine to coarse SAND, little (-) fine Gravel, trace Silt.
			5 6 7 7	S-3	5.0 7.0	12		Medium dense, beige, fine to medium SAND, trace (-) Silt.
8								-SAND-
							163.0 10.0	
			6 7 8 8	S-4	10.0 12.0	8		Medium dense, beige-tan, fine to medium SAND, some (-) Silt, with seams of fine to coarse SAND, trace Silt.
12								-SILTY SAND-
							158.5 14.5	[Strata change based on increase in drilling resistance]
16			42 45 36 45	S-5	15.0 17.0	13		Very dense, gray, fine to coarse SAND and fine to coarse GRAVEL, some (-) Silt.
								-GLACIAL TILL-
20			19 20 40 30	S-6	20.0 22.0	1		Gray, coarse GRAVEL. [Gravel stuck in tip of split spoon]
			36	S-7	22.0	4		Very dense, gray, fine to medium SAND and fine to coarse GRAVEL,

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	**BORING B-6**
		30+	Hard		

McArdle Gannon Associates, Inc.
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TEST BORING LOG

BORING B-6

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC

MGA NO. : W0403
SHEET NO. : 2 of 2

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recov-ery (in)	Elev-ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			36		23.5		149.5	some (-) Silt.
			30				23.5	BOTTOM OF BORING AT 23.5 FEET.
24								
28								
32								
36								
40								
44								
48								

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	**BORING B-6**
		30+	Hard		

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TEST BORING LOG

BORING B-7

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: New Hampshire Boring, Inc.

MGA NO. : W0403
SHEET NO. : 1 of 1
LOCATION N : See Plan
E :
ELEVATION : 172'±
DATE START : 9/17/13
END : 9/17/13
DRILLER : Mark D'Ambrosio
ENGINEER : Gina Romano

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	Split Spoon	---
9/17/13	1400	---	20'	22'	Size I.D.	4"	1-3/8"	---
					Hammer Wt.	300#	140#	----
					Hammer Fall	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0							171.9	-ASPHALT-
							0.1	-FILL-
			9 7 8 6	S-1	1.0 3.0	14	171.0 1.0	Medium dense, tan, fine to medium SAND, some (+) Silt.
4			4 3 7 6	S-2	3.0 5.0	17		Loose to medium dense, tan-beige, fine to medium SAND, some (+) Silt.
			5 4 6 8	S-3	5.0 7.0	14		Loose to medium dense, beige, SILT, some (-) fine Sand.
8							162.0	-SILTY SAND-
12			13 14 13 13	S-4	10.0 12.0	10	10.0	Medium dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt. -SAND & GRAVEL-
							157.0	
16			12 15 15	S-5	15.0 16.5	8	15.0 155.5	Medium dense to dense, beige, fine to medium SAND and SILT. -SILTY SAND-
			38	S-5A	16.5 17.0	5	16.5	Gray, fine to coarse SAND, some Silt, some (-) fine Gravel. -GLACIAL TILL-
20			25 15 19 18	S-6	20.0 22.0	7	150.0	Dense, brown, fine to coarse SAND and fine to coarse GRAVEL, some Silt.
							22.0	BOTTOM OF BORING AT 22 FEET.

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	BORING B-7
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	
		30+	Hard		

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TEST BORING LOG

BORING B-8

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: New Hampshire Boring, Inc.

MGA NO. : W0403
SHEET NO. : 1 of 1
LOCATION N : See Plan
E :
ELEVATION : 172'±
DATE START : 9/17/13
END : 9/18/13
DRILLER : Mark D'Ambrosio
ENGINEER : Gina Romano

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	Split Spoon	---
9/17/13	1500	---	20'	20'	Size I.D.	4"	1-3/8"	---
					Hammer Wt.	300#	140#	----
					Hammer Fall	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0							171.9	-ASPHALT-
							0.1	-FILL-
			6 9 8 10	S-1	1.0 3.0	8	171.0 1.0	Medium dense, light brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt.
4			10 14 10 13	S-2	3.0 5.0	4		Medium dense, light brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt.
			17 25 30 35	S-3	5.0 7.0	1		Very dense, gray-brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt.
8								-SAND & GRAVEL-
12			11 8 12 20	S-4	10.0 12.0	10		Medium dense, light brown, fine to coarse SAND, some (-) fine Gravel, trace Silt.
16			20 24 16 19	S-5	15.0 17.0	10		Dense, light brown, fine to coarse SAND, some fine to coarse Gravel, little (+) Silt.
20			100/0"	S-6	20.0 20.0	0	152.0 20.0	[Split spoon refusal at 20 feet] BOTTOM OF BORING AT 20 FEET.

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	BORING B-8
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	
		30+	Hard		

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TEST BORING LOG

BORING B-9

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: New Hampshire Boring, Inc.

MGA NO. : W0403
SHEET NO. : 1 of 2
LOCATION N : See Plan
E :
ELEVATION : 172'±
DATE START : 9/18/13
END : 9/18/13
DRILLER : Mark D'Ambrosio
ENGINEER : Gina Romano

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	Split Spoon	---
9/18/13	1000	---	22'	24'	Size I.D.	4"	1-3/8"	---
					Hammer Wt.	300#	140#	- - - -
					Hammer Fall	24"	30"	- - - -

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0							171.9	-ASPHALT-
							0.1	-FILL-
			9 10 8 12	S-1	1.0 3.0	14	171.0 1.0	Medium dense, beige, fine to medium SAND, little (-) Silt.
4			19 9 9 13	S-2	3.0 5.0	11	167.0	Medium dense, beige, fine to coarse SAND, trace Silt. -SAND-
			10 14 8 10	S-3	5.0 7.0	8	5.0	Medium dense, beige, fine SAND and SILT.
8								
12			8 10 10 12	S-4	10.0 12.0	10		Medium dense, beige, fine SAND and SILT. -SILTY SAND-
16			6 6 10 10	S-5	15.0 17.0	10		Medium dense, beige, fine to medium SAND, little (+) Silt.
20							152.0 20.0	[Cobbles/Boulder from 20-20.5 feet] -GLACIAL TILL-
			27	S-6	22.0	10		Dense, olive-gray, fine to medium SAND, some Silt, some fine to coarse

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY
0 - 4	Very Loose	0 - 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
50 +	Very Dense	15 - 30	Very Stiff
		30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

SUMMARY
Station:
Rock:
Samples:

BORING B-9

McArdle Gannon Associates, Inc.
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TEST BORING LOG

BORING B-9

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC

MGA NO. : W0403
SHEET NO. : 2 of 2

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recov-ery (in)	Elev-ation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			14		24.0			Gravel.
			20					
24			23				148.0	
							24.0	BOTTOM OF BORING AT 24 FEET.
28								
32								
36								
40								
44								
48								

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	**BORING B-9**
		30+	Hard		

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TEST BORING LOG

BORING B-10

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: New Hampshire Boring, Inc.

MGA NO. : W0403
SHEET NO. : 1 of 1
LOCATION N : See Plan
E :
ELEVATION : 171'±
DATE START : 9/18/13
END : 9/18/13
DRILLER : Mark D'Ambrosio
ENGINEER : Gina Romano

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	Split Spoon	---
9/18/13	1200	---	15'	22'	Size I.D.	4"	1-3/8"	---
					Hammer Wt.	300#	140#	----
					Hammer Fall	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0							170.9	-ASPHALT-
							0.1	-FILL-
			8	S-1	1.0	14	170.0	Medium dense, beige, fine to medium SAND, little fine Gravel, trace Silt.
			12		3.0		1.0	
			12					
			10					
			21	S-2	3.0	0		[No Recovery]
4			20		5.0			
			14					
			12					
			14	S-3	5.0	0		[No Recovery]
			18		7.0			
			16					
			16					
			8	S-4	7.0	11		Medium dense, beige, fine to medium SAND, trace Silt, trace fine Gravel.
8			7		9.0			
			8					
			9	S-5	9.0	12		Medium dense, beige, alternating 4-6" seams of fine to medium SAND, little Silt / fine to coarse SAND, little fine Gravel, trace Silt.
			13		11.0			
			11					
			8					
			10					
12								-SAND-
							156.0	
			6	S-6	15.0	12	15.0	Medium dense, beige, fine to medium SAND, some (+) Silt.
16			8		17.0			
			11					
			12					
								-SILTY SAND-
							151.0	
20			20	S-7	20.0	11	20.0	Dense, olive-beige, fine to medium SAND, some (+) Silt, little (+) fine to coarse Gravel.
			19		22.0			-GLACIAL TILL-
			25					
			50				149.0	
							22.0	BOTTOM OF BORING AT 22 FEET.

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	**BORING B-10**
		30+	Hard		

McArdle Gannon Associates, Inc.
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TEST BORING LOG

BORING B-11

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: New Hampshire Boring, Inc.

MGA NO. : W0403
SHEET NO. : 1 of 2
LOCATION N : See Plan
E :
ELEVATION : 170.5'±
DATE START : 9/18/13
END : 9/18/13
DRILLER : Mark D'Ambrosio
ENGINEER : Gina Romano

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	Split Spoon	---
9/18/13	1400	---	20'	34'	Size I.D.	4"	1-3/8"	---
					Hammer Wt.	300#	140#	----
					Hammer Fall	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
0							170.4	-ASPHALT-
							0.1	
			5 4 2 3	S-1	1.0 3.0	9	167.5	Loose, light brown to dark brown, fine to medium SAND, some Silt, little (-) fine Gravel. -FILL-
4			4 3 2 4	S-2	3.0 5.0	8	165.5	Loose, light brown, fine to medium SAND, little (-) Silt. -SAND-
			11 6 8 8	S-3	5.0 7.0	7	160.5	Medium dense, light brown to gray, fine to coarse SAND, some (+) fine Gravel, trace Silt.
8								-SAND& GRAVEL-
			5 7 10 11	S-4	10.0 12.0	11	10.0	Medium dense, beige, fine to medium SAND, some Silt.
12								-SILTY SAND-
16			8 10 11 12	S-5	15.0 17.0	12		Medium dense, beige, fine to medium SAND, some Silt.
20			5 3 4 5	S-6	20.0 22.0	16		Loose, olive-beige, fine SAND and SILT.

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	BORING B-11
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	
		30+	Hard		

McArdle Gannon Associates, Inc. Engineers & Consultants	TEST BORING LOG	BORING B-11

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC

MGA NO. : W0403
SHEET NO. : 2 of 2

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
24								
			8 11	S-7	25.0 26.0	7		Olive-beige, fine to medium SAND and SILT.
			21 23	S-7A	26.0 27.0	8		Olive-brown, fine to medium SAND, some (+) fine to coarse Gravel, some (-) Silt.
28								-SILTY SAND-
			23 28 39 36	S-8	30.0 32.0	0		[No Recovery]
32			15 12 16 19	S-9	32.0 34.0	18		Medium dense, beige, fine to medium SAND, some Silt.
							136.5 34.0	BOTTOM OF BORING AT 34 FEET.
36								
40								
44								
48								

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0 - 4	Very Loose	0 - 2	Very Soft	- S - Split Spoon	Station:
4 - 10	Loose	2 - 4	Soft	- T - Thin Wall Tube	Rock:
10 - 30	Medium Dense	4 - 8	Medium Stiff	- U - Undisturbed Piston	Samples:
30 - 50	Dense	8 - 15	Stiff	- C - Diamond Core	**BORING B-11**
50 +	Very Dense	15 - 30	Very Stiff	- B - Bulk/Grab Sample	
		30+	Hard		

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Asphalt
	Fill
	Sand
	Silty sand
	Glacial Till
	Sand and Gravel
Soil Samplers	
	Split Spoon
Monitor Well Details	
	flush-mount cover
	concrete seal
	assorted cuttings
	bentonite pellets
	silica sand, blank PVC
	slotted pipe w/ sand
	end of well installation

Notes:

1. Test borings performed by New Hampshire Boring, Inc. on September, 16 through 18, 2013 using a truck mounted drill rig equipped with a 140 pound safety hammer and hydraulic winch.

2. Test boring elevations estimated from ground surface contours and spot elevations shown on a plan entitled "Existing Conditions Plan," by Waterman Design Associates, Inc., dated May 15, 2013 and should be considered approximate.

3. Test borings observed and logged by MGA.

McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST PIT LOG

TEST PIT NO. TP-1

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: Silversmith Excavating

EQUIPMENT: John Deere 410E Backhoe

OPERATOR: Tony Gantone

GROUNDWATER

Date	Time	Depth (ft.)	Notes
9/16/13		---	Not Encountered

MGA NO. : W0403
SHEET NO. : 1 of 1
LOCATION N : See Plan
E :
ELEVATION : 173'±
DATE START : 9/16/13
END : 9/16/13
ENGINEER : Robert Drown

Depth in Feet	Strata Change	Sample Number/ Type	Sample Depth Range (ft)	Elev-ation/ Depth (ft)	SOIL DESCRIPTION (BURMISTER)	REMARKS
0					-ASPHALT-	
					-TOPSOIL-	
				172.3 / 0.7		
1					Brown to tan-brown, fine to coarse SAND, little (-) Silt, trace fine Gravel. -FILL-	
2						
					12"	
3					CONCRETE FOUNDATION	
				169.0 / 4.0		
4					Light brown, fine to medium SAND, trace Silt. -SAND FILL-	
				168.5 / 4.5		
					Olive-gray, fine to medium SAND, some (-) Silt. -SILTY SAND-	
5				168.0 / 5.0	BOTTOM OF TEST PIT AT 5 FEET.	

TEST PIT DIMENSIONS	BOULDERS	SAMPLE IDENTIFICATION	SUMMARY
Width: 2.5' Feet	6" to 18" Diameter= 0	- B - Bag	Overburden:
	18" to 36" Diameter= 0	- J - Jar	Rock:
Length: 3.5' Feet	Over 36" Diameter= 0 (number)	- P - Percolation Test	Samples:
			TEST PIT NO. TP-1

300 Oak Street Suite 460 Pembroke, MA 02359 | Telephone (781) 826-0400 | Fax (781) 735-0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

TEST PIT LOG

TEST PIT NO. TP-2

PROJECT: Mt. Wayte Plaza, 444 Franklin Street, Framingham, MA
CLIENT: Plaza Properties LLC
CONTRACTOR: Silversmith Excavating

EQUIPMENT: John Deere 410E Backhoe

OPERATOR: Tony Gantone

GROUNDWATER

Date	Time	Depth (ft.)	Notes
9/16/13		----	Not Encountered

MGA NO. : W0403
SHEET NO. : 1 of 1
LOCATION N : See Plan
E :
ELEVATION : 171.5'±
DATE START : 9/16/13
END : 9/16/13
ENGINEER : Robert Drown

Depth in Feet	Strata Change	Sample Number/ Type	Sample Depth Range (ft)	Elev-ation/ Depth (ft)	SOIL DESCRIPTION (BURMISTER)	REMARKS
0				171.2	-ASPHALT-	
				0.3	Brown to tan-brown, fine to coarse SAND, little (-) Silt, trace fine to coarse Gravel, trace (-) Cobbles/Boulders. -FILL-	
1						
2						
3					12" CONCRETE FOUNDATION	
4				167.5		
				4.0	Light brown, fine to medium SAND, trace Silt. -SAND FILL-	
				167.0		
				4.5	Olive-gray, fine to medium SAND, some Silt. -SILTY SAND-	
5				166.5		
				5.0	BOTTOM OF TEST PIT AT 5 FEET.	

TEST PIT DIMENSIONS	BOULDERS	SAMPLE IDENTIFICATION	SUMMARY
Width: 5' Feet	6" to 18" Diameter= 3	- B - Bag	Overburden:
	18" to 36" Diameter= 0	- J - Jar	Rock:
Length: 4.5' Feet	Over 36" Diameter= 0 (number)	- P - Percolation Test	Samples:
			TEST PIT NO. TP-2

KEY TO SYMBOLS

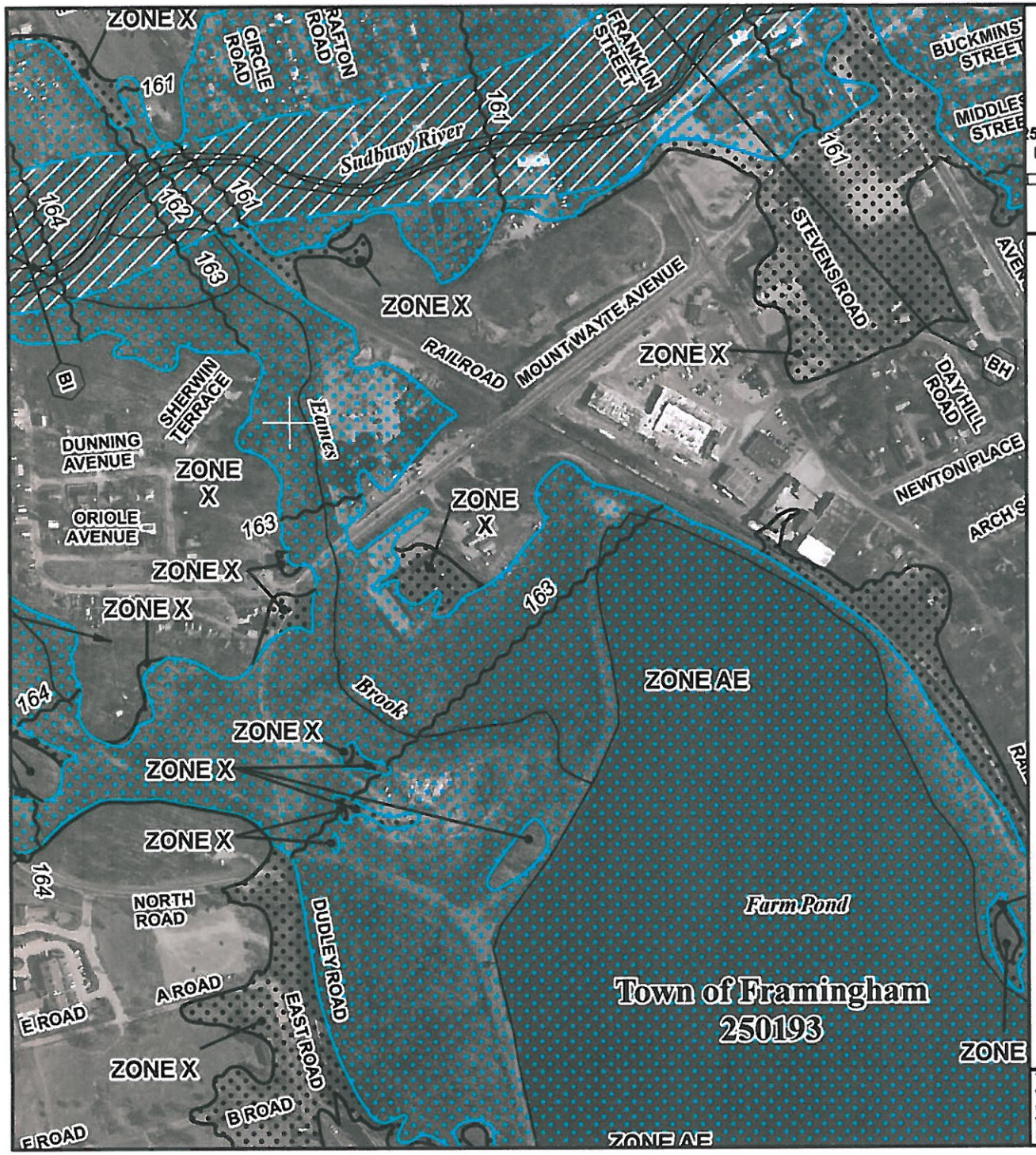
Symbol	Description
Strata symbols	
	Topsoil
	Fill
	Sand Fill
	Silty sand
	Asphalt

Notes:

1. Test pits performed by Silversmith Excavating on September 16, 2013 using a John Deere 410E rubber tired backhoe.

2. Test pit elevations estimated from ground surface contours shown on a plan entitled "Existing Conditions Plan," by Waterman Design Associates, Inc. (WDA), dated May 15, 2013 and should be considered approximate.

3. Test pits observed and logged by MGA.



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0516E

FIRM

FLOOD INSURANCE RATE MAP

MIDDLESEX COUNTY, MASSACHUSETTS
(ALL JURISDICTIONS)

PANEL 516 OF 656

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
FRAMINGHAM, TOWN OF	250193	0516	E

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
25017C0516E

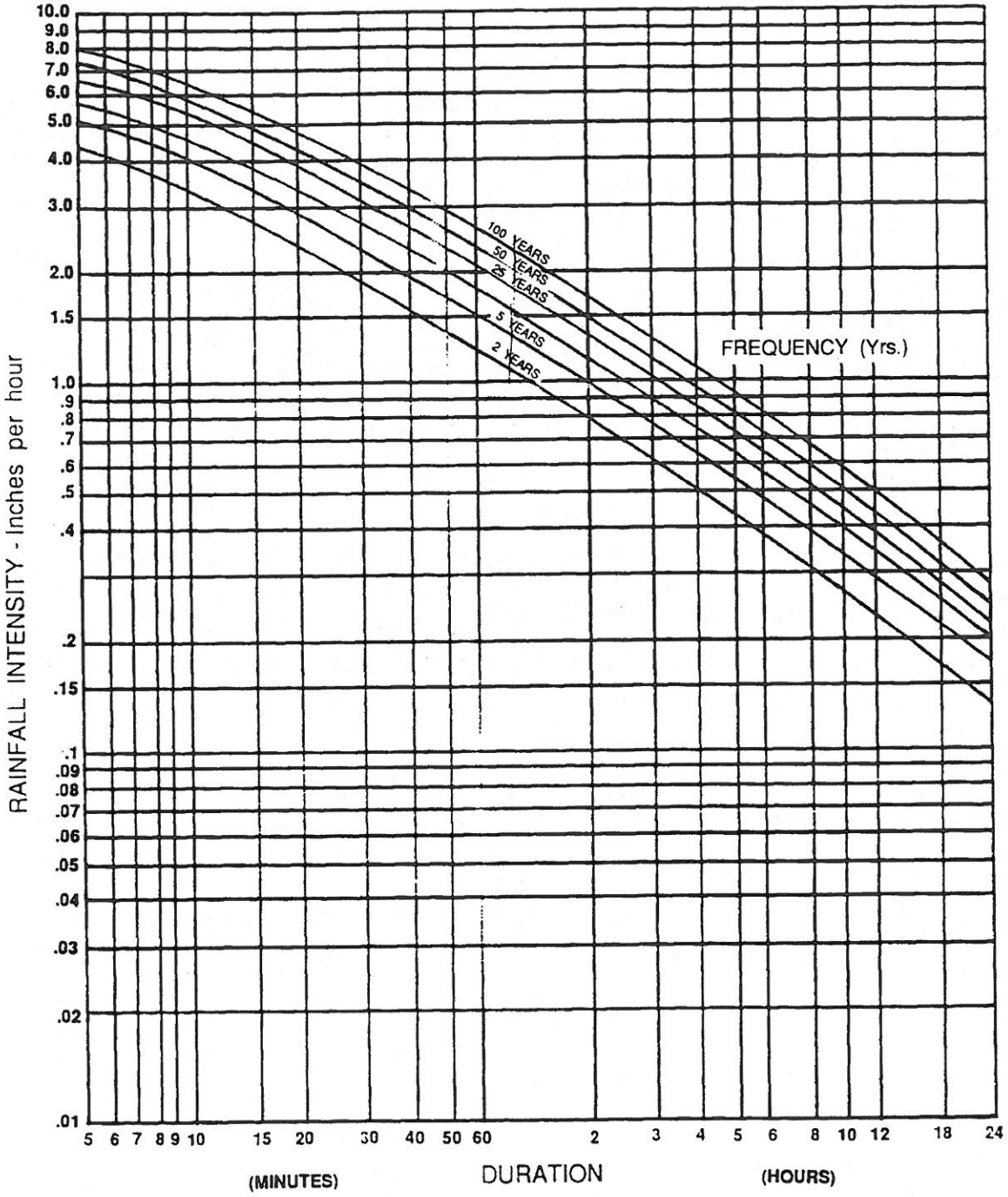
EFFECTIVE DATE
JUNE 4, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Exhibit 8-14

Intensity - Duration - Frequency Curve for Worcester, MA



Source: TR55 - Urban Hydrology for Small Wetlands, NRCS

PROJECT DESCRIPTION

The project proposal includes the demolition and removal of the existing gas station building, fuel pumps and dispenser stations followed by the construction of a new new two story 18932± square foot building near the corner of Franklin and Mt. Wayte Streets. Additionally, the northern portion of the existing shopping center will be demolished and a new two story building will be constructed in its place along with the reconstruction of associated parking areas and the installation of a modern drainage system and new utility services. The redevelopment will result in roughly 0.76 acres of open space, or 11.3% of the site, an increase over that which currently exists.

All stormwater runoff from the eastern parking areas will be collected in hooded catch basins and conveyed to existing design points at a rate equal to or less than existing conditions for the 2-, 10-, and 100-year, 24-hour design storms. Stormwater runoff from the western parking and loading areas will flow to the existing catch basins, but the drainage system will be fitted with new water quality structures (Stormceptor 450 and 900), prior to discharging offsite. In addition, rooftop runoff from the new two-story building fronting on Franklin Street will be directed to a subsurface infiltration system to infiltrate over two (2) inches of run off. This is equivalent to more than an inch of stormwater runoff from the two new buildings.

Stormwater runoff from the overland areas not tributary to the stormwater management facilities will drain by sheet flow or shallow concentrated flow along the existing flow patterns to the design points.

PROJECT PHASING

The project will be constructed as a single phase.

7.2.9. Buffer Documentation:

This parcel contains a buffer zone located on the southeastern corner of the property for a Bordering Vegetative Wetland (BVW) located off site to the southeast. There is no work proposed within 50' of any wetland resource area.

Note: CGP requires a 50' ***undisturbed*** buffer or equivalent erosion controls if a surface water (i.e., most wetland resources) is within 50' of the site (i.e., proposed area of disturbance)...there are tables for small construction projects, but the CGP does require that you use the RUSLE program (or equivalent) for other projects.

PROJECT CONSTRUCTION SEQUENCE

Construction consists of the proposed building(s), accessory structure(s), access driveways, parking areas, installation of subsurface utility services, and stormwater management system. Construction will be considered complete upon final landscaping and ground surface stabilization. All erosion control measures will be installed prior to the commencement of construction, maintained throughout the construction process, and repaired or replaced as necessary. Diversion swales and/or erosion control measures consisting of, but not limited to, hay bales and/or silt fence, hay or bark mulch, tackifier, hydroseed, riprap, and erosion control blankets may be utilized during the construction phase.

General construction sequence:

- Provide 3"-6" trap rock construction entrance at all points of entry for construction vehicles.
- Install erosion control barrier at the limit of clearing and limit of work line.
- Demolish and remove those items slated for removal.
- Clear and grub site and properly dispose of stumps and brush.
- Rough grade stormwater management basin(s).
- Install new drainage infrastructure and riprap aprons at the stormwater management basin(s). Loam and seed basin embankments as soon as weather conditions permit.
- Stockpile top and subsoil from cleared areas and surround with silt fence if stockpile is to remain for more than forty-eight (48) hours.
- Rough grade access driveway corridors and parking areas.
- Rough grade off-grading and provide stapled jute-matting where slopes exceed 3:1.
- Excavate building foundations, form and pour foundations, and rough grade around foundation.
- Install drainage, water, sewer and other underground utilities within access driveways and parking areas and provide utility services to building.
- Begin framing and continue building construction.
- Adjust grades in basin(s) and swales, final stabilization as needed (repair loam and seed, hay mulch, sod, hydroseed, etc.).
- Subgrade access driveways and parking areas.
- Place and roll gravel base, apply binder course on areas to be paved.
- Place curbing where applicable.
- Final grade proposed lawn areas along all driveways, parking areas, sidewalks, plant trees, loam and seed, apply hay mulch cover.
- Adjust catch basin grates, place hay bale check dams along curbs prior to catch basins or provide silt sacks (or equal) within catch basins until the site is completely stabilized.
- Apply top course of pavement to access drives, parking areas, and sidewalks.
- Street sweeping should occur once per month or as site/climatic conditions warrant during construction and until the surfaces adjacent to all driveways and sidewalks are stabilized.

The Site Contractor and Owner will assign an on-site contact person to inspect erosion control measures as required (refer to Section: Inspection Procedures (CGP 4.1)) and report any adjustments or problem areas to the DPW and/or agent, Conservation Commission, and the project engineer. Repairs shall be made in accordance with Section: Maintenance Requirements (CGP 2.1.1.4).

POLLUTION CONTROLS

Potential Pollutant Generating Activities (CGP 7.2.7.1):

Activity:	Planned?	Comments:	Pollution Control:
Paving	Yes	Roadways, sidewalks, and driveways	Erosion and sediment controls as described
Painting	Possible	Single-family houses if wood siding.	Stormwater Management system includes hoods for oil control in both catch basins and water quality treatment structures.
Solid Waste	Yes	During Construction.	During Construction solid waste

Storage			will be stored and hauled in accordance with state and local regulations.
		Following completion of construction – single family house waste.	Following Construction solid waste will be stored and hauled in accordance with state and local regulations.
Construction Dewatering	Possible	Potential with deep cuts/excavations.	Must follow Dewatering Practices (CGP 2.1.3.4)

Erosion and Sedimentation Controls

The contractor shall minimize exposed soils to the extent practicable during site construction activities. Erosion controls shall be installed prior to any construction activity, and maintained until all disturbed land surfaces are stabilized. Erosion control barrier (entrenched, staked silt fence backed by staked haybales) shall be installed in accordance with the approved Site Plans. Erosion control measures will be installed to prevent potential erosion and sedimentation of resource areas, abutting properties, and Town/State ways.

- Construction access points will be maintained to prevent tracking or flowing of sediment onto public or private roads.
- Erosion control barriers will be erected at the down gradient limit of work prior to commencement of construction, excavation, or grading.
- Hay bale check dams will be installed around existing and proposed uncovered catch basins in low points to protect against off-site sedimentation/siltation, as well as at 45° angles along curb lines and within temporary diversion swales.
- Curbing will be installed along the edge of the roadway to direct surface stormwater flows through the stormwater management system.
- Disturbed areas shall be minimized, and shall be stabilized as soon as practicable, but no later than 14 calendar days after the initiation of soil stabilization measures consistent with CGP Part 2.2.1.1, you are required to have completed:
  a. For vegetative stabilization, all activities necessary to initially seed or plant the area to be stabilized; and/or
  b. For non-vegetative stabilization, the installation or application of all such non-vegetative measures.
- Surround stockpiles with silt fence if stockpile is to remain for more than forty-eight (48) hours.
- Temporary stabilization will be accomplished utilizing temporary seeding with mulch during growing season and chopped hay and/or tackifier during non-growing season.
- Stabilization of disturbed areas will be accomplished by building cover, paving, riprap slope stabilization, temporary seeding, permanent seeding, mulching (blown hay or wood chips), landscaping or acceptable equivalent practice.
- Riprap or other velocity reducing measures will be used where necessary to control erosion.
- Street sweeping will be conducted as necessary to control the migration of sediment. Town DPW may require weekly sweeping if deemed necessary during construction until surfaces are properly stabilized. Following the installation of pavement on proposed roadways, street sweeping shall occur monthly unless Town DPW determines weekly sweeping necessary.
- Erosion control practices will be continued until all areas affected by the construction are stabilized.

- An adequate reserve of erosion control materials will be kept on site for emergency or routine replacement.
- Permanent detention and infiltration basins have been designed to be used as temporary sedimentation basins during construction considering soil types, contributing areas, and phasing. Topsoil and subsoil shall NOT be stripped from bottom of infiltration basins until site upstream of basins is stabilized to prevent siltation of soil voids in the parent soil material. Contractor is required to provide temporary diversion swales during construction to direct runoff from open/graded areas to the detention/infiltration facilities.

Stormwater Management Controls

The following measures will be taken to control pollutants occurring in stormwater runoff during and following construction:

- Temporary swales with hay bale and/or stone check dams will be provided if necessary during construction to direct runoff to temporary sedimentation basins.
- Silt fences and hay bales, staked in place, will be installed along all sloped boundaries of the construction areas.
- Sediment will be retained on-site within the limits of the erosion control barriers and removed regularly.
- Runoff from the project site will be directed through a closed drainage system (catch basins with 4' deep sumps and hoods and/or stormwater treatment units) into the existing drainage system.

Sewage and Solid Waste Control (CGP 7.2.11.2)

The following measures will be taken to control pollution by site-generated waste:

- Portable toilets shall be made available during the construction period, with wastes disposed of at an off-site location in accordance with local and state regulations.
- Construction site waste materials will be properly contained on site, and then disposed of at an off-site location in accordance with local and state regulations. Roll-offs will be maintained on-site for proper disposal of construction waste/debris. All wastes will be disposed of or recycled in accordance with local and state regulations by a licensed contractor.
- Solid waste generated by site construction will be removed to an approved location.
- The project must comply with MassDEP's Solid Waste and Air Pollution Control regulations, pursuant to M.G.L. c.40, s.54 and must comply with both Solid Waste and Air Pollution Control regulations, pursuant to M.G.L. c.40, s. 5.

Control of Pollution from Spills - during construction (CGP 7.2.11.1)

- Discharging toxic or hazardous substances from a spill or other release (consistent with CGP 2.3.1.5) is prohibited. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302 occurs during a 24-hour period, you must notify the National Response Center (NRC) at (800) 424-8802 in accordance with the requirements of 40 CFR Part 110, 40 CFR Part 117, and 40 CFR Part 302 as soon as you have knowledge of the discharge. You must also, within 7 calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release.

- Spills or leaks will be treated according to material type, volume, and location of spill. Mitigation will include containing the spill, removing spilled material as practicable in a safe and environmentally sound manner, and remediating any damage to the environment.
- For large spills, Massachusetts DEP Hazardous Waste Incident Response Group will be notified immediately at (508) 792-7650 and an emergency response contractor will be called in.

Documentation of Compliance with Other Federal Requirements (CGP 7.2.14)

- 7.2.14.1 *Endangered Species Act:* **Criterion A**. No federally-listed threatened or endangered species or their designated critical habitat(s) are likely to occur on the site. There are no areas of Priority or Estimated Habitats of Rare Wildlife or Certified Vernal Pools as referenced in Massachusetts Natural Heritage Atlas, 13th Edition, Effective October 1, 2008.
- 7.2.14.2 *Historic Properties:* no historic properties exist on the site based on our review of the Massachusetts Cultural Resource Information System. Additionally, Massachusetts Historical Commission was included in the distribution of the project Environmental Notification Form and had no comments on the proposed project.
- 7.2.14.3 *Safe Drinking Water Act Underground Injection Control (UIC) Requirement:* The project may be required to file a UIC registration (BRP WS 06) with Massachusetts DEP for the small subsurface infiltration trench system at Salisbury Street prior to discharge of treated stormwater into the system.

State and Local Control

The project is designed to comply with applicable State and Local regulations, including the Massachusetts Contingency Plan, Massachusetts Stormwater Management Regulations, Town of Framingham Earth Moving Bylaw, and Town of Framingham Stormwater Management and Erosion Control Bylaw. The project received a Special Permit from the Planning Board, Site Plan Approval from the Framingham Board of Selectmen, and Order of Conditions from the Framingham Conservation Commission.

Non-Stormwater Discharges

No non-permitted, non-stormwater discharges are associated with this project. Process wastewater and sanitary wastewater are specifically prohibited from discharging on-site during the construction phase. Illegal dumping of trash on site will be controlled by monitoring and by periodic clean up. The following non-stormwater discharges are planned/not planned as a result of this project:

Water source	Planned?	Comments
Firefighting	No	Emergency only
Waterlines	Yes	Flushing hydrants only Water line flushing-no contaminants
Irrigation	No	
Vehicle Washing	No	No soap or detergent allowed
Dust Control	No	Watering as needed
Building Wash Down	No	External. No Detergents Allowed
Pavement Washing	No	Allowed only if no spills of toxic or

		hazardous materials has occurred. Must be directed to sediment basin or sediment traps.
Air Conditioner Condensate	Yes	Uncontaminated.
Groundwater	No	Foundation drain or underdrain.
Streams, Springs	No	Uncontaminated, non-turbid.
Construction Dewatering	No	Must follow Dewatering Practices (CGP 2.1.3.4)

Posting Permit Coverage (CGP 1.5)

The contractor shall post a sign or notice conspicuously so that is visible/legible from a public way near the construction site. The sign or notice shall be posted in a safe and publicly accessible location proximate to the project site. The sign shall include the NPDES Permit tracking number and contact name and phone number (in accordance with CGP 1.5).

On-Site Availability of SWPPP (CGP 7.3)

The current copy of the SWPPP shall be retained on-site or at an easily accessible location so that it can be made available at the time of an on-site inspection or upon request by EPA; a state, tribal, or local agency approving stormwater management plans; the operator of a storm sewer system receiving discharges from the site; or representatives of the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS).

Inspection Procedures (CGP 4.1)

- Frequency of Inspections (in accordance with CGP 4.1.2): Inspections shall be conducted once per every seven (7) calendar days or once every fourteen (14) calendar days and within twenty-four (24) hours of a storm event greater than 0.25 inches (a rain gauge must be properly maintained on-site or obtain storm event information from a weather station representative of this location). The inspector, in accordance with the CGP, shall maintain inspection logs on-site and shall record total rainfall during events 0.25 inches or greater.
- Areas to be inspected (in accordance with CGP 4.1.5): All cleared, graded, or excavated areas that have not completed stabilization; all stormwater controls, all material, waste, borrow, storage, and maintenance areas; all areas where stormwater typically flows on-site including drainage ways, diversion swales, conveyances, or treatment devices; all points of discharge from the site; all locations where stabilization measures have been implemented.
- Inspection Requirements (in accordance with CGP 4.1.6): Check whether all controls are installed, operational, and working as intended; determine if controls need to be replaced, repaired, or maintained; check for presence of conditions that could lead to spills, leaks, or other accumulations of pollutants; identify locations where new or modified stormwater controls are necessary; check for signs of visible erosion and sedimentation (at points of discharge and/or surface waters flowing through site); identify any and all incidents of noncompliance observed; initiate corrective action.
- If a discharge is occurring during the inspection: Identify all discharge locations; observe and document visual quality of discharge (color, odor, suspended or settled solids, foam, oil sheen,

etc.); document whether stormwater controls are operating effectively; describe controls not operating as intended or those in need of maintenance.

- Provide Inspection Report (in accordance with CGP 4.1.7). A sample Inspection Report is included herewith for guidance.

Maintenance Requirements (CGP 2.1.1.4)

- Erosion and sediment controls shall remain in effective operating condition during construction and during permit coverage.
- Sediment must be removed before it has accumulated to one-half the above-ground height of any perimeter control (hay bale or silt fence).
- If sediment has been tracked from the site onto streets, sediment must be removed by the end of the same work day in which it was tracked or by the end of the next work day if the tracking occurs on a non-work day. Shovel, sweep, or vacuum sediment; sediment may not be hosed or swept into any stormwater system.
- Should problems are found during construction:
  - If the problem does not require significant repair or replacement or if the problem can be corrected through routine maintenance: work to fix the problem must be initiated immediately after discovery and work must be completed by the close of the next work day.
  - When installation of new erosion control barrier/sediment control or significant repair is required: new or modified control must be installed and operational by no later than seven (7) calendar days from time of discovery (or document why it is infeasible and make it operational as soon as practicable).
- Should actions result in a change to the stormwater controls or procedures documented in this SWPPP, the SWPPP must be modified accordingly within seven (7) calendar days.

UPTOWN
Framingham, Massachusetts

STORMWATER POLLUTION PREVENTION PLAN CERTIFICATION

(SWPPP February 2014)

Owner

Name:

Address:

Telephone: _____

Responsibility

The owner is responsible for the conduct of all construction activities, and ultimate compliance with all provisions of the Stormwater Pollution Prevention Plan.

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the systems, or those persons directly responsible for gathering the information, the information 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.

Signature: _____ Date: _____
Corporate Officer

Printed Name: _____

Representing: _____

STORMWATER TEAM (CGP 7.2.1)

Framingham, MA

REFERENCE

National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges from Construction Activities, Permit # MAR120000

PROJECT NAME

UPTOWN
444-480 Franklin Street
Framingham, Massachusetts

STORMWATER TEAM

"Stormwater Team" – the group of individuals responsible for oversight of the development and modifications of the SWPPP, and oversight of compliance with the permit requirements. The individuals on the "Stormwater Team" must be identified below:

1. Name:

_____
_____
_____
_____

Area of control:

_____
_____

2. Name:

_____
_____
_____
_____

Area of control:

_____
_____

3. Name:

_____
_____
_____
_____

Area of control:

_____
_____

STAFF TRAINING

The contractor must ensure that the required personnel were trained in accordance with CGP 6. Staff Training logs are attached.

ESTIMATED DATES OF CONSTRUCTION ACTIVITIES

The contractor and/or Stormwater Team must provide a schedule of the estimated **start dates and duration** of the activity for activities listed in CGP 7.2.5

7.2.5.1 Installation of stormwater control measures, and when they will be made operational, including an explanation of how the sequence and schedule for installation of stormwater control measures complies with Part 2.1.1.3a and of any departures from manufacturer specifications pursuant to Part 2.1.1.3b;

	Start Date	Duration

7.2.5.2 Commencement and duration of earth-disturbing activities, including clearing and grubbing, mass grading, site preparation (i.e., excavating, cutting and filling), final grading, and creation of soil and vegetation stockpiles requiring stabilization;

	Start Date	Duration

7.2.5.3 Cessation, temporarily or permanently, of construction activities on the site, or in designated portions of the site;

	Start Date	Duration

7.2.5.4 Final or temporary stabilization of areas of exposed soil. The dates for stabilization must reflect the applicable deadlines to which you are subject in Part 2.2.1;

	Start Date	Duration

7.2.5.5 Removal of temporary stormwater conveyances/channels and other stormwater control measures, removal of construction equipment and vehicles, and cessation of any pollutant-generating activities.

	Start Date	Duration

Note: If plans change due to unforeseen circumstances or for other reasons, the requirement to describe the sequence and estimated dates of construction activities is not meant to "lock in" the operator to meeting these projections. When departures from initial projections are necessary, this should be documented in the SWPPP itself or in associated records, as appropriate.

FORMS:

SWPPP AMENDMENT LOG

STAFF TRAINING LOG

DELEGATION OF AUTHORITY FORM

SUBCONTRACTOR AGREEMENT FORM

CONSTRUCTION INSPECTION REPORTS

Inspection Report (CGP 4.1.5, 4.1.6, 4.1.7)

(Inspection Reports shall be retained for at least 3 years from the date that the permit coverage expires and is terminated.)

REFERENCE:	Mt. Wayte Plaza 444-480 Franklin Street Framingham, Massachusetts
INSPECTION DATE:	
	Circle One: weekly? rainfall event?
INSPECTED BY:	
Rainfall Amount (in.):	

Rainfall Gauge Location:_____

Observations and Action Items

EROSION AND SEDIMENT CONTROLS:

Erosion Control (i.e. haybales, silt fence, sediment basin)	Installed?	Operational?	Working as Intended?	Repairs, Replacements or Maintenance? Identify

CONDITIONS THAT COULD LEAD TO SPILLS, LEAKS OR OTHER POLLUTANTS:

Identify Condition _____

NEW OR MODIFIED STORMWATER CONTROLS NECESSARY:

Identify New Control _____
Purpose _____

Identify Modified Control _____
Purpose _____

VISIBLE EROSION AND/OR SEDIMENTATION:

Points of Discharge / Location _____

Surface Waters _____

NONCOMPLIANCE:

Identify Noncompliance Issue _____

Regulatory Reference (i.e. Order of Conditions) _____

IF DISCHARGE IS OCCURING DURING INSPECTION:

Identify all discharge points: _____

Visual Quality of discharge: _____

Stormwater controls not operating as intended: _____

Stormwater controls in need of maintenance: _____

CORRECTIVE ACTIONS REQUIRED: _____

_____

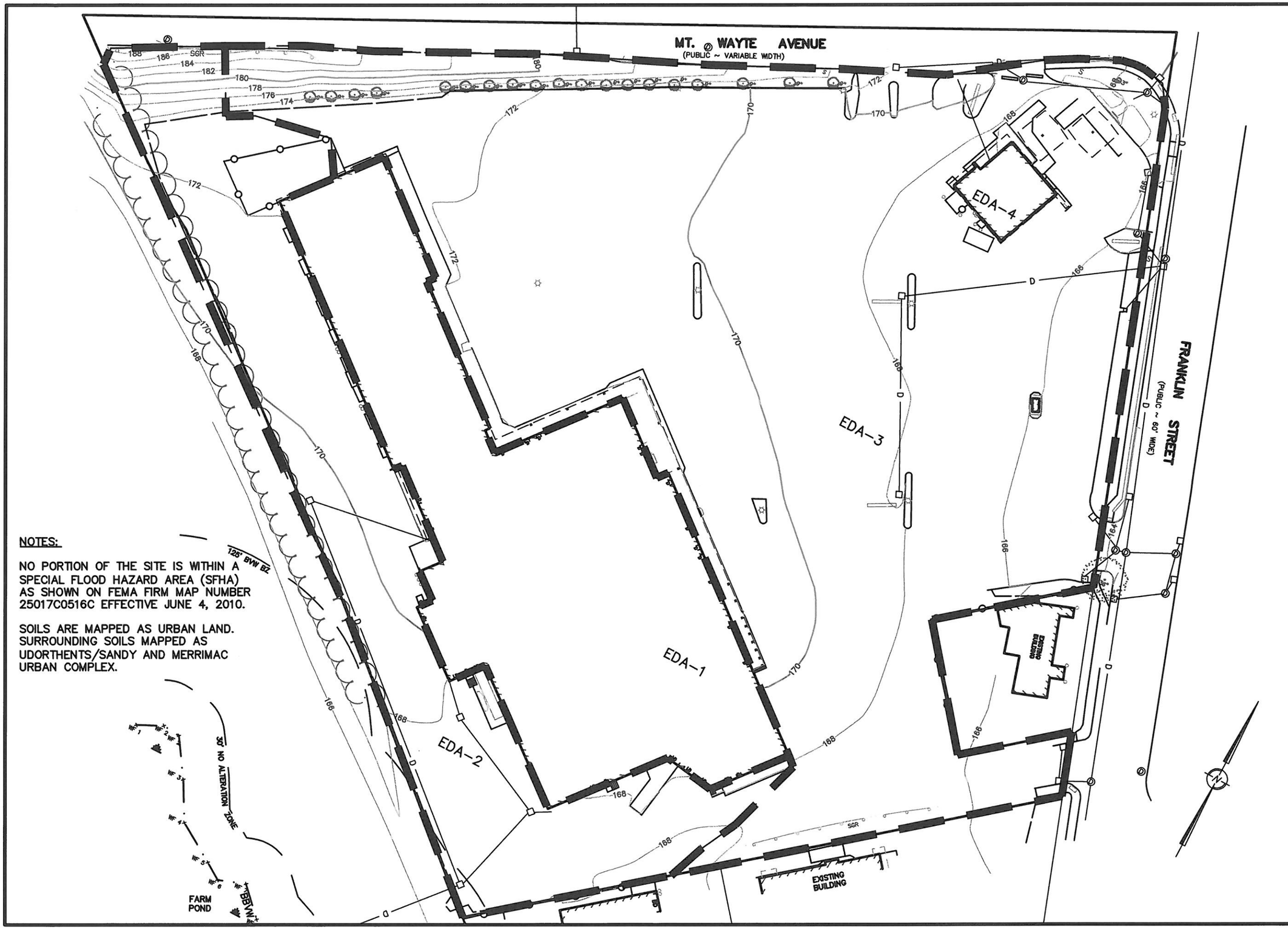
Inspector Signature / Date

CGP 7.2.16.1 NOI submitted to EPA
CGP 7.2.16.2 EPA acknowledgment letter

SITE PLAN APPROVAL
SPECIAL PERMIT
ORDER OF CONDITIONS

CGP 7.2.16.3
CONSTRUCTION GENERAL PERMIT &
APPENDIX I – STANDARD PERMIT CONDITIONS
(Other Appendices not included herewith)

SITE PLANS AND DETAILS



NOTES:

NO PORTION OF THE SITE IS WITHIN A SPECIAL FLOOD HAZARD AREA (SFHA) AS SHOWN ON FEMA FIRM MAP NUMBER 25017C0516C EFFECTIVE JUNE 4, 2010.

SOILS ARE MAPPED AS URBAN LAND. SURROUNDING SOILS MAPPED AS UDORTHENTS/SANDY AND MERRIMAC URBAN COMPLEX.

TITLE: EXISTING HYDROLOGY PLAN
UPTOWN
Framingham, MA

OWNER: FRAMINGHAM FRANKLIN LLC
P.O. Box 166
Shrewsbury, MA 01545

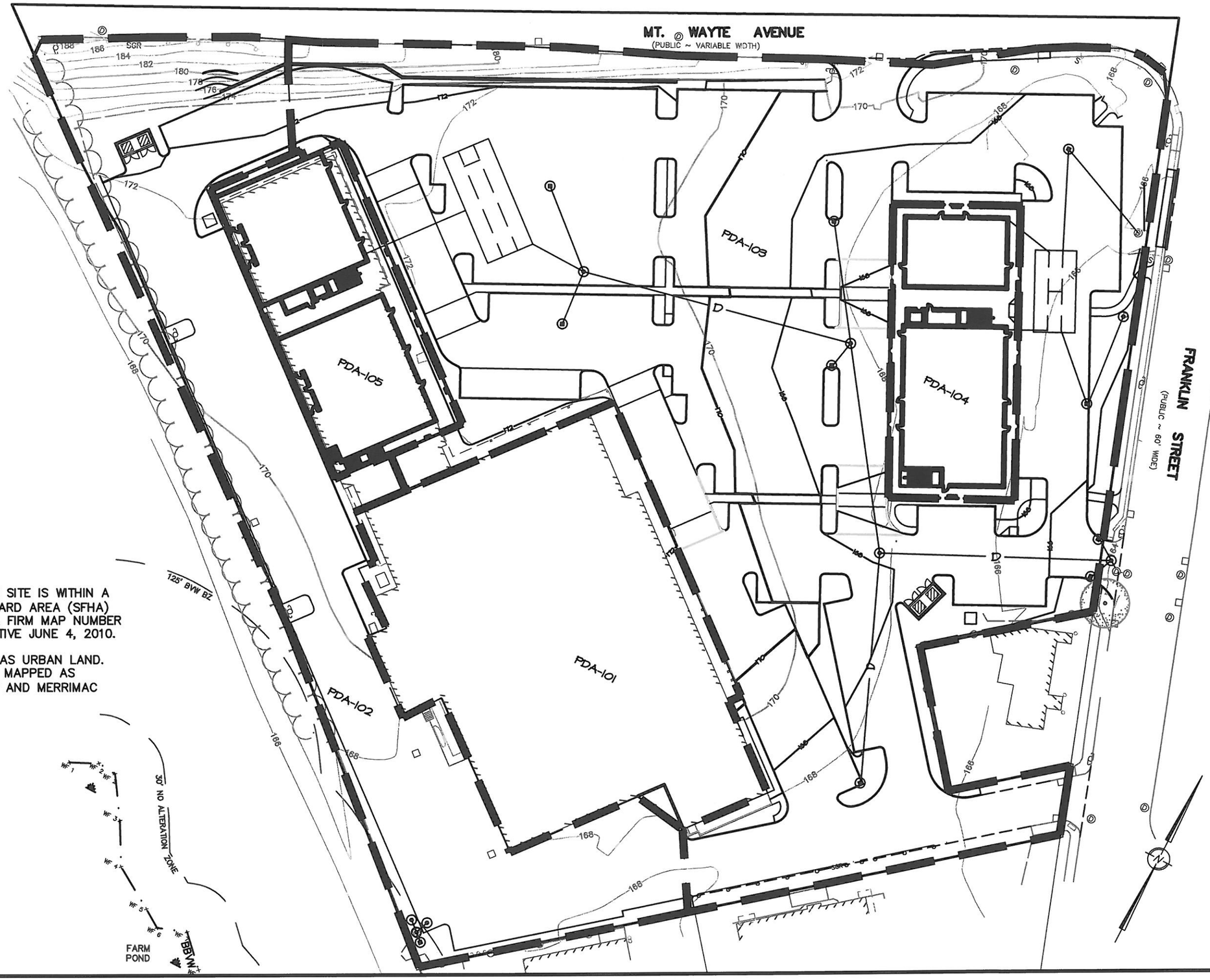
PREPARED FOR: FRAMINGHAM FRANKLIN LLC
P.O. Box 166
Shrewsbury, MA 01545

DATE:	XX/XX/XX	FILE NO.: 0849350	SCALE: 1" =60'
JOB NO.:	0849	DWG NO.: 0849351A	DRAWN BY:
		REV. NO.:	REV. DATE:

PREPARED BY:

WATERMAN DESIGN ASSOCIATES, INC.
31 East Main Street
Westborough, MA 01581
508.366.6552
(fax) 508.366.6506
watermandesign.com wda@wdassoc.com

CIVIL ENGINEERS SURVEYORS PLANNERS LANDSCAPE ARCHITECTS



NOTES:

NO PORTION OF THE SITE IS WITHIN A SPECIAL FLOOD HAZARD AREA (SFHA) AS SHOWN ON FEMA FIRM MAP NUMBER 25017C0516C EFFECTIVE JUNE 4, 2010.

SOILS ARE MAPPED AS URBAN LAND. SURROUNDING SOILS MAPPED AS UDORTHENTS/SANDY AND MERRIMAC URBAN COMPLEX.

TITLE: PROPOSED HYDROLOGY PLAN
UPTOWN
Framingham, MA

OWNER: FRAMINGHAM FRANKLIN LLC
P.O. Box 166
Shrewsbury, MA 01545

PREPARED FOR: FRAMINGHAM FRANKLIN LLC
P.O. Box 166
Shrewsbury, MA 01545

DATE: XX/XX/XX
JOB NO.: 0849
FILE NO.: 0849350
DWG NO.: 0849352A
REV. NO.:
SCALE: 1" = 60'
DRAWN BY:
REV. DATE:

PREPARED BY:

WATERMAN DESIGN ASSOCIATES, INC.
31 East Main Street
Westborough, MA 01581
508.366.6552
(fax) 508.366.6506
watermandesign.com wda@wdassoc.com

CIVIL ENGINEERS SURVEYORS LANDSCAPE ARCHITECTS PLANNERS