Eastern Land Survey Associates, Inc.

Professional Land Surveyors & Civil Engineers
ESSEX SURVEY SERVICE 1958 - 1986
OSBORN PALMER 1911 - 1970
BRADFORD & WEED 1885 - 1972

STORMWATER MANAGEMENT REPORT
RIVERVIEW PLACE
FLINT AND MASON STREETS
SALEM, MA. 01970

NOVEMBER 2008

Owner/Applicant:

Riverview Place LLC
6 Cider Mill Road
Peabody, MA. 01960
(978)-979-4072

Engineer:

Clayton A. Morin, P.E. 30969 (Mass.)
Eastern Land Survey Associates, Inc.
104 Lowell Street
Peabody, MA. 01960

104 LOWELL STREET
PEABODY, MASS. 01960

TELEPHONE: 978-531-8121 FAX: 978-531-5920

TABLE OF CONTENTS

SECTION 1
SITE CONDITIONS

SITE CONDITIONS

Existing Conditions

The site of Riverview Place is located on Flint and Mason Streets and the North River and is comprised of 4.3 acres of industrially developed and used land. The site has been used for such purposes since the 1800's. The primary industrial use on site has been activities related to leather manufacturing until recent years when a variety of commercial activities have occurred on the property.

Some 2.9 acres of the site are covered by buildings or pavement, 0.8 acres by hard-packed gravel yard areas and 0.6 acres of the site by sparsely vegetated areas.

The site drains directly to the North River. Municipal water and sewer services are available from both Mason and Flint Streets.

Soil Conditions

Soils on the site are classified as on the NCRS database and have been likely disturbed completely by on-going activities for the last 150 years. Soils have been assumed to be in Hydrologic Soil Group D for analysis purposes. (The Conservation Commission is requested to waive the requirements of Standard 2 since the site is subject to coastal storm flowage).

Resource Areas

The following resource areas are present on site:

1. Bank and associated 100 foot Buffer Zone as associated with the North River;

2. 200 foot wide riverfront;

3. Land subject to coastal storm flowage (At or below Elevation 10.3, N.G.V.D.).

SECTION 2
STORMWATER MANAGEMENT

Project Description

The proposed project is to completely redevelop the site for use as 130 units of multi-family housing in three buildings and a 5,000 square foot commercial space in Building 3. Stormwater is to be managed in accordance with D.E.P. Technical Guidance.

Low Impact Development Measures

Low impact development measures include the use of bioretention cells and an area of porous pavement. The LID measures will be finalized once the site assessment has been completed. If on-site conditions so require, the LID BMP's will be constructed with impervious liners and underdrains.

Standard 1

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

Site runoff will be directed through an 18 inch drain to the existing riprap lined portion of the bank of the North River. A scour analysis is provided in Section 3.

Standard 2

Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

A stormwater collection and management system has been designed for Riverview Place in the greatest degree of compliance achievable under the 2008 Department of Environmental Protection Stormwater Standards.

Site drainage will be accomplished by collection of surface runoff into a series of piped catch basins and manholes. Outflow from that system will be directed through an appropriately designed proprietary water quality treatment device before discharge into the North River. The storm drainage collection system has been sized on the basis of a ten year storm. Since most of the basins are located in low points, storms of higher intensity can be accommodated with minor (3 to 6 inch) ponding and pipe surcharging.

Computations of predevelopment and postdevelopment runoff from the site and properties along Mason and Flint Streets which flow into the property have been performed using TR-55 methodology. Those computations are provided in Section 3 of the report and are summarized as follows:

Storm Recurrence Interval	Peak Runoff Rate (cfs)	
	Predevelopment	Postdevelopment
2 Year	10.99	10.71
10 Year	16.91	16.66
100 Year	26.24	26.05

The slight decrease in postdevelopment runoff is attributed to landscape addition and improvements throughout the site. Since portions of the site are subject to coastal storm flowage, Stormwater Management Policy does not require attenuation of postdevelopment runoff.

Standard 3

Loss of annual recharge to ground water shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type.

Prior site development activities have rendered site soils unclassifiable and virtually eliminated the opportunity for groundwater recharge. Following the site assessment after demolition of the existing buildings, the feasibility of constructing one or more bioretention cells to accept roof runoff will be investigated. Landscaped areas on site will increase greatly thus improving the opportunity for groundwater recharge.

Standard 4

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

A series of deep sump hooded catch basins will collect runoff from paved areas of the site and direct that runoff to an appropriately sized Stormceptor. Roof runoff from areas where mechanical equipment is contained will also be directed to that devise. A TSS removal rate of 82.75 % will result. No treatment facilities currently exist.

Standard 5

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

The property use is primarily residential and is not considered to be a use with higher potential pollutant loads.

Standard 6

Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas as provided in the Massachusetts Stormwater Handbook.

Stormwater discharge is not into any water supply area nor near any other critical area.

Standard 7

A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5 and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

The project is a redevelopment. Standards 1, 2, 4, 8, 9 and 10 are met. Standard 3 is met to the maximum extent practicable. Standard 2 is requested to be waived although discharges will be slightly reduced as a result of redevelopment. Standards 5 and 6 are not applicable to the site.

Standard 8

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

A draft NPDES SWPPP is included in Section 4; erosion control measures are also outlined on the Plan and within the Operation and Maintenance Plan.

Standard 9

A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

A long term Operation and Maintenance Plan for the various stormwater best management practices is provided in Section 4.

Standard 10

All illicit discharges to the stormwater management system are prohibited.

The stormwater management plan includes a statement as to prohibition of illicit discharges. A statement for the site will be provided after demolition is completed.

SECTION 3
HYDROLOGIC AND HYDRAULIC ANALYSIS

EASTERN LAND SURVEY ASSOCIATES, INC.
Christopher R. Mello PLS
104 Lowell Street
PEABODY, MA 01960
(978) 531-8121

JOB Riverview Place
SHEET NO. 1 OF 3
CALCULATED BY JDM DATE 11-06
CHECKED BY [signature] DATE
SCALE

Standard 1
Scour Analysis.

The storm drainage system outlet for Riverview Place is proposed to discharge on a placed riprap portion of the bank of the North River at a point slightly above mean high tide. The riprap is typically on a 2 to 1 slope and primarily consists of 1 to 2 foot dimension stone.

The piped system analysis indicates a 10 year discharge velocity of 6.1 feet per second, which is not expected to compromise bank stability.

EASTERN LAND SURVEY ASSOCIATES, INC.
Christopher R. Mello PLS
104 Lowell Street
PEABODY, MA 01960
(978) 531-8121

JOB Riverview Place - Salem
SHEET NO. 1 OF 4
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

RUNOFF CURVE NUMBER COMPUTATIONS

EXISTING CONDITIONS

DRAINAGE AREA = 5.75 ACRES - ASSUME HSG D

SURFACE TYPE	AREA (AC)	CN	A x CN
IMPERVIOUS	4.05	98	396.9
OPEN SPACE FAIR	.9	84	75.6
COMPACTED GRAVEL STORAGE AREAS	.8	89	71.2
TOTAL			543.7

COMPOSITE CN = 543.7/5.75 = 94.6, USE 95

PROPOSED CONDITIONS

	SURFACE TYPE	AREA	CN	A x CN
OFFSITE	IMPERVIOUS.	1.15	98	112.7
	OPEN SPACE FAIR.	.3	84	25.2
ON SITE	IMPERVIOUS	3.0	98	294.0
	OPEN SPACE GOOD	1.15	80	92.0
	OPEN SPACE FAIR	.15	84	12.6
				536.5

COMPOSITE CN = 536.5/5.75 = 93.3 USE 94

Hydrograph Plot

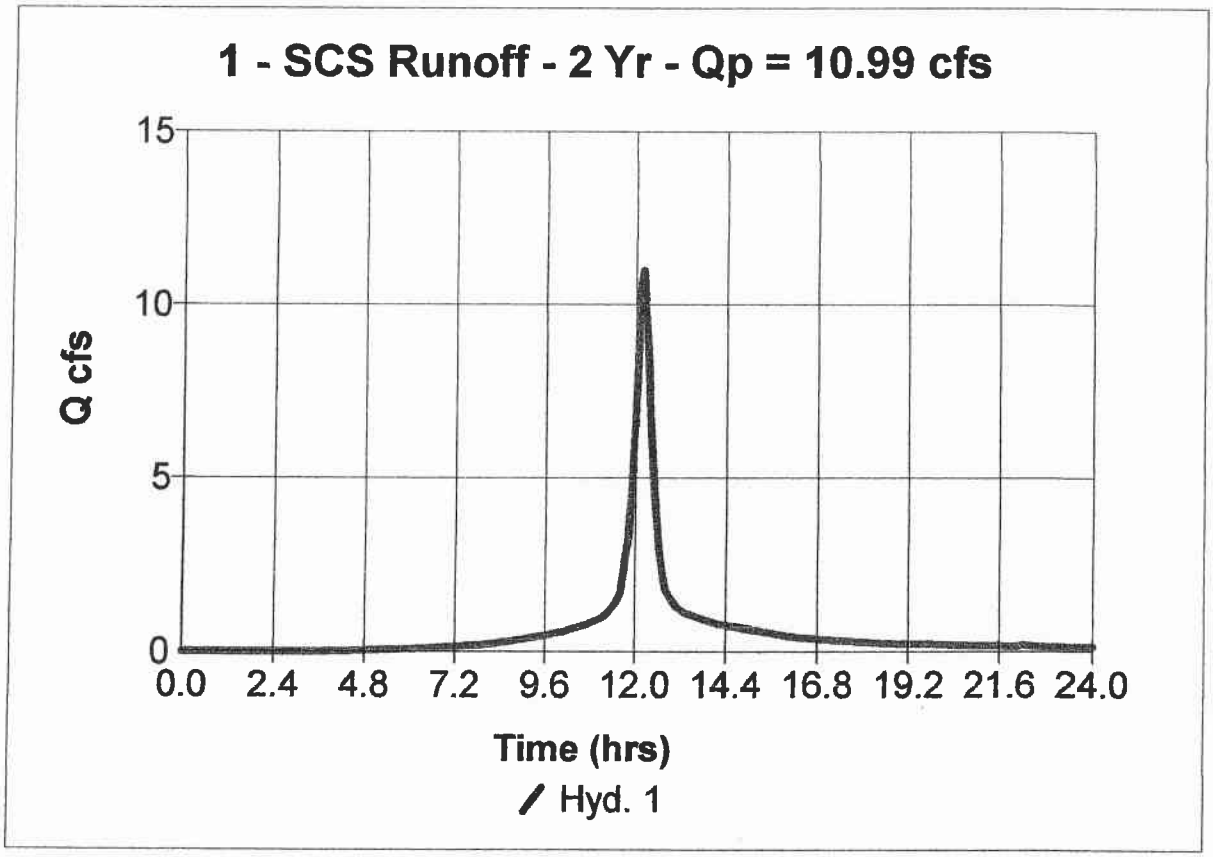
Hydraflow Hydrographs by Intelisolve

Hyd. No. 1

Predevelopment

Hydrograph type	= SCS Runoff	Peak discharge	= 10.99 cfs
Storm frequency	= 2 yrs	Time interval	= 6 min
Drainage area	= 5.75 ac	Curve number	= 95
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 3.10 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 49,841 cuft



Hydrograph Plot

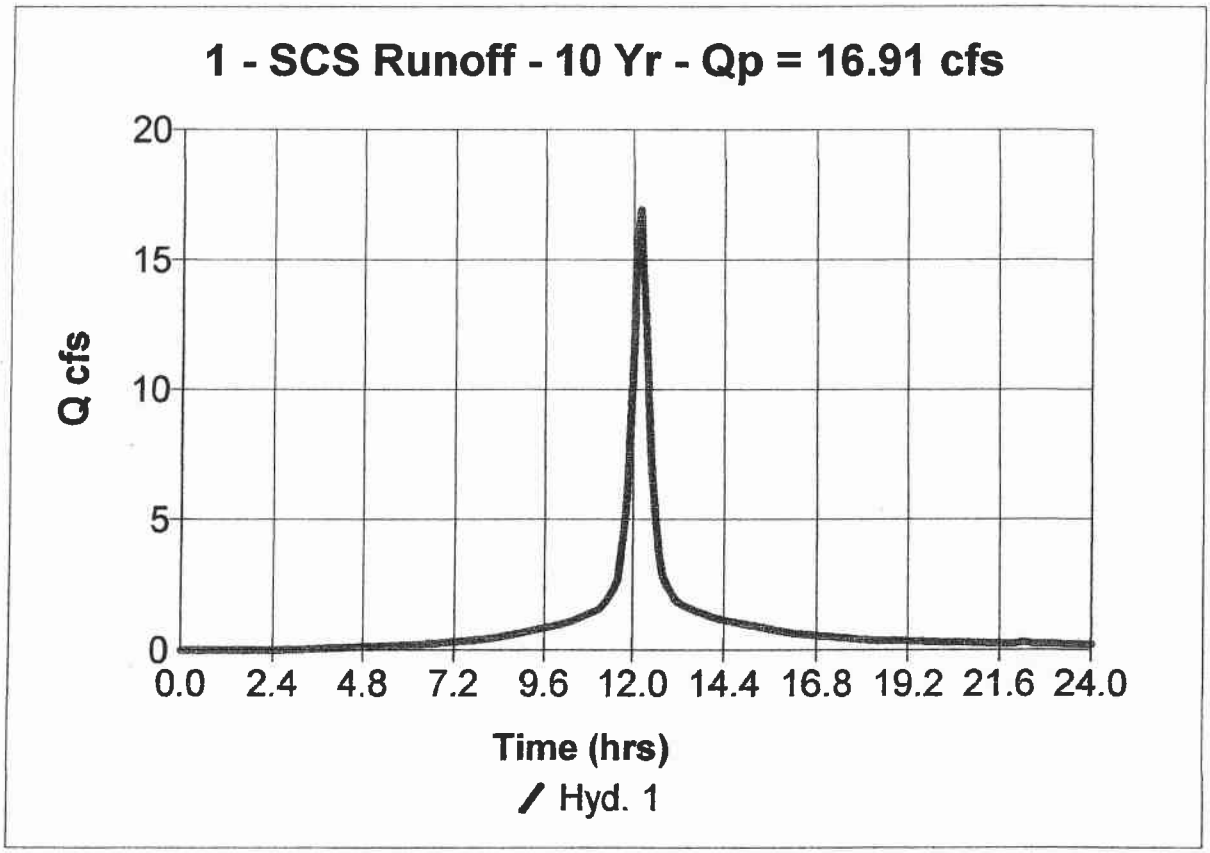
Hydraflow Hydrographs by Intelisolve

Hyd. No. 1

Predevelopment

Hydrograph type	= SCS Runoff	Peak discharge	= 16.91 cfs
Storm frequency	= 10 yrs	Time interval	= 6 min
Drainage area	= 5.75 ac	Curve number	= 95
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 4.60 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 78,733 cuft



Hydrograph Plot

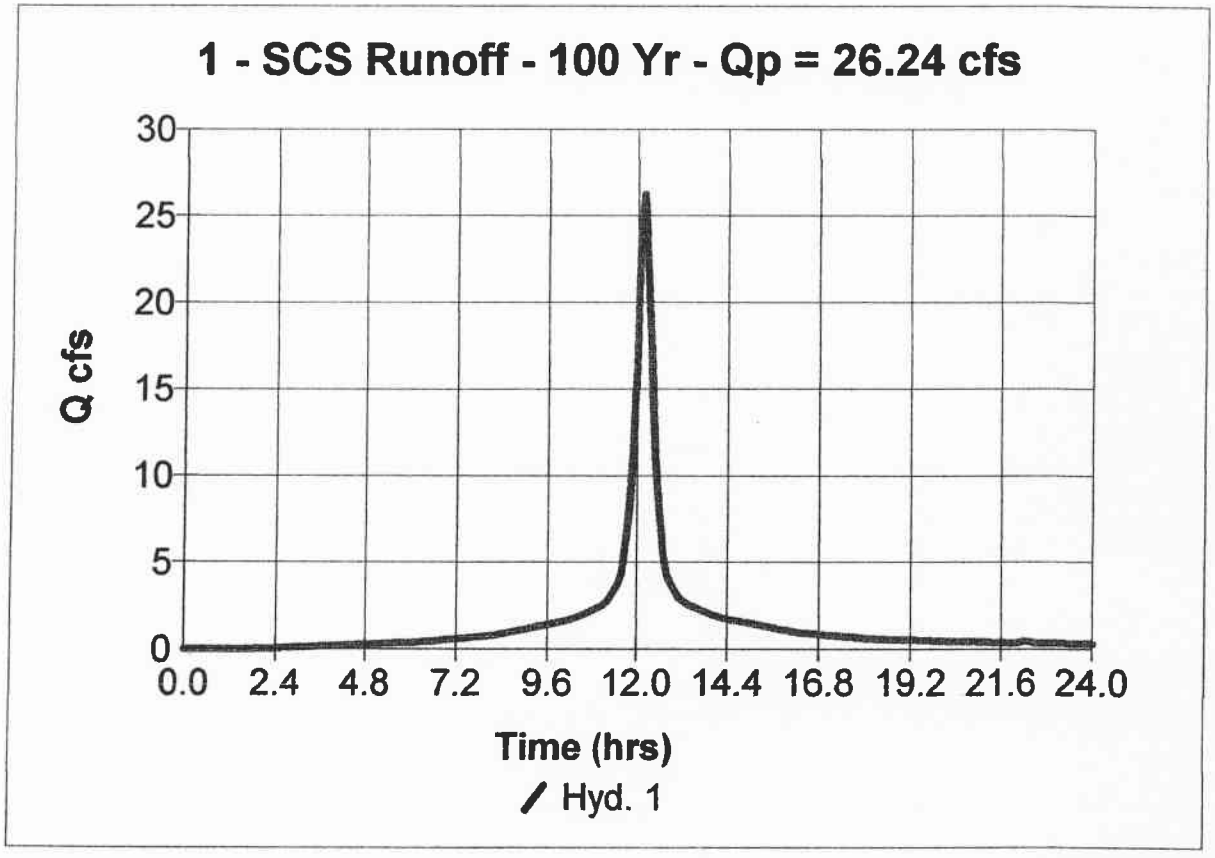
Hydraflow Hydrographs by Intelisolve

Hyd. No. 1

Predevelopment

Hydrograph type	= SCS Runoff	Peak discharge	= 26.24 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Drainage area	= 5.75 ac	Curve number	= 95
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 7.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 125,348 cuft



POSTDEVELOPMENT RUNOFF COMPUTATIONS

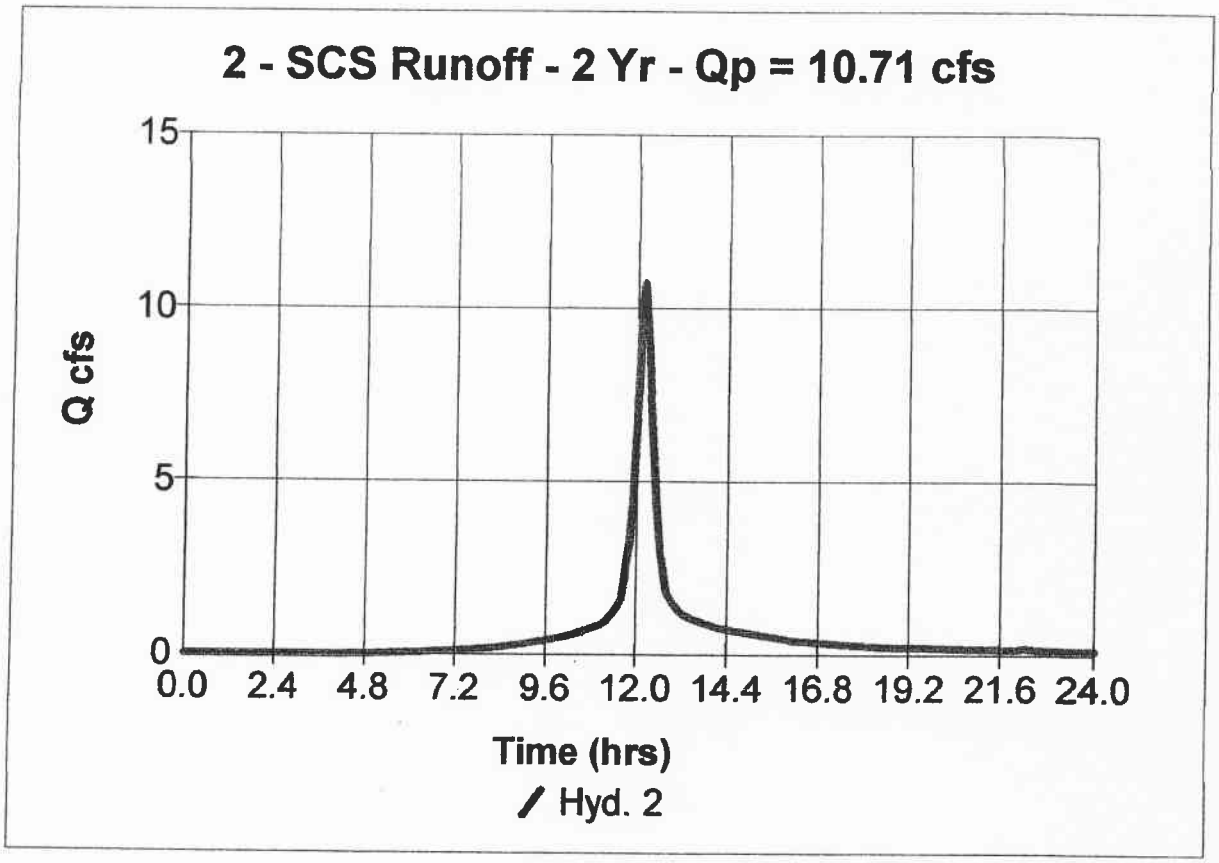
Hydrograph Plot

Hyd. No. 2

Postdevelopment

Hydrograph type	= SCS Runoff	Peak discharge	= 10.71 cfs
Storm frequency	= 2 yrs	Time interval	= 6 min
Drainage area	= 5.75 ac	Curve number	= 94
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 3.10 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 47,880 cuft



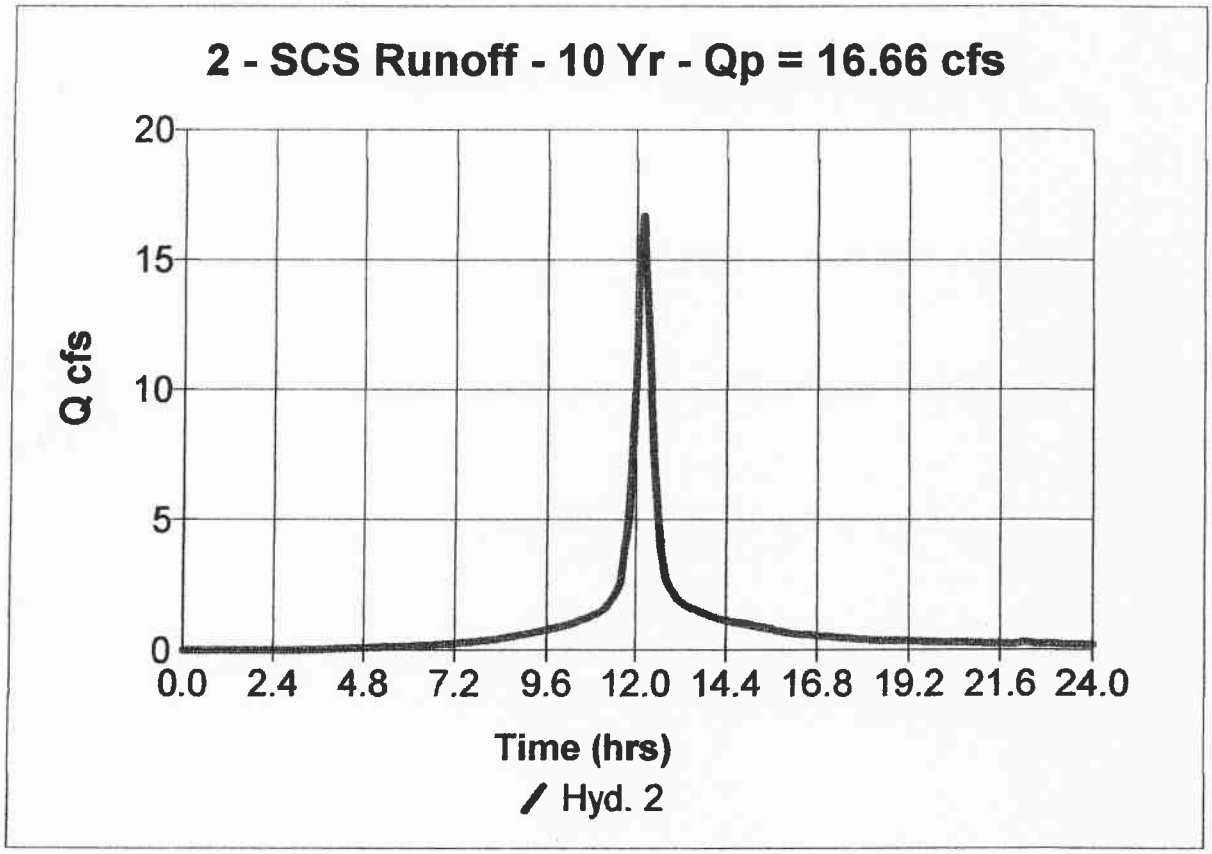
Hydrograph Plot

Hyd. No. 2

Postdevelopment

Hydrograph type	= SCS Runoff	Peak discharge	= 16.66 cfs
Storm frequency	= 10 yrs	Time interval	= 6 min
Drainage area	= 5.75 ac	Curve number	= 94
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 4.60 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 76,584 cuft



Hydrograph Plot

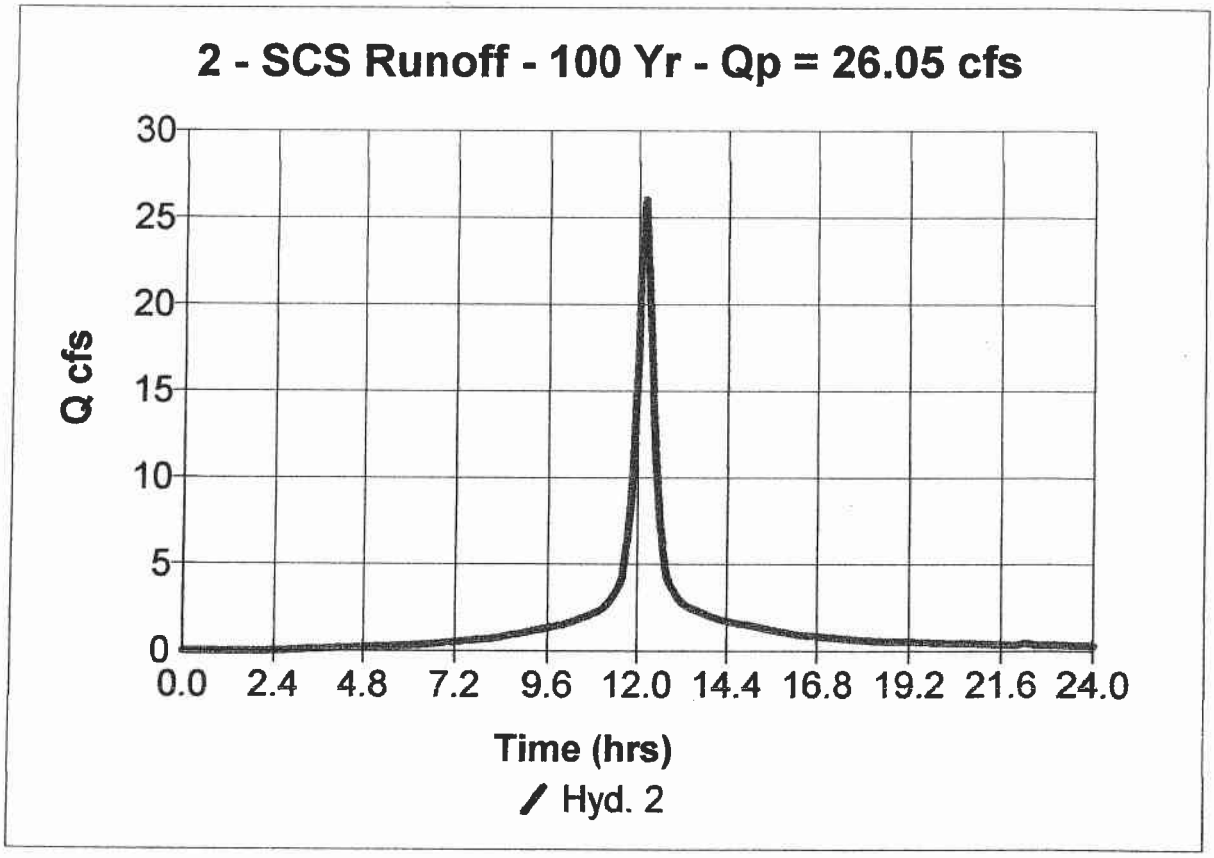
Hydraflow Hydrographs by Intelisolve

Hyd. No. 2

Postdevelopment

Hydrograph type	= SCS Runoff	Peak discharge	= 26.05 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Drainage area	= 5.75 ac	Curve number	= 94
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15 min
Total precip.	= 7.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 123,049 cuft



EASTERN LAND SURVEY ASSOCIATES, INC.
Christopher R. Mello PLS
104 Lowell Street
PEABODY, MA 01960
(978) 531-8121

JOB Riverview Place - Salem.
SHEET NO. 1 OF 2
CALCULATED BY JHM DATE 11-08
CHECKED BY [signature] DATE "
SCALE

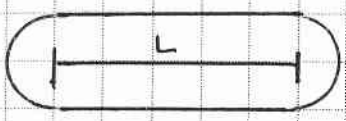
GROUNDWATER RECHARGE CALCULATIONS.

1. DETERMINE REQUIRED RECHARGE FOR ALL SOIL TYPES UNTIL FIELD TESTING OF ON-SITE SOILS IS ACCOMPLISHED.
INCREASED IMPERVIOUS AREA = 0.1 ACRE

Soil Type	Target Depth Factor. (in)	Required Recharge Volume (cf).
A	.6"	218 cf
B	.35"	127
C	.25"	91
D	.1"	36

SAMPLE CALC. FOR SOIL TYPE A:
$\frac{.6"}{12"/FT} \times .1 \times 43,560 = 218$ CF

2. CALCULATE AVAILABLE VOLUME IN EACH PROPOSED BIORETENTION AREA



R=5'. SURFACE AREA = $10 \times L + 5^2\pi$
FOR 6" PONDING SURFACE (3:1 SLOPES).
S.A. = $13L + 6.5^2\pi$
VOID RATIO IN SOIL ASSUMED AT 0.35
DEPTH = 2'

CELL FOR BUILDING 3 L = 25'
S.A. @ MIDDLE = 328 SF S.A. PONDING = 382 SF.
PONDING VOLUME = $((328+382)/2)(.5) = 177$ CF.
SOIL VOLUME = $328 \times 2 \times .35 = 230$ CF
TOTAL WQV = 407 CF.

CELL FOR BUILDING 1 L = 45'
PONDING VOLUME = 277 CF. SOIL VOLUME = 370 CF.
TOTAL VOLUME = 647 CF

EASTERN LAND SURVEY ASSOCIATES, INC.
Christopher R. Mello PLS
104 Lowell Street
PEABODY, MA 01960
(978) 531-8121

JOB Riverview Place - Salem.
SHEET NO. 2 OF 2
CALCULATED BY JWM DATE 11-08
CHECKED BY _____ DATE _____
SCALE _____

3. Check Drawdown Times

Full WQV = 407 CF Cell Building 3
Bottom Area = 328 SF
Assume infiltration rate = .27"/HR.

Exfiltration rate = $\frac{.27}{12} \times \frac{1}{3600} \times 328 = .0021$ CFS

(407 CF / .0021 CFS) 3600 sec/hr = 55 HR.

Similarly for Cell Building 1, drawdown time = 57 hour

4. Capture Areas.

Building 3 - Direct front portion of roof (excluding mech. areas) to BRC.

Area = 4200 ± SF x .5"/12" = 175 CF.

Building 1 - Direct east wing to BRC

Area = 9700 ± SF. x .5"/12" = 404 CF.

Required Volume for HSG A (Pc 1) = 218 CF.
WQV >> Required infiltration - OK.

5. Check BRC Area ratio.

Building 3 4200 SF : 5% = 210 SF 10% = 420 SF
Proposed Surface Area = 328 SF OK.

Building 1 (east wing). 9700 SF 5% = 435 SF 10% = 970 SF
Proposed Surface Area = 528 SF OK

EASTERN LAND SURVEY ASSOCIATES, INC.
Christopher R. Mello PLS
104 Lowell Street
PEABODY, MA 01960
(978) 531-8121

JOB RIVERVIEW PLACE - SALEM
SHEET NO. 1 OF 4
CALCULATED BY JJM DATE 11-11-08
CHECKED BY CRM DATE "
SCALE

STANDARD 4

TOTAL SUSPENDED SOLIDS REMOVAL.

INSTRUCTIONS:

Non-automated: Mar. 4, 2001

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: STORMCEPTOR 202

TSS Removal Calculation Worksheet

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
DEEP SUMP CATCH BASIN	25%	1.00	.25	.75
STORMCEPTOR	77%	.75	.5775	.1725

Total TSS Removal = 82.75 %

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: RIVERVIEW PLACE
Prepared By: JJM
Date: 11-11-08

*Equals remaining load fro previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

STORMCEPTOR SELECTION CRITERIA.

TRIBUTARY IMPERVIOUS AREA = 2.35 ACRES. (INCLUDES ROOF OF BLDG 3 & 2500 SF ROOF MECH. AREA FOR BLDGS. 1&2).

PER DEP FACT SHEET 4, TABLE 1 (PG. 3-13) USE MODEL NO. STC 3600. (2.6 AC. IMPERVIOUS CAPACITY).

COMPUTE REQUIRED FLOWRATE WITHOUT BYPASS (TO BE VERIFIED BY MANUFACTURER)

$2.35\ AC \times \frac{.76"}{12"}/HR \times 43,560 \times \frac{1}{3600} = 1.8\ CFS.$

(FOR MIN. WATER QUALITY VOLUME OF .5")

Fact Sheet #4

Stormwater Technology: Stormceptor

(Hydro Conduit, formerly CSR New England Pipe)

Revised February 2003

*The **Stormceptor Fact Sheet** is one in a series of fact sheets for stormwater technologies and related performance evaluations, which are undertaken by the Massachusetts STrategic Envirotechnology Partnership (STEP).*

The STEP evaluation entitled, *Technology Assessment, Stormceptor CSR New England Pipe*, January 1998 is the information source for this fact sheet. When a more thorough understanding of a system is required, the full *Technology Assessment* should be reviewed. Copies are available for downloading from the STEP Web site (www.STEPSITE.org/) or by contacting the STEP Program (Phone: 617/626/1197, FAX: 617/626/1180, email: linda.benevides@state.ma.us). This fact sheet is subject to future updates as additional performance information becomes available.

Description/Definition

Stormceptor is a prefabricated, underground unit that separates oils, grease, and sediment from stormwater runoff when installed with an existing or new pipe conveyance system. The unit is divided into two chambers a treatment and a flow bypass chamber. During typical storm events, runoff is directed by the inflow weir through a drop pipe into the lower treatment chamber where sediment, oil, and grease are separated from the flow by gravity. The bypass chamber is designed to convey excess stormwater, which overtops the inflow weir, through the system without treatment.

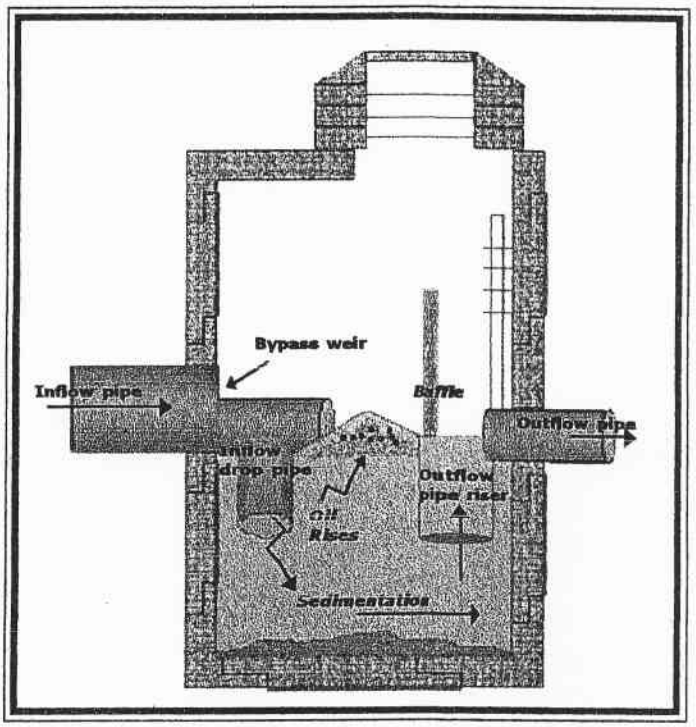


Figure 1. Stormceptor operation during average flow conditions.

Equipment and Sizing

The on-line Stormceptor units are available in eight sizes ranging from six and twelve feet in diameter with capacities of 900 to 7200 gallons. Since issuing the STEP assessment in 1998, the manufacturer has expanded the Stormceptor product line to include a storm drain inlet (STC 450i) and three units (Models STC 11000, STC 13000, and STC16000). These systems are not included in the STEP evaluation. Users and decision-makers may require additional field test results and new data for these new systems in order to accept performance ratings, particularly if they are higher than those reported in the STEP technology assessment and this fact sheet.

Stormceptor units are available in either precast concrete or fiberglass for special applications. Concrete units are pre-engineered for HS-20 min. traffic loading at the surface. Fiberglass units can be used in areas where there is a potential for oil and chemical spills.

Performance/Effectiveness

The system is designed to provide separation of sediment, oil, and grease from stormwater by routing runoff into a low-turbulence environment where solids settle and oils float out of solution. The system sizing is based on the drainage area, historical rainfall data, and the solids removal efficiency required. It is recommended that the system be used in combination with other stormwater controls to conform with the Massachusetts Stormwater Management Policy and standards.

An Imperial Model STC 2000 (equivalent to the Model STC 2400) in Edmonton, Canada treats flow from a 9.8 acre commercial parking lot. This system was monitored during four storm events in 1996 and shown to have an average total suspended solids (TSS) removal efficiency of 52 percent. In designing a system to achieve a comparable removal efficiency, the relationship between system size and impervious drainage area should be considered, as detailed in Table 1 and the Technology Assessment Report.

A Model STC 1200 in Westwood, Massachusetts treats flow from 0.65 acres consisting of a paved truck loading area at a manufacturing facility. The unit was monitored for six storm events in 1997, but only four events had measurable TSS influent concentrations. Of these four events, the average TSS removal efficiency was calculated to be 77 percent, which is less than the 80 percent removal targeted by the manufacturer.

Based on these field monitoring results, and when the unit sizing follows the guidance in Table 1, removal efficiencies between 52 percent and 77 percent may be achieved where installations have similar rainfall and land use characteristics as those reviewed for the STEP evaluation. It is recommended that additional field research and new data be evaluated to validate performance ratings higher than those verified by STEP.

Specific performance claims for oil and grease were not evaluated by STEP. However, total petroleum hydrocarbons (TPH) were analyzed during the Westwood study. Results indicated that the unit was effective in capturing oils.

Stormceptor Model Number	Maximum Impervious Area (acres)	
	77% TSS removal	52% TSS removal
STC 900	0.45	0.9
STC 1200	0.7	1.45
STC 1800	1.25	2.55
STC 2400	1.65	3.35
STC 3600	2.6	5.3
STC 4800	3.6	7.25
STC 6000	4.6	9.25
STC 7200	5.55	11.25

Table 1: Sizing for TSS removal (adapted from the manufacturer's sizing in the 1998 STEP Report) Use the table to determine a TSS removal rate. Use the new Rinker method for sizing Stormceptor units. The sizing method has been changed since publication of the STEP Report. **Note:** To achieve 52% and 77% TSS removal rates on some sites, it may be necessary to use lower maximum impervious areas than those in Table 1.

Technology Status

The Stormceptor system provides greater solids separation and higher TSS removal efficiencies than oil and grit separators. Stormceptor systems are among the category of hydrodynamic separators, which are flow-through devices with the capacity to settle or separate grit, oil, sediment, or other pollutants from stormwater. According to the U.S. Environmental Protection Agency, "*Hydrodynamic separators are most effective where the* materials to be removed from runoff are heavy particulates - which can be settled - or floatables - which can be captured, rather than solids with poor settleability or dissolved pollutants."

The field studies evaluated for the STEP assessment predate the Stormwater Best Management Practice Demonstration Tier II Protocol (2001), which is applicable in Massachusetts and other states in the Technology Acceptance Reciprocity Partnership (TARP), to ensure quality controlled studies that can be shared among participating states. Therefore, interstate reciprocity is not available to the manufacturer, based on performance claims that were evaluated by STEP in 1998. If the TARP Protocol requirements are fulfilled in the future, the manufacturer could pursue reciprocal verification for Stormceptor systems in participating TARP states. More information on the TARP Protocol is available on the following Web site: www.dep.state.pa.us/dep/deputate/pollprev/techservices/tarp.

Applications/Advantages

- Stormceptor systems identified in Table 1 should be used in combination with other BMPs to remove 80 percent of the average annual load of TSS (DEP Stormwater Policy Standard 4). Systems may be well suited for pretreatment in a mixed component system designed for stormwater recharge.
- Performance data show that Stormceptor may provide TSS removal rates in the range of 52 percent to 77 percent when sized according to Table 1. Higher TSS removal rates were achieved during low flow, low intensity storms with less than one third of an inch of runoff. Also, by reducing the impervious drainage area, relative to the system size, the STEP Technology Assessment Report indicated that higher removal efficiencies may be achievable. However, STEP recommends collection of additional data "representing a varied set of operating conditions over a realistic maintenance cycle to verify TSS removal rates greater than 80 percent."
- The Stormceptor system is suitable for new and retrofit applications. For retrofit applications, it should not

take the place of a catch basin for the systems that have been verified. Also, for retrofit applications, it should be installed in lateral lines and not main trunk lines.

- The system is particularly well suited in constricted areas and where space is limited.
- It also is suitable for use in areas of high potential pollutant loads (DEP Stormwater Policy Standard 5), where it may be used effectively in capturing and containing oil and chemical spills. *Web site:* www.state.ma.us/dep/brp/stormwtr/stormpub.htm.

Considerations/Limitations

- Systems are not expected to provide significant nutrient (nitrogen and phosphorus) or fecal coliform removal.
- The systems are not recommended for use in critical areas, such as public drinking water supplies, certified vernal pools, public swimming beaches, shellfish growing areas, cold water fisheries, and some Areas of Critical Environmental Concern (ACECs), except as a pretreatment device for BMPs that have been approved by DEP for use in critical areas. The structural BMPs approved for use in critical areas are described in Standard 6 of the Stormwater Management Policy, www.state.ma.us/dep/brp/stormwtr/stormpub.htm.
- There is a limited set of useful data for predicting the relationship between treatment efficiency and loading rates. Removal efficiencies have not been demonstrated for all unit sizes.
- Further research is needed to determine how much TSS bypasses the treatment chamber during certain, higher velocity storm events which recur less frequently.
- Systems require regular maintenance to minimize the potential for washout of the accumulated sediments.

Reliability/Maintenance

All BMPs require scheduled, routine maintenance to ensure that they operate as efficiently as possible. Although maintenance requirements are site specific, a general relationship between cleaning needs and depths of sediment has been established by the manufacturer. Inspection of the Stormceptor interior should be done after major storm events, particularly in the first year of operation. It is recommended that material in the treatment chamber be pumped out by a vacuum truck semiannually, or when the sediment and pollutant loads reach about 15 percent of the total storage. If the unit is used for spill containment, it should be pumped after the event is contained. Typical cleaning costs were estimated by the manufacturer in 1998 to be $250, with disposal costs averaging $300 to $500. The expected life of a system has been estimated to be 50 to 100 years.

Sediment Depths Indicating Required Maintenance	
Model Number	Sediment Depth (feet)
STC 900	0.5
STC 1200	0.75
STC 1800	1
STC 2400	1
STC 3600	1.25
STC 4800	1
STC 6000	1.5
STC 7200	1.25

Table 2: The Stormceptor clean out is based on 15 percent of the sediment storage volume in the

References

Winkler, E.S. 1998. "Technology Assessment, Stormceptor." University of Massachusetts, Amherst, MA. *STEP Web site:* www.STEPSITE.org/

Massachusetts Department of Environmental Protection and Office of Coastal Zone Management. 1997. "Stormwater Management Handbooks, Volumes One and Two." Boston, MA. *Handbooks Web site:* www.state.ma.us/dep/brp/stormwtr/stormpub.htm.

United States Environmental Protection Agency. "Storm Water Technology Fact Sheet Hydrodynamic Separators." EPA 832-F-99-017.

Stormceptor Web sites: www.rinkermaterials.com/stormceptor

TARP Web site: www.dep.state.pa.us/dep/deputate/pollprev/techservices/tarp

STEP Verification vs. Regulatory Approval

STEP assistance to developers of innovative technologies and STEP verification of stormwater treatment systems is not required to receive necessary approvals from conservation commissions or the Department of Environmental Protection (DEP). However, if a system has received verification, a conservation commission shall presume that the technology will function as proposed, provided the conditions are similar to those in which performance was verified. STEP reports are not technology approvals, and do not constitute an endorsement or recommendation for use. Questions on regulatory issues should be referred to the DEP regional offices.

EASTERN LAND SURVEY ASSOCIATES, INC.
Christopher R. Mello PLS
104 Lowell Street
PEABODY, MA 01960
(508) 531-8121

JOB Riverview Place
SHEET NO. 1 OF
CALCULATED BY JWM DATE 11-11-08
CHECKED BY DATE
SCALE

STORM DRAINAGE COMPUTATIONS
Based upon Rational Formula
Q = CiA

LOCATION Riverview Place
DESIGN STORM 10 year
MANNING "n" 0.011

MANHOLE to MANHOLE	PEAK RUNOFF COMPUTATION							HYDRAULIC COMPUTATION					
	INCREMENTAL AREA Acres	TOTAL AREA A Acres	RUNOFF COEFFICIENT	INLET CONCENTRATION TIME Minutes	INTENSITY i In./Hr.	RUNOFF Q CFS	SLOPE %	PIPE DIAMETER In.	CAPACITY CFS	FULL VELOCITY FPS	ACTUAL VELOCITY FPS
207 TO 206	.16	.16	.9	10	4.6	.66	.3	12	2.31	2.94	2.5
213 - 210	.44	.44	.79	10	4.6	1.59	.3	12	2.31	2.94	3.1
211 - 210	.70	.70	.64	10	4.6	2.06	.42	12	2.73	3.47	3.8
210 - 206	0.1	1.24	.68	10	4.6	3.54	.34	15	4.45	3.43	4.1
206 - 203	-	1.	.71	10	4.6	4.25	.4	15	4.83	3.93	4.5
221 - 218	.18	.18	.84	10	4.6	.70	.48	12	2.92	3.71	3.1
218 - 217	.33	.51	.81	10	4.6	1.90	.37	12	2.56	3.26	3.6
217 - 214	.25	.76	.84	10	4.6	2.94	2.28	12	6.36	8.10	7.3

EASTERN LAND SURVEY ASSOCIATES, INC.
Christopher R. Mello PLS
104 Lowell Street
PEABODY, MA 01960
(508) 531-8121

JOB Riverview Place
SHEET NO. 2 OF 5
CALCULATED BY WM DATE 11-11-08
CHECKED BY _____ DATE _____
SCALE _____

STORM DRAINAGE COMPUTATIONS
Based upon Rational Formula
Q = CiA

LOCATION Riverview Place
DESIGN STORM 10 year.
MANNING "n" 0.011

MANHOLE to MANHOLE	INCREMENTAL AREA Acres	TOTAL AREA A Acres	RUNOFF COEFFICIENT	INLET CONCENTRATION TIME Minutes	INTENSITY i In./Hr.	RUNOFF Q CFS	SLOPE %	PIPE DIAMETER In.	CAPACITY CFS	FULL VELOCITY FPS	ACTUAL VELOCITY FPS	
214 - 203	.39	1.15	.81	10	4.6	4.28	.5	15	5.40	4.48	4.9	
203 - 201	.32	2.88*	.77	10	4.6	10.20	1.0	18	12.41	7.03	7.9	
201 - OUTLET	1.28	4.16**	.81	10	4.6	15.50	.4	24	14.91	5.38	6.1	

* INCLUDES 5000 SF MECH. ROOF AREA FROM BUILDING 1 & 2.
** INCLUDES REMAINING ROOF RUNOFF FROM BUILDING 1 & 2.

EASTERN LAND SURVEY ASSOCIATES, INC.
Christopher R. Mello PLS
104 Lowell Street
PEABODY, MA 01960
(978) 531-8121

JOB River View Place - Salem
SHEET NO. 3 OF 5
CALCULATED BY JWM DATE 11-08
CHECKED BY _____ DATE _____
SCALE _____

RUNOFF COEFFICIENT COMPUTATIONS.

INTO DRAIN STRUCTURE	IMPERVIOUS AREA	LANDSCAPED AREA	TOTAL AREA.	'C' COMPUTATION.	'C' USED.
209	.16	-0-	.16	$.16 \times .9 / .9 = .9$	.90
213	.32	.12	.44	$\frac{.32 \times .9 + .12 \times .3}{.44} = .736$	.74
211	.40	.30	.70	$\frac{.4 \times .9 + .3 \times .3}{.70} = .643$	.64
21.	.1	-0	.1.	$.1 \times .9 / .9 = .9$	.9.
221	.16	.02	.18	$\frac{.16 \times .9 \times .02 \times .3}{.18} = .833$	.84
218	.27	.06	.33	$\frac{.27 \times .9 + .06 \times .3}{.33}$	.79.
217	.25	-0-	.25.	$\frac{.25 \times .9}{.9} = .9$	.90
214	.23	.16	.39	$\frac{.23 \times .9 + .16 \times .3}{.39} = .654$	.66
203	.30	.02	.32	$\frac{.30 \times .9 + .02 \times .3}{.32} = .8625$	.86

Drainage Capacity Calculations

Riverview Place - Salem,Ma

Sewer Pipes -- English Units

Civil Tools for Windows
(11-12-2008, 13:24:40)

Flowrate (cfs)	Diameter (in)	Friction ()	Slope (%)	Velocity (fps)
2.31	12.00	0.011	0.30	2.94
2.73	12.00	0.011	0.42	3.47
4.45	15.00	0.011	0.34	3.63
4.83	15.00	0.011	0.40	3.93
2.92	12.00	0.011	0.48	3.71
2.56	12.00	0.011	0.37	3.26
6.36	12.00	0.011	2.28	8.10
5.40	15.00	0.011	0.50	4.40
12.41	18.00	0.011	1.00	7.03
16.91	24.00	0.011	0.40	5.38

a = Cross-sectional area of waterway
p = wetted perimeter
$R = \frac{a}{p}$ = Hydraulic radius.

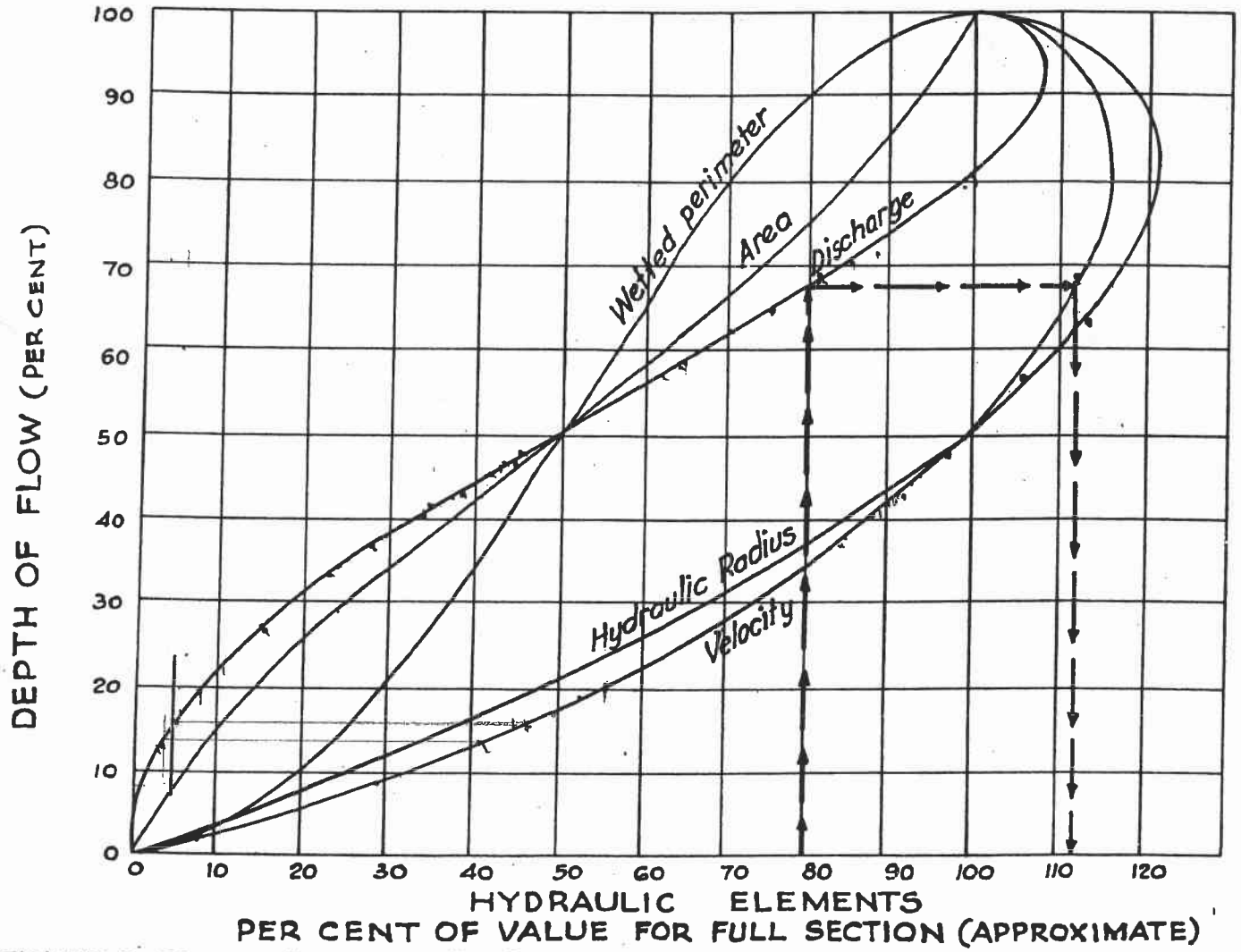
For pipes full or half-full
$R = \frac{D}{4}$

SECTION OF ANY OPEN CHANNEL

SECTION OF CIRCULAR PIPE

V = Average or mean velocity in feet per second.
Q = a V = Discharge of pipe or channel in cubic feet per second (c.f.s.).
n = Coefficient of roughness of pipe or channel surface, see Table A-Pg.18-68.
S = Slope of Hydraulic Gradient (water surface in open channels or pipes not under pressure, same as slope of channel or pipe invert only when flow is uniform in constant section.

FIG. A- HYDRAULIC ELEMENTS OF CHANNEL SECTIONS.



EXAMPLE: Given: Discharge = 12 c.f.s. through a pipe which has capacity flowing full of 15 c.f.s. at a velocity of 7.0 ft. per sec. Required to find V for Q = 12 c.f.s.
∴ Percentage of full discharge = $\frac{12}{15}$ = 80%. Enter chart at 80% of value for full section of Hydraulic Elements, find V = 112.5% × 7 = 7.9 ft. per sec.

FIG. B- VALUES OF HYDRAULIC ELEMENTS OF CIRCULAR SECTION FOR VARIOUS DEPTHS OF FLOW.

SECTION 4
ADDITIONAL SUBMISSIONS

DRAFT STORMWATER POLLUTION PREVENTION PLAN

Notes regarding draft NPDES SWPPP
Riverview Place – Salem, MA.

Sections to be addressed following selection of a General Contractor:

1.2
5.1.1
5.2
6.1
6.3
8

Appendices:

Appendix B – Will be the 8 sheet Site Development Permit Plan

Appendix C – Most recent version will be attached following filing of NPDES NOI

Appendix D – Will be added once NPDES Notice of Intent is filed and acknowledged

SECTION 1: SITE EVALUATION, ASSESSMENT, AND PLANNING

1.1 Project/Site Information

Instructions:

- In this section, you can gather some basic site information that will be helpful to you later when you file for permit coverage.
- For more information, see *Developing Your Stormwater Pollution Prevention Plan: A SWPPP Guide for Construction Sites* (also known as the *SWPPP Guide*), Chapter 2
- Detailed information on determining your site's latitude and longitude can be found at www.epa.gov/npdes/stormwater/latlong

Project/Site Name: Riverview Place

Project Street/Location: 72 Flint Street, 67 and 71 Mason St.

City: Salem State: MA ZIP Code: 01970

County or Similar Subdivision: Essex County

Latitude/Longitude (Use **one** of three possible formats, and specify method)

Latitude:	Longitude:
1. _ _ ° _ _ ' _ _" N (degrees, minutes, seconds)	1. _ _ ° _ _ ' _ _" W (degrees, minutes, seconds)
2. _ _ ° _ _ . _ _' N (degrees, minutes, decimal)	2. _ _ ° _ _ . _ _' W (degrees, minutes, decimal)
3. 42. 5205 ° N (decimal)	3. 70 . 9675 ° W (decimal)

Method for determining latitude/longitude:

X USGS topographic map (specify scale: 1:25,000) ☐ EPA Web site ☐ GPS

☐ Other (please specify): _____

Is the project located in Indian country? X Yes ☐ No

If yes, name of Reservation, or if not part of a Reservation, indicate "not applicable." _____

Is this project considered a federal facility? ☐ Yes X No

NPDES project or permit tracking number*: _____

**(This is the unique identifying number assigned to your project by your permitting authority after you have applied for coverage under the appropriate National Pollutant Discharge Elimination System (NPDES) construction general permit.)*

1.2 Contact Information/Responsible Parties

Instructions:

- List the operator(s), project managers, stormwater contact(s), and person or organization that prepared the SWPPP. Indicate respective responsibilities, where appropriate.
- Also, list subcontractors expected to work on-site. Notify subcontractors of stormwater requirements applicable to their work.
- See *SWPPP Guide*, Chapter 2.B and EPA's Construction General Permit (CGP) Part 3, Subparts 3.2, 3.3.A, and 3.4.A.

Operator(s):

Insert Company or Organization Name: Riverview Place LLC
Insert Name: Michael O'Brien
Insert Address: 6 Cider Mill Road
Insert City, State, Zip Code: Peabody, MA. 01960
Insert Telephone Number: 978-979-4072
Insert Fax/Email:
Insert area of control (if more than one operator at site):
Repeat as necessary

Project Manager(s) or Site Supervisor(s):

Insert Company or Organization Name: To Be Determined
Insert Name:
Insert Address:
Insert City, State, Zip Code:
Insert Telephone Number:
Insert Fax/Email:
Insert area of control (if more than one operator at site):
Repeat as necessary

SWPPP Contact(s):

Insert Company or Organization Name: To Be Determined
Insert Name:
Insert Address:
Insert City, State, Zip Code:
Insert Telephone Number:
Insert Fax/Email:
Insert area of control (if more than one operator at site):
Repeat as necessary

This SWPPP was Prepared by:

Insert Company or Organization Name: Eastern Land Survey Associates, Inc.
Insert Name: James H. MacDowell, Clayton A. Morin, PE
Insert Address: 104 Lowell St.
Insert City, State, Zip Code: Peabody, MA. 01960
Insert Telephone Number: 978-531-8121
Insert Fax/Email: 978-531-5920

Subcontractor(s):

Insert Company or Organization Name: To Be Determined
Insert Name:
Insert Address:
Insert City, State, Zip Code:
Insert Telephone Number:
Insert Fax/Email:
Repeat as necessary

Emergency 24-Hour Contact:

Insert Company or Organization Name: To Be Determined
Insert Name:
Insert Telephone Number:

1.3 Nature and Sequence of Construction Activity

Instructions:

- Briefly describe the nature of the construction activity and approximate time frames (one or more paragraphs, depending on the nature and complexity of the project).
- For more information, see *SWPPP Guide*, Chapter 3.A. and EPA's CGP Part 3, Subparts 3.3.B.1 and 2, and 3.4.A.

Describe the general scope of the work for the project, major phases of construction, etc:
The proposed site activities will consist of the following:

- Demolition of existing industrial buildings and removal of demolition debris to approved locations.
- Final testing of on site soils and remediation in accordance with applicable Federal, State and Local regulations.
- Site preparation, grading, driveway, parking area, utility and building construction for a 130 unit multi-family residential facility to be located within three buildings.

The project is expected to require two years to complete once construction has commenced.

What is the function of the construction activity?
X Residential ☐ Commercial ☐ Industrial ☐ Road Construction ☐ Linear Utility
☐ Other (please specify):
Estimated Project Start Date: 09 / 01 / 2008
Estimated Project Completion Date: 09 / 01 / 2010

1.4 Soils, Slopes, Vegetation, and Current Drainage Patterns

Instructions:

- Describe the existing soil conditions at the construction site including soil types, slopes and slope lengths, drainage patterns, and other topographic features that might affect erosion and sediment control.
- Also, note any historic site contamination evident from existing site features and known past usage of the site.
- This information should also be included on your site maps (See *SWPPP Guide*, Chapter 3.C.).
- For more information, see *SWPPP Guide*, Chapter 3.A and EPA's CGP Part 3, Subpart 3.3.C.

Soil type(s): Urban UR

Slopes (describe current slopes and note any changes due to grading or fill activities):
Existing 0-15%, Proposed 1-15%, terracing due to new site design.

Drainage Patterns (describe current drainage patterns and note any changes dues to grading or fill activities): Overland north to south into North River existing. Proposed – a new drainage collection and treatment system will be constructed.

Vegetation: Sparse in existing condition – site is primarily covered by buildings and industrial yard areas.

Other: Site has been used for a variety of industrial activities since the 1800's.

1.5 Construction Site Estimates

Instructions:

- Estimate the area to be disturbed by excavation, grading, or other construction activities, including dedicated off-site borrow and fill areas.
- Calculate the percentage of impervious surface area before and after construction
- Calculate the runoff coefficients before and after construction.
- For more information, see *SWPPP Guide*, Chapter 3.A and EPA's CGP Part 3, Subpart 3.3.B.

The following are estimates of the construction site:

Total project area:	4.3 acres
Construction site area to be disturbed:	4.2 acres
Percentage impervious area before construction:	82 %
Runoff coefficient before construction:	95
Percentage impervious area after construction:	70 %
Runoff coefficient after construction:	94

1.6 Receiving Waters

Instructions:

- List the waterbody(s) that would receive stormwater from your site, including streams, rivers, lakes, coastal waters, and wetlands. Describe each as clearly as possible, such as *Mill Creek, a tributary to the Potomac River*, and so on.
- Indicate the location of all waters, including wetlands, on the site map. For more information, see EPA's CGP Part 3, Subparts 3.3.B.4 and 3.3.C.6.
- Note any stream crossings, if applicable.
- List the storm sewer system or drainage system that stormwater from your site could discharge to and the waterbody(s) that it ultimately discharges to.
- If any of the waterbodies above are impaired and/or subject to Total Maximum Daily Loads (TMDLs), please list the pollutants causing the impairment and any specific requirements in the TMDL(s) that are applicable to construction sites. Your SWPPP should specifically include measures to prevent the discharge of these pollutants. For more information, see EPA's CGP Part 1, Subpart 1.3.C.5 and Part 3, Subpart 3.14.
- For more information, see *SWPPP Guide*, Chapter 3.A and 3.B.
- Also, for more information and a list of TMDL contacts and links by state, visit www.epa.gov/npdes/stormwater/tmdl.

Description of receiving waters: North River (tidal reach in an open canal).

Description of storm sewer systems: None in existing condition. A full collection and treatment system will be constructed.

Description of impaired waters or waters subject to TMDLs: None listed on Massachusetts website.
Other:

1.7 Site Features and Sensitive Areas to be Protected

Instructions:

- Describe unique site features including streams, stream buffers, wetlands, specimen trees, natural vegetation, steep slopes, or highly erodible soils that are to be preserved.
- Describe measures to protect these features.
- Include these features and areas on your site maps.
- For more information, see *SWPPP Guide*, Chapter 3.A and 3.B.

Description of unique features that are to be preserved: Bank of the North River.

Describe measures to protect these features: Install erosion control prior to commencement of any sitework as depicted on the site plan.

1.8 Potential Sources of Pollution

Instructions:

- Identify and list all potential sources of sediment, which may reasonably be expected to affect the quality of stormwater discharges from the construction site.
- Identify and list all potential sources of pollution, other than sediment, which may reasonably be expected to affect the quality of stormwater discharges from the construction site.
- For more information, see *SWPPP Guide*, Chapter 3.A and EPA's CGP Part 3, Subpart 3.1.B.

Potential sources of sediment to stormwater runoff:
Exposed earth areas during construction, stockpiles, newly graded areas.
Potential pollutants and sources, other than sediment, to stormwater runoff:
INSERT TEXT OR USE TABLE BELOW

Trade Name Material	Stormwater Pollutants	Location
Portable Toilets	Bacteria, Parasites, Viruses	Staging Area
Fertilizer	Nitrogen, Phosphorous	Newly Seeded Areas
Asphalt	Oil, Petroleum, Distillates	Parking Lots and Driveways
Concrete	Lime, Sand, PH, Chromium	Building, Foundations, Walks
Glue, Adhesives	Polymers, Epoxies	Construction Building
Gasoline	Benzene, Ethyl Benzene, Tuluene, Xylene, MTBE	Staging Area
Diesel Fuel	Petroleum Distillate, Oil and Grease, Naphthalene, Xylenes	Staging Area
Hydraulic Oil/Fluids	Mineral Oil	Staging Area
Antifreeze/Coolant	Ethylene Glycol, Propylene Glycol, Heavy Metals	Staging Areas

1.9 Endangered Species Certification

Instructions:

- Before beginning construction, determine whether endangered or threatened species or their critical habitats are on or near your site.
- Adapt this section as needed for state or tribal endangered species requirements and, if applicable, document any measures deemed necessary to protect endangered or threatened species or their critical habitats.
- For more information on this topic, see *SWPPP Guide*, Chapter 3.B and EPA's CGP Part 1, Subpart 1.3.C.6 and Appendix C.
- Additional information on Endangered Species Act (ESA) provisions for EPA's Construction General Permit is at www.epa.gov/npdes/stormwater/esa

Are endangered or threatened species and critical habitats on or near the project area?

☐ Yes ☒ No

Describe how this determination was made:

Massachusetts Natural Heritage Database, 2007.

If yes, describe the species and/or critical habitat:

INSERT TEXT HERE

If yes, describe or refer to documentation that determines the likelihood of an impact on identified species and/or habitat and the steps taken to address that impact. (Note, if species are on or near your project site, EPA strongly recommends that the site operator work closely with the appropriate field office of the U.S. Fish and Wildlife Service or National Marine Fisheries Service. For concerns related to state or tribal listing of species, please contact a state or tribal official.)

INSERT TEXT HERE

1.10 Historic Preservation

Instructions:

- Before you begin construction, you should review federal and any applicable state, local, or tribal historic preservation laws and determine if there are historic sites on or near your project. If so, you might need to make adjustments to your construction plans or to your stormwater controls to ensure that these historic sites are not damaged.
- For more information, see *SWPPP Guide*, Chapter 3.B or contact your state or tribal historic preservation officer.

Are there any historic sites on or near the construction site?

☐ Yes ☒ No

Describe how this determination was made:

Consultation with local Historical Association.

If yes, describe or refer to documentation that determines the likelihood of an impact on this historic site and the steps taken to address that impact.

INSERT TEXT HERE

1.11 Applicable Federal, Tribal, State or Local Programs

Instructions:

- Note other applicable federal, tribal, state or local soil and erosion control and stormwater management requirements that apply to the construction site. See EPA's CGP Part 3.9.

INSERT TEXT HERE

1.12 Maps

Instructions:

- Attach site maps. For most projects, a series of site maps is recommended. The first should show the undeveloped site and its current features. An additional map or maps should be created to show the developed site or for more complicated sites show the major phases of development.

These maps should include the following:

- Direction(s) of stormwater flow and approximate slopes before and after major grading activities;
- Areas and timing of soil disturbance;
- Areas that will not be disturbed;
- Natural features to be preserved;
- Locations of major structural and non-structural BMPs identified in the SWPPP;
- Locations and timing of stabilization measures;
- Locations of off-site material, waste, borrow, or equipment storage areas;
- Locations of all waters, including wetlands;
- Locations where stormwater discharges to a surface water;
- Locations of storm drain inlets; and
- Areas where final stabilization has been accomplished.
- For more information, see SWPPP Guide, Chapter 3.C and EPA's CGP Part 3, Subparts 3.1.B.1 and 3.3.C.

Include the site maps with the SWPPP.

SECTION 2: EROSION AND SEDIMENT CONTROL BMPS

Instructions:

- Describe the BMPs that will be implemented to control pollutants in stormwater discharges. For each major activity identified, do the following
  - ✓ Clearly describe appropriate control measures.
  - ✓ Describe the general sequence during the construction process in which the measures will be implemented.
  - ✓ Describe the maintenance and inspection procedures that will be used for that specific BMP.
  - ✓ Include protocols, thresholds, and schedules for cleaning, repairing, or replacing damaged or failing BMPs.
  - ✓ Identify staff responsible for maintaining BMPs.
  - ✓ (If your SWPPP is shared by multiple operators, indicate the operator responsible for each BMP.)
- Categorize each BMP under one of the following 10 areas of BMP activity as described below:
  - ***2.1 Minimize disturbed area and protect natural features and soil***
  - ***2.2 Phase Construction Activity***
  - ***2.3 Control Stormwater flowing onto and through the project***
  - ***2.4 Stabilize Soils***
  - ***2.5 Protect Slopes***
  - ***2.6 Protect Storm Drain Inlets***
  - ***2.7 Establish Perimeter Controls and Sediment Barriers***
  - ***2.8 Retain Sediment On-Site and Control Dewatering Practices***
  - ***2.9 Establish Stabilized Construction Exits***
  - ***2.10 Any Additional BMPs***
- Note the location of each BMP on your site map(s).
- For any structural BMPs, you should provide design specifications and details and refer to them. Attach them as appendices to the SWPPP or within the text of the SWPPP.
- For more information, see *SWPPP Guide*, Chapter 4 and EPA's CGP Part 3, Subparts 3.3.B.2 and 3.4.A-D, and Part 4, Subpart 4.5.
- Consult your state's design manual or one of those listed in Appendix D of the *SWPPP Guide*.
- For more information or ideas on BMPs, see EPA's National Menu of BMPs http://www.epa.gov/npdes/stormwater/menuofbmps

2.1 Minimize Disturbed Area and Protect Natural Features and Soil

Instructions:

- Describe the areas that will be disturbed with each phase of construction and the methods (e.g., signs, fences) that you will use to protect those areas that should not be disturbed. Describe natural features identified earlier and how each will be protected during construction activity. Also describe how topsoil will be preserved. Include these areas and associated BMPs on your site map(s) also. (For more information, see *SWPPP Guide*, Chapter 4, ESC Principle 1.)
- Also, see EPA's *Preserving Natural Vegetation BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/perserve_veg

Existing Features – With the exception of a foot wide strip along the easterly boundary, virtually all of the site clearing and preparation will be done at once as a result of the need for demolition of the existing buildings and anticipated remediation measures.

BMP Description – The area of existing vegetation to be preserved is delineated on the site plan in Appendix B. The area will be marked in the field prior to commencement of demolition work by temporary plastic orange mesh fencing. Perimeter trees which are to be preserved will be clearly marked with a distinct color of surveyor's plastic ribbon. Construction equipment and vehicles will be kept out of areas to be preserved.

Installation Schedule – Areas of existing vegetation to be preserved shall be delineated with orange mesh fence and trees marked with surveyor's ribbon prior to commencement of demolition.

Maintenance and Inspection – Areas of vegetation preservation shall be inspected weekly to determine stability of delineation fencing and tree marking.

Responsible Staff –

Topsoil – Minimal topsoil is anticipated to exist on site and evidenced by existing development.

BMP Description – Any topsoil stripped from areas of proposed construction shall be stockpiled in the project staging area for screening, testing, and if clean, re-use on the site. Stockpiles will be kept out of areas of concentrated runoff flow and protected from erosion by perimeter silt fencing. Stockpile surfaces shall be roughened by equipment tracking.

Installation Schedule – Topsoil stockpiles shall be established in the project staging area as site grading proceeds. Stockpiles will be protected with temporary erosion controls, once placed.

Maintenance and Inspection – Stockpile areas will be inspected weekly and following storm events. Any observed areas of erosion shall be stabilized immediately.

Responsible Staff:

2.2 Phase Construction Activity

Instructions:

- Describe the intended construction sequencing and timing of major activities, including any opportunities for phasing grading and stabilization activities to minimize the overall amount of disturbed soil that will be subject to potential erosion at one time. Also, describe opportunities for timing grading and stabilization so that all or a majority of the soil disturbance occurs during a time of year with less erosion potential (i.e., during the dry or less windy season). (For more information, see *SWPPP Guide*, Chapter 4, ESC Principle 2.) It might be useful to develop a separate, detailed site map for each phase of construction.
- Also, see EPA's *Construction Sequencing BMP Fact Sheet* at http://www.epa.gov/npdes/stormwater/menuofbmps/construction/cons_seq)

Given the necessity of complete demolition of existing buildings on site, the small size of the site (4.3 acres) and the interrelationship of the various site improvements, phasing of construction in Riverview Place is not considered as a practical BMP.

2.3 Control Stormwater Flowing onto and through the Project

Instructions:

- Describe structural practices (e.g., diversions, berms, ditches, storage basins) including design specifications and details used to divert flows from exposed soils, retain or detain flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. (For more information, see *SWPPP Guide*, Chapter 4, ESC Principle 3.)

Grading characteristics of the site are such that small quantities of runoff may enter the site from the industrial site located east of the site and residential properties north and west of the site.

BMP Description: Existing swale near easterly property line. The existing swale receives runoff from a portion of the Mason Realty Trust site, located east of Riverview Place. Immediately following demolition activities, the swale will be cleaned of debris and deadfall and maintained in perpetuity. The inlet end outlet pipe (outlet is visible in the wall of the North River Canal) will be located and cleaned. A headwall will be installed, if appropriate.

Installation Schedule:	The west side of the swale will be protected with a silt barrier prior to commencement of other work on site. Following demolition, the swale will be cleaned of any accumulated debris and deadfall, the inlet to the drain pipe located and the drain cleaned.
Maintenance and Inspection:	The swale will be inspected weekly and following storm events. Any debris or sediment buildup will be removed from the swale.
Responsible Staff:	

***BMP Description*:** Diversion swale northwest and west portion of site. A diversion swale will be constructed along the northwest and west boundaries of the site to intercept runoff from existing residential properties on Mason and Flint Streets. The swale will be maintained until the onsite drainage system is constructed and operating. The swale will be routed through an on-site sediment basin prior to discharge into the North River.

***Installation Schedule*:**	The diversion swale will be installed prior to commencement of sitework in the west portion of the site.
***Maintenance and Inspection*:**	The diversion swale will be inspected weekly and following storm events. Any debris will be removed. If any breaches develop in the swale embankment, they will be repaired immediately.
***Responsible Staff*:**	

Repeat as needed

2.4 Stabilize Soils

Instructions:

- Describe controls (e.g., interim seeding with native vegetation, hydroseeding) to stabilize exposed soils where construction activities have temporarily or permanently ceased. Also describe measures to control dust generation. Avoid using impervious surfaces for stabilization whenever possible. (For more information, see *SWPPP Guide*, Chapter 4, ESC Principle 4, EPA's CGP Part 3, Subpart 3.13.D.)
- Also, see EPA's *Seeding BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/seeding

BMP Description: Hydroseeding will be utilized for temporary stabilization of any areas where construction is to be ceased for more than 14 days. The hydroseed mix shall consist of wood fibers, seed (slope mix) fertilizer and stabilizing emulsion. Application rates shall be at a rate of 8 lbs. per acre. Seeding will be performed at times of the year when vegetation is more likely to be established. Any areas requiring winter stabilization shall be hydroseeded no later than October 1st.

☐ ***Permanent***	☒ ***Temporary***
Installation Schedule:	Temporary stabilization will be applied to areas of the site where activity will temporarily cease for more than 14 days.
Maintenance and Inspection:	Stabilized areas shall be inspected weekly and following storm events. Until dense vegetation has established, any bare areas shall be reseeded, fertilized and mulched or re-hydroseeded.
Responsible Staff:	

BMP Description: Permanent stabilization shall be done upon final grading of soil-surfaced landscaped areas, but in no case more than 14 days after completion following placement and grading of topsoil.

Final seeding of lawn areas shall be done mechanically. Seed mix shall be as specified by the landscape architect. Trees and shrubs shall be native, non-invasive species and shall be installed in accordance with the nursery suppliers recommendations.

☒ ***Permanent***	☐ ***Temporary***
Installation Schedule:	Permanent stabilization shall be done within 14 days following the completion of all other site activities, except final paving.
Maintenance and Inspection:	All newly landscaped areas shall be inspected weekly and following storm events. Any areas of failure shall be re-landscaped immediately. Permanently stabilized areas shall be monitored until final stabilization is attained.
Responsible Staff:	

BMP Description: Dust shall be controlled by wetting with water using a pressure distribution truck or sprinklers. Only potable water shall be used, the source of which shall be approved by the City of Salem. The typical application rate shall be 500 gallons per acre and minimized to avoid ponding or runoff generation.

☐ ***Permanent***	☒ ***Temporary***
Installation Schedule:	Dust control will be performed as needed during site grading operations and during dry windy conditions (actual or forecast winds of greater than 20 miles per hour). Spraying of potable water shall not be done more than 3 times daily in June-September nor more than once daily at other times unless site or climatic conditions demand otherwise.
Maintenance and Inspection:	At least one pressure distribution dewatering truck or trailer shall be kept on site. The unit shall have a positive shutoff valve to prevent excessive watering.
Responsible Staff:	

2.5 Protect Slopes

Instructions:

- Describe controls (e.g., erosion control blankets, tackifiers) including design specifications and details that will be implemented to protect all slopes. (For more information, see *SWPPP Guide*, Chapter 4, ESC Principle 5.)
- Also, see EPA's *Geotextiles BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/geotextiles

BMP Description: Geotextile erosion control blankets will be used to stabilize slopes in areas which are steeper than 3 to 1 and proposed to be grassed surface. The entire slope shall be covered with the blanket following final grading and installation of seed, fertilizer and mulch. The leading edge of the blanket will be anchored in a 12 inch deep by 6 inch wide trench on the uphill side of the slope. The blanket will be rolled slowly downslope and stapled at 12 inch intervals. If multiple blankets are used, they shall be overlapped a minimum of two inches and stapled along the overlapped edge.

If there are conflicts between the above installation procedures and the manufacturer's recommendations, the manufacturer's procedures shall be followed.

Installation Schedule:	Erosion control blankets shall be installed once slopes have been graded and seeded.
Maintenance and Inspection:	Erosion control blankets shall be inspected weekly and immediately following storm events. If any cracks, tears or breaches are observed, the section shall be repaired or replaced immediately. Any areas where the blanket is not in close contact with the ground will be repaired or replaced. Inspection and maintenance will continue until permanent vegetative stabilization of the slope has occurred.
Responsible Staff:	

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

Repeat as needed

2.6 Protect Storm Drain Inlets

Instructions:

- Describe controls (e.g., inserts, rock-filled bags, or block and gravel) including design specifications and details that will be implemented to protect all inlets receiving stormwater from the project during the entire project. (For more information, see *SWPPP Guide*, Chapter 4, ESC Principle 6.)
- Also, see EPA's *Storm Drain Inlet Protection BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/storm_drain

BMP Description: Storm Drain Inlet Protection prior to Paving. A siltation barrier shall be placed around catch basin inlets. The barrier will consist of properly anchored silt socks or stone filters. As an alternative, an impervious membrane may be installed beneath the catch basin grating.

Installation Schedule:	Once catch basins have been constructed, a silt barrier shall be installed around each one until pavement base course has been placed.
Maintenance and Inspection:	See Section 2, Part 2.7.
Responsible Staff:	

BMP Description: Storm Drain Inlet Protection after Pavement Construction. Silt barriers made of filter stone or silt socks shall be installed to protect each catch basin.

Installation Schedule:	Silt protection shall be installed once the base course of pavement has been constructed and removed just prior to installation of the top course of pavement.
Maintenance and Inspection:	Silt protection BMP's will be inspected weekly and immediately following storm events. If external barriers are used, silt will be removed when it reaches 1/3 the height (or capacity) of the barrier.
Responsible Staff:	

2.7 Establish Perimeter Controls and Sediment Barriers

Instructions:

- Describe structural practices (e.g., silt fences or fiber rolls) including design specifications and details to filter and trap sediment before it leaves the construction site. (For more information, see *SWPPP Guide*, Chapter 4, ESC Principle 7.)
- Also see, EPA's *Silt Fence BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/silt_fences or *Fiber Rolls BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/fiber_rolls

BMP Description: Silt Fence. Silt fences shall be installed around the area of proposed work as shown on the Site Plan in Appendix B and around stockpiles of soil. The silt fence shall consist of staked haybales and fabric silt fence as detailed on Sheet 8 of the Site Plan.

Installation Schedule:	The silt fences shall be installed wherever feasible prior to commencement of demolition. Any sections of silt fence damaged during demolition shall be replaced immediately. Silt fence shall be installed around soil stockpiles immediately after their placement.

Maintenance and Inspection:	Silt fences will be inspected weekly and immediately following storm events to ensure that it is stable and functioning as intended. Any gaps or tears in the fabric fence shall be repaired immediately. When sediment reaches one-third the height of the silt fence, it shall be removed and disposed of lawfully. Prior to removal of silt fences from the site, all sediment shall be removed. It is likely that the silt fence will require replacement every 12 to 18 months.
Responsible Staff:	

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

Repeat as needed

2.8 Retain Sediment On-Site

Instructions:

- Describe sediment control practices (e.g., sediment trap or sediment basin), including design specifications and details (volume, dimensions, outlet structure) that will be implemented at the construction site to retain sediments on-site. (For more information, see *SWPPP Guide*, Chapter 4, ESC Principle 8 or EPA's CGP Part 3.13.E.)
- Also, see EPA's *Sediment Basin BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/sediment_basins

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

Repeat as needed

2.9 Establish Stabilized Construction Exits

Instructions:

- Describe location(s) of vehicle entrance(s) and exit(s), procedures to remove accumulated sediment off-site (e.g., vehicle tracking), and stabilization practices (e.g., stone pads or wash racks or both) to minimize off-site vehicle tracking of sediments and discharges to stormwater. (For more information, see *SWPPP Guide*, Chapter 4, ESC Principle 9 and EPA's CGP Part 3, Subparts 3.4.G and 3.13.B.)
- Also, see EPA's *Construction Entrances BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/cons_entrance

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

Repeat as needed

2.10 Additional BMPs

Instructions:

- Describe additional BMPs that do not fit into the above categories.

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

BMP Description:

Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

Repeat as needed

SECTION 3: GOOD HOUSEKEEPING BMPS

Instructions:

- Describe the key good housekeeping and pollution prevention (P2) measures that will be implemented to control pollutants in stormwater.
- Categorize each good housekeeping and pollution prevention (P2) BMP under one of the following seven categories:
  - ***3.1 Material Handling and Waste Management***
  - ***3.2 Establish Proper Building Material Staging Areas***
  - ***3.3 Designate Washout Areas***
  - ***3.4 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices***
  - ***3.5 Allowable Non-Stormwater Discharges and Control Equipment/Vehicle Washing***
  - ***3.6 Spill Prevention and Control Plan***
  - ***3.7 Any Additional BMPs***
- For more information, see *SWPPP Guide*, Chapter 5 and EPA's CGP Part 3. Subparts 3.4.(F), (G), (H), and (I).
- Consult your state's design manual or resources in Appendix D of the *SWPPP Guide*.
- For more information or ideas on BMPs, see EPA's National Menu of BMPs http://www.epa.gov/npdes/stormwater/menuofbmps

3.1 Material Handling and Waste Management

Instructions:

- Describe measures (e.g., trash disposal, sanitary wastes, recycling, and proper material handling) to prevent the discharge of solid materials to receiving waters, except as authorized by a permit issued under section 404 of the CWA (For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 1.)
- Also, see EPA's *General Construction Site Waste Management BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/cons_wasteman

BMP Description: All waste materials will be gathered daily and disposed of into metal trash dumpsters located on site. Only construction debris and trash shall be deposited in dumpsters. All construction personnel will be instructed as to the permitted procedures for waste material disposal. The procedures shall be posted in writing at the site superintendent's office trailer. The site superintendent shall be responsible for seeing that practices are followed.

Installation Schedule:	Trash dumpsters shall be installed as soon as work has commenced.
Maintenance and Inspection:	The dumpsters will be inspected weekly and immediately following storm events. Dumpsters shall be emptied weekly by private contractor and disposed of at an approved location. If trash load exceeds this schedule, dumpsters will be emptied more frequently.
Responsible Staff:	Site Superintendent

BMP Description: Hazardous Waste. Any hazardous waste materials such as oil filters, petroleum products, paint, solvents and equipment maintenance fluids will be stored in sealed original labeled containers in a designated hazardous materials storage area on site. Storage of such materials will be on spill pallets or enclosed site containers. Such materials will not be disposed of in dumpsters. Disposal of hazardous materials shall be in accordance with all applicable Local, State and Federal regulations. All construction personnel will be instructed as to the permitted procedures for waste material disposal. The procedures shall be posted, in writing, at the site superintendent's office trailer. The site superintendent shall be responsible for seeing that practices are followed.

Installation Schedule:	
Maintenance and Inspection:	Hazardous material storage areas shall be inspected weekly and following storm events. Storage area(s) shall be kept well organized, clean and equipped with sufficient cleanup supplies as required for the materials being stored. Material inventories, material safety data sheets and emergency contact numbers shall be maintained in the site superintendent's office trailer.
Responsible Staff:	Site Superintendent

BMP Description: Sanitary Waste. Temporary sanitary facilities (portable toilets) will be provided on the site. Portable toilets will not be located in concentrated runoff flow paths or traffic areas. Collection pans will be provided beneath toilets as a secondary containment mechanism.

Installation Schedule:	
Maintenance and Inspection:	Sanitary waste shall be collected by private contractor in accordance with their customary collection schedule. Toilets will be inspected by that Contractor on a weekly basis for evidence of leaking holding tanks. Any toilets with leaking tanks shall be removed immediately from the site.

Responsible Staff:	Site Superintendent

BMP Description: Recycling. Recyclable construction scrap such as pallets, cardboard and other recyclable containers shall be disposed of in a designated recycling dumpster. The dumpster shall have a secure water tight cover and be placed on site away from runoff flow paths.

All construction personnel will be instructed as to the permitted procedures for waste material disposal. The procedures shall be posted, in writing, at the site superintendent's office trailer. The site superintendent shall be responsible for seeing that practices are followed.

Installation Schedule:	The designated recycling dumpster shall be installed upon commencement of construction activities.
Maintenance and Inspection:	The recycling dumpster shall be inspected weekly and following storm events. The recycling dumpster will be emptied when filled, but in no case less than monthly.
Responsible Staff:	Site Superintendent

3.2 Establish Proper Building Material Staging Areas

Instructions:

- Describe construction materials expected to be stored on-site and procedures for storage of materials to minimize exposure of the materials to stormwater. (For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 2 and EPA's CGP Part 3.4.H.)

BMP Description: Construction equipment and maintenance supplies will be stored in the project staging area. Hand tools, small parts and the like will be stored in a site shed, watertight shipping container within proposed buildings or a trailer. Hazardous materials shall be stored as described in Section 3.1.

Soil stockpiles will be maintained in a designated staging area until such are removed or distributed in connection with site grading activities. Stockpiles will not be placed in areas of runoff concentration and will be protected with erosion control BMP's.

Materials used in connection with site utility construction, such as pipe, manholes and fittings, shall be stored in the project staging area. Building materials used to construct new buildings shall be stored in designated staging areas. Such materials should be stored on wood blocks in order to minimize contact with surface runoff.

Installation Schedule:	The project staging and materials storage area will be designated prior to commencement of construction activities and expanded in accordance with the project demands. Materials storage areas for each building will be designated following rough grading and foundation construction.

Maintenance and Inspection:	Storage areas will be inspected weekly and following storm events. Perimeter controls, covers and liners will be repaired or replaced as needed to maintain proper functioning. Storage areas will be kept in an organized manner.
Responsible Staff:	

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

Repeat as needed

3.3 Designate Washout Areas

Instructions:

- Describe location(s) and controls to eliminate the potential for discharges from washout areas for concrete mixers, paint, stucco, and so on. (For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 3.)
- Also, see EPA's *Concrete Washout BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/concrete_wash

BMP Description: Designated temporary below grade concrete washout areas will be designated for each proposed building as the project progresses. The washout areas will be a minimum of 10 feet square and 3 feet deep, lined with a 10 mil thick impervious liner. Concrete delivery operators will be advised of the washout area. Concrete washout areas shall not be located in runoff paths nor within 50 feet of catch basins.

Concrete will not be placed nor trucks washed out during or immediately prior to an anticipated rainfall event. Excess concrete and washout slurry will be discharged into the designated washout area or removed from the site. When a washout area is no longer needed, it will be cleaned out, materials removed and disposed of as described below, backfilled, graded and stabilized.

Installation Schedule:	Washout areas will be constructed for each proposed building prior to commencement of foundation installation.
Maintenance and Inspection:	Washout areas shall be inspected daily when concrete deliveries are occurring. Inspection shall include liner stability, proper use of washout area and cleanout when the area is filled to 75 percent of its capacity.
Responsible Staff:	

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

Repeat as needed

3.4 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices

Instructions:

- Describe equipment/vehicle fueling and maintenance practices that will be implemented to control pollutants to stormwater (e.g., secondary containment, drip pans, and spill kits) (For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 4.)
- Also, see EPA's *Vehicle Maintenance and Washing Areas BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/vehicile_maintain

BMP Description: Vehicle/Equipment Fueling and Maintenance. (Discuss with General Contractor, maintenance limited to routine activities).

Installation Schedule:	Equipment and vehicle maintenance and fueling practices will be implemented at the time of commencement of construction activities.
Maintenance and Inspection:	(Discuss w/Contractor)
Responsible Staff:	

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

Repeat as needed

3.5 Control Equipment/Vehicle Washing

Instructions:

- Describe equipment/vehicle washing practices that will be implemented to control pollutants to stormwater. (For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 5.)
- Also, see EPA's *Vehicle Maintenance and Washing Areas BMP Fact Sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/vehicile_maintain

BMP Description: (Discuss with Contractor, likely will not be allowed on site).	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

Repeat as needed

3.6 Spill Prevention and Control Plan

Instructions:

- Describe the spill prevention and control plan to include ways to reduce the chance of spills, stop the source of spills, contain and clean up spills, dispose of materials contaminated by spills, and train personnel responsible for spill prevention and control. (For more information, see *SWPPP Guide*, Chapter 5, P2 Principle 6 and EPA's CGP Parts 4.3 and 4.4.)
- Also, see EPA's *Spill Prevention and Control Plan BMP Fact sheet* at www.epa.gov/npdes/stormwater/menuofbmps/construction/spill_control

Spill Prevention and Control Procedures - BMP Description:

a. Employee Training – all employees will be trained as to procedures to be followed relative to spill prevention and control.

b. Vehicle Maintenance – major vehicle and equipment maintenance will be accomplished offsite. Vehicles and equipment will be checked for leaking oil, fuel or other fluids. Such leaks shall be repaired immediately.

c. Hazardous Material Storage – hazardous materials shall be stored in accordance with Section 3.1 and all applicable regulatory requirements.

3.7 Any Additional BMPs

Instructions:

- Describe any additional BMPs that do not fit into the above categories. Indicate the problem they are intended to address.

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

Repeat as needed

3.8 Allowable Non-Stormwater Discharge Management

Instructions:

- Identify all allowable sources of non-stormwater discharges that are not identified. The allowable non-stormwater discharges identified in Part 1.3.B of EPA's CGP include
  - ✓ Discharges from fire-fighting activities
  - ✓ Fire hydrant flushings
  - ✓ Waters used to wash vehicles where detergents are not used
  - ✓ Water used to control dust in accordance with EPA's CGP, Part 3, Subpart 3.4.G
  - ✓ Potable water including uncontaminated water line flushings
  - ✓ Routine external building wash down that does not use detergents
  - ✓ Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used
  - ✓ Uncontaminated air conditioning or compressor condensate
  - ✓ Uncontaminated ground water or spring water
  - ✓ Foundation or footing drains where flows are not contaminated with process materials such as solvents
  - ✓ Uncontaminated excavation dewatering
  - ✓ Landscape irrigation
- Identify measures used to eliminate or reduce these discharges and the BMPs used to prevent them from becoming contaminated.
- For more information, see *SWPPP Guide*, Chapter 3.A or EPA's CGP Part 1.3.B and 3.5.

List allowable non-stormwater discharges and the measures used to eliminate or reduce them and to prevent them from becoming contaminated:

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

Repeat as needed

SECTION 4: SELECTING POST-CONSTRUCTION BMPs

Instructions:

- Describe all post-construction stormwater management measures that will be installed during the construction process to control pollutants in stormwater discharges after construction operations have been completed. Examples of post-construction BMPs include the following:
  - ✓ Biofilters
  - ✓ Detention/retention devices
  - ✓ Earth dikes, drainage swales, and lined ditches
  - ✓ Infiltration basins
  - ✓ Porous pavement
  - ✓ Other proprietary permanent structural BMPs
  - ✓ Outlet protection/velocity dissipation devices
  - ✓ Slope protection
  - ✓ Vegetated strips and/or swales
- Identify any applicable federal, state, local, or tribal requirements for design or installation.
- Describe how low-impact designs or smart growth considerations have been incorporated into the design.
- For any structural BMPs, you should have design specifications and details and refer to them. Attach them as appendices to the SWPPP or within the text of the SWPPP.
- For more information on this topic, see your state's stormwater manual.
- You might also want to consult one of the references listed in Appendix D of the *SWPPP Guide* and EPA's CGP Part 3, Subparts 3.4.E and 3.9.
- Visit the post-construction section of EPA's Menu of BMPs at: www.epa.gov/npes/menuofbmps

BMP Description: Deep Sump Hooded Catch Basins. Deep sump hooded catch basins will be installed prior to pavement installation and will intercept runoff from paved areas of the site.

Installation Schedule:	Catch basins will be installed prior to installation of pavement.
Maintenance and Inspection:	Basins will be inspected and maintained in accordance with Section ___ of the Operation and Maintenance Plan dated January 2008.
Responsible Staff:	

BMP Description: Stormceptor. The Stormceptor is a Massachusetts step tested water quality device which will attain 77 percent total suspended solids removal.

Installation Schedule:	The Stormceptor will be installed prior to installation of pavement.
Maintenance and Inspection:	The Stormceptor will be inspected and maintained in accordance with Section B of the Operation and Maintenance Plan dated January 2008.
Responsible Staff:	

BMP Description: Infiltration Basin. An underground infiltration basin is proposed as a LID alternative to dispose of runoff from a portion of the roof of the 22 unit building on Mason Street.	
Installation Schedule:	The infiltration basin will be installed prior to pavement installation south of the 22 unit building.
Maintenance and Inspection:	The infiltration basin will be inspected and maintained in accordance with Section E of the Operation and Maintenance Plan dated January 2008.
Responsible Staff:	

BMP Description: Porous Pavement. An area of porous pavement is proposed south of the 57 unit building as a LID alternative and local test case.	
Installation Schedule:	The porous pavement area will be installed following installation of the base course of paving south of the 57 unit building and field confirmation of subsurface soil suitability.
Maintenance and Inspection:	The porous pavement shall be inspected and maintained in accordance with Section F of the Operation and Maintenance Plan dated January 2008.
Responsible Staff:	

SECTION 5: INSPECTIONS

5.1 Inspections

Instructions:

- Identify the individual(s) responsible for conducting inspections and describe their qualifications. Reference or attach the inspection form that will be used.
- Describe the frequency that inspections will occur at your site including any correlations to storm frequency and intensity.
- Note that inspection details for particular BMPs should be included in Sections 2 and 3.
- You should also document the repairs and maintenance that you undertake as a result of your inspections. These actions can be documented in the corrective action log described in Part 5.3 below.
- For more on this topic, see *SWPPP Guide*, Chapters 6 and 8 and EPA's CGP Part 3, Subparts 3.6.A, 3.10 and 3.11.C.
- Also, see suggested inspection form in Appendix B of the *SWPPP Guide*.

1. ***Inspection Personnel:*** Identify the person(s) who will be responsible for conducting inspections and describe their qualifications:

2. ***Inspection Schedule and Procedures:***

   Describe the inspection schedules and procedures you have developed for your site (include frequency of inspections for each BMP or group of BMPs, indicate when you will inspect, e.g., before/during/and after rain events, spot inspections):

   Describe the general procedures for correcting problems when they are identified. Include responsible staff and time frames for making corrections:

   Attach a copy of the inspection report you will use for your site.
   See Appendix E.

5.2 Delegation of Authority

Instructions:

- Identify the individual(s) or specifically describe the position where the construction site operator has delegated authority for the purposes of signing inspection reports, certifications, or other information.
- Attach a copy of the signed delegation of authority form that will be used.
- For more on this topic, see *SWPPP Guide*, Chapter 7 and Appendix G, Subsection 11 of EPA's CGP.

Duly Authorized Representative(s) or Position(s):

Insert Company or Organization Name:
Insert Name:
Insert Position:
Insert Address:
Insert City, State, Zip Code:
Insert Telephone Number:
Insert Fax/Email:

Attach a copy of the signed delegation of authority form in Appendix K.

5.3 Corrective Action Log

Instructions:

- Create here, or as an attachment, a corrective action log. This log should describe repair, replacement, and maintenance of BMPs undertaken as a result of the inspections and maintenance procedures described above. Actions related to the findings of inspections should reference the specific inspection report.
- This log should describe actions taken, date completed, and note the person that completed the work.

Corrective Action Log:
See Appendix F.

SECTION 6: RECORDKEEPING AND TRAINING

6.1 Recordkeeping

Instructions:

- The following is a list of records you should keep at your project site available for inspectors to review:
- Dates of grading, construction activity, and stabilization (which is covered in Sections 2 and 3)
- A copy of the construction general permit (attach)
- The signed and certified NOI form or permit application form (attach)
- A copy of the letter from EPA or/the state notifying you of their receipt of your complete NOI/application (attach)
- Inspection reports (attach)
- Records relating to endangered species and historic preservation (attach)
- Check your permit for additional details
- For more on this subject, see *SWPPP Guide*, Chapter 6.C and EPA's CGP Part 3, Subparts 3.4.C, 3.8, 3.10.G and 3.12.A.

Records will be retained for a minimum period of at least 3 years after the permit is terminated.

Date(s) when major grading activities occur:
INSERT LOG HERE or REFERENCE ATTACHMENT
Date(s) when construction activities temporarily or permanently cease on a portion of the site:
INSERT LOG HERE or REFERENCE ATTACHMENT
Date(s) when an area is either temporarily or permanently stabilized:
INSERT LOG HERE or REFERENCE ATTACHMENT

6.2 Log of Changes to the SWPPP

Instructions:

- Create a log here, or as an attachment, of changes and updates to the SWPPP. You should include additions of new BMPs, replacement of failed BMPs, significant changes in the activities or their timing on the project, changes in personnel, changes in inspection and maintenance procedures, updates to site maps, and so on.

Log of changes and updates to the SWPPP
See Appendix G.

6.3 Training

Instructions:

- Training your staff and subcontractors is an effective BMP. As with the other steps you take to prevent stormwater problems at your site, you should document the training that you conduct for your staff, for those with specific stormwater responsibilities (e.g. installing, inspecting, and maintaining BMPs), and for subcontractors.
- Include dates, number of attendees, subjects covered, and length of training.
- For more on this subject, see *SWPPP Guide*, Chapter 8.

Individual(s) Responsible for Training:
INSERT TEXT or TABLE HERE
Describe Training Conducted:

- General stormwater and BMP awareness training for staff and subcontractors:

- Detailed training for staff and subcontractors with specific stormwater responsibilities:

SECTION 7: FINAL STABILIZATION

Instructions:

- Describe procedures for final stabilization. If you complete major construction activities on part of your site, you can document your final stabilization efforts for that portion of the site. Many permits will allow you to then discontinue inspection activities in these areas (be sure to check your permit for exact requirements). You can amend or add to this section as areas of your project are finally stabilized.
- Update your site plans to indicate areas that have achieved final stabilization.
- For more on this topic, see *SWPPP Guide*, Chapter 9 and EPA's CGP Part 3, Subparts 3.11 and 3.13.D, and Part 5, Subpart 5.1.

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

BMP Description:	
Installation Schedule:	
Maintenance and Inspection:	
Responsible Staff:	

Repeat as needed

SECTION 8: CERTIFICATION AND NOTIFICATION

Instructions:

- The SWPPP should be signed and certified by the construction operator(s). Attach a copy of the NOI and permit authorization letter received from EPA or the state in Appendix D.
- For more information, see EPA's CGP Part 3, Subpart 3.12.A-D and Appendix G, Section 11.

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

Name: _____ Title: _____

Signature: _____ Date: _____

Repeat as needed for multiple construction operators at the site

SWPPP APPENDICES

Attach the following documentation to the SWPPP:

Appendix A – General Location Map

Appendix B – Site Maps

Appendix C – Construction General Permit

Appendix D – NOI and Acknowledgement Letter from EPA/State

Appendix E – Inspection Reports

Appendix F – Corrective Action Log (or in Part 5.3)

Appendix G – SWPPP Amendment Log (or in Part 6.2)

Appendix H – Subcontractor Certifications/Agreements

Appendix I – Grading and Stabilization Activities Log (or in Part 6.1)

Appendix J – Training Log

Appendix K – Delegation of Authority

Appendix L – Additional Information (i.e., Endangered Species and Historic Preservation Documentation)

APPENDIX E
SAMPLE INSPECTION REPORT

Stormwater Construction Site Inspection Report

General Information			
Project Name	Riverview Place		
NPDES Tracking No.		**Location**	Salem, Mass.
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications	Insert qualifications or add reference to the SWPPP. (See Section 5 of the SWPPP Template)		
Describe present phase of construction			

Type of Inspection:
❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event

Weather Information

Has there been a storm event since the last inspection? ❑Yes ❑No
If yes, provide:
Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):

Weather at time of this inspection?
❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds
❑ Other: Temperature:

Have any discharges occurred since the last inspection? ❑Yes ❑No
If yes, describe:

Are there any discharges at the time of inspection? ❑Yes ❑No
If yes, describe:

Site-specific BMPs

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

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1	Protect Nat. Features	❑Yes ❑No	❑Yes ❑No	
2	Protect Stockpiles	❑Yes ❑No	❑Yes ❑No	
3	Existing Nat. Swale	❑Yes ❑No	❑Yes ❑No	
4	Diversion Swale	❑Yes ❑No	❑Yes ❑No	
5	Catch Basins	❑Yes ❑No	❑Yes ❑No	
6	Stormceptor	❑Yes ❑No	❑Yes ❑No	
7	Sediment Basin	❑Yes ❑No	❑Yes ❑No	
8	Infiltration Basin	❑Yes ❑No	❑Yes ❑No	
9	Porous Pavement	❑Yes ❑No	❑Yes ❑No	
10		❑Yes ❑No	❑Yes ❑No	
11		❑Yes ❑No	❑Yes ❑No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
12		❑Yes ❑No	❑Yes ❑No	
13		❑Yes ❑No	❑Yes ❑No	
14		❑Yes ❑No	❑Yes ❑No	
15		❑Yes ❑No	❑Yes ❑No	
16		❑Yes ❑No	❑Yes ❑No	
17		❑Yes ❑No	❑Yes ❑No	
18		❑Yes ❑No	❑Yes ❑No	
19		❑Yes ❑No	❑Yes ❑No	
20		❑Yes ❑No	❑Yes ❑No	

Overall Site Issues

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

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
3	Are perimeter controls and sediment barriers adequately installed and maintained?	❑Yes ❑No	❑Yes ❑No	
4	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
5	Are storm drain inlets properly protected?	❑Yes ❑No	❑Yes ❑No	
6	Is the construction exit preventing sediment from being tracked into the street?	❑Yes ❑No	❑Yes ❑No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	
12		❑Yes ❑No	❑Yes ❑No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

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

Print name and title: _____

Signature: _____ **Date:** _____

Appendix F – *Sample* Corrective Action Log

Project Name:
SWPPP Contact:

Inspection Date	Inspector Name(s)	Description of BMP Deficiency	Corrective Action Needed (including planned date/responsible person)	Date Action Taken/Responsible person

Appendix G – *Sample* SWPPP Amendment Log

Project Name:
SWPPP Contact:

Amendment No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]

Appendix H – *Sample* Subcontractor Certifications/Agreements

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: _____

Project Title: _____

Operator(s): _____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the BMPs and practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: _____

Address: _____

Telephone Number: _____

Type of construction service to be provided: _____

_____

_____

Signature: _____

Title: _____

Date: _____

Appendix I – *Sample* Grading and Stabilization Activities Log

Project Name:
SWPPP Contact:

Date Grading Activity Initiated	Description of Grading Activity	Date Grading Activity Ceased (Indicate Temporary or Permanent)	Date When Stabilization Measures are Initiated	Description of Stabilization Measure and Location

Appendix J – *Sample* SWPPP Training Log

Stormwater Pollution Prevention Training Log

Project Name:

Project Location:

Instructor's Name(s):

Instructor's Title(s):

Course Location: _____ Date: _____

Course Length (hours): _____

Stormwater Training Topic: *(check as appropriate)*

- ❑ **Erosion Control BMPs**
- ❑ **Sediment Control BMPs**
- ❑ **Non-Stormwater BMPs**
- ❑ **Emergency Procedures**
- ❑ **Good Housekeeping BMPs**

Specific Training Objective:_____

_____

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Company
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Appendix K – *Sample* Delegation of Authority Form

Delegation of Authority

I, _____ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the Construction General Permit, at the _____ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

_____ (name of person or position)
_____ (company)
_____ (address)
_____ (city, state, zip)
_____ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in Appendix G, Subsection 11.A of EPA's Construction General Permit (CGP), and that the designee above meets the definition of a "duly authorized representative" as set forth in Appendix G, Subsection 11.B (1-3).

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

Name: _____

Company: _____

Title: _____

Signature: _____

Date: _____

PERMIT REQUIREMENTS

Permit Requirements

- Variance from Salem Zoning Board of Appeals
- Section 7-21 Special Permit. NRCC Mixed Use District
- Site Plan Review (Section 7-18)
- Wetlands and Flood Hazard District Special Permit
- Order of Conditions (Salem Conservation Commission)
- Chapter 91 License – Massachusetts DEP

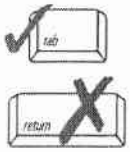
CHECKLIST FOR STORMWATER REPORT

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

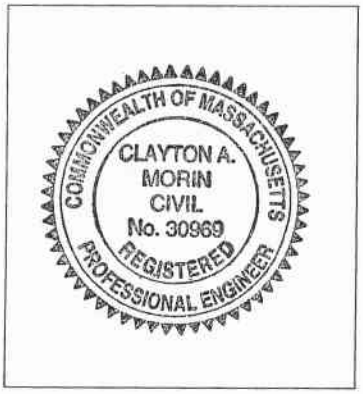
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Signature and Date 11 Nov 2008

Checklist

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

☐ New development

☒ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☒ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☒ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

☐ Solid Waste Landfill pursuant to 310 CMR 19.000

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

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

- ☐ The ½" or 1" Water Quality Volume or
- ☒ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

Standard 6: Critical Areas

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

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

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

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

☐ Limited Project

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

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

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

☐ Bike Path and/or Foot Path

☒ Redevelopment Project

☐ Redevelopment portion of mix of new and redevelopment.

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

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

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

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

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

Standard 10: Prohibition of Illicit Discharges

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

☐ An Illicit Discharge Compliance Statement is attached;

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

OPERATION AND MAINTENANCE PLAN
PROPOSED STORMWATER MANAGEMENT FACILITIES

RIVERVIEW PLACE
SALEM, MASSACHUSETTS

JANUARY 2008
REVISED: NOVEMBER 2008

The following Operations and Maintenance Plan ("O&M") has been prepared to ensure that proposed systems function as designed. The O & M plan includes a maintenance schedule to ensure that structural and non-structural components are implemented properly and identifies the responsible parties.

A brief summary of the specific BMP's to be implemented at the site are as follows:

Non-Structural Methods

Site Layout

Any maintained vegetated buffers disturbed during other site construction activities will be stabilized upon completion of project activities.

Source Control

A comprehensive source control program will be implemented at the site which includes regular pavement sweeping (at least four times per year), catch basin cleaning, and Stormceptor cleaning.

Spill Prevention

A spill prevention plan that includes an emergency notification plan and cleanup program will be developed as part of the National Pollution Discharge Elimination System (NPDES) Construction General Permit. At a minimum the following good housekeeping practices will be followed on-site during construction:

1. An effort will be made to store only enough product required to do the job.

2. All materials stored on-site will be kept in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.

Structural Methods

A. Deep Sump Catch Basins

1. During Construction

a. Protect catch basins grates with hay bales, check dams until base paving course is installed and landscaped areas are stabilized and/or vegetated.

b. Inspect basins monthly or following rainstorms of greater than one inch in 24 hours and clean when sediment levels are greater than twelve inches.

2. Long Term

a. Inspect basins monthly and clean as necessary, but at least twice annually.

B. Stormceptor Unit

1. Maintain in accordance with Manufacturer's recommendations (copy follows). The Stormceptor Unit shall be inspected at least four times annually and after any spill event. The unit shall be maintained annually and immediately following any spill event.

C. Snow Removal

Snow removal and/or storage shall be conducted in accordance with the Massachusetts DEP, Resource Protection Snow Disposal Guidance, effective March 1, 2001. Snow shall not be stockpiled on the walkway adjacent to the North River nor on top of catch basins and shall not be dumped or pushed into the river.

Snow stockpile areas shall be designated prior to snowfall (but not later than December 1st) with orange plastic temporary fencing. Snow stockpile areas shall be cleaned of any debris not later than May 15th. If snow exceeds the on-site storage capacity, it shall be removed to an approved off-site stockpile location.

D. Erosion Control Procedures

1. Staked hay bales, silt fence, temporary diversion swales and sediment basins shall be installed in accordance with this plan or as otherwise directed by the project engineer or the Conservation Commission prior to

commencement of construction activities. 20 additional hay bales and 100 ft. of silt fence shall be kept on site for repairs or other erosion control needs. The contractor shall inspect erosion control facilities weekly and after every rainfall event to confirm that same are properly functioning. Any deficiencies in the erosion control facilities shall be corrected immediately.

2. All soil stockpiles shall be protected against erosion utilizing erosion control barriers and/or crushed stone filter dikes.

3. Catch basins shall be protected with filters, as shown on the plan, until no sediment transport is visible during rainfall events. Filters shall be inspected weekly and maintained as necessary.

4. Temporary erosion control measures to be taken during construction shall conform with the "Massachusetts Erosion and Sediment Control Guidelines, Urban and Suburban Areas" dated March 1997, and may include some or all of the following measures:

   - Temporary seeding
   - Temporary mulching (straw)
   - Permanent seeding
   - Hydroseeding
   - Sodding
   - Placement of hay or jute netting during winter months

5. Debris and/or litter shall be removed from the site on a weekly basis.

6. If dust is generated during construction, it shall be controlled by use of water trucks, sprinkling or temporary stabilization methods.

7. At the completion of the project, all disturbed areas shall be permanently stabilized with loam and seed or other ground cover. All stormwater BMP's shall be inspected and cleaned as necessary. Paved areas shall be swept.

E. Bioretention Cells

1. Bioretention cells shall be constructed following all other construction activities occurring near or on proposed cell locations.

2. Inspection

   a. Cells shall be inspected monthly throughout the growing season and bi-weekly in the summer; inspection shall include examination of plants and ground cover for pest or disease problems as well as sediment accumulation, erosion, mulch and overflow piping.

3. Maintenance

a. Clean sediment accumulation if more than one inch in depth;

b. Repair any eroded areas;

c. Treat diseased vegetation as necessary;

d. Remove and replace dead vegetation (April 1st – May 15th and/or September 15th – October 30th);

e. Remove any invasive species;

f. Replace mulch every two years.

F. Porous Pavement

Porous pavement surfaces are to be cleaned at least six times a year by vacuum sweeping and pressure washed at least twice annually. No sanding shall be allowed on porous pavement surfaces. A sign shall be posted identifying areas of porous pavements. No salting of porous pavement surfaces shall be permitted.

Porous pavements shall be inspected following rainfall events to confirm that proper drainage is occurring and that no deterioration of the surface is occurring. Porous surfaces shall not be sealed or repaved with impermeable materials.

G. Long Term Pollution Prevention Plan

1. Good Housekeeping

a. Inspect the site weekly, pickup and properly dispose of any trash, debris or branches;

b. Compost all landscape waste in an appropriate container or remove from the site to an approved waste area;

c. Inspect paved areas for any signs of oil drippings and apply an absorbent agent to such immediately;

d. Vacuum and sweep paved areas of site at least four times annually.

2. Storage of Waste Materials

Store any waste or recyclables in covered containers or a covered dumpster and remove such materials from the site on a regular basis, but in no case less often than weekly.

3. Vehicle Washing

No vehicle washing is to be done on site other than hand washing of vehicles owned by occupants of the residences.

4. Inspect and maintain stormwater best management practices in accordance with Sections A, B, E and F of this Operation and Maintenance Plan.

5. Spill Prevention and Response:

A spill prevention and response plan is included in the NPDES SWPPP.

6. Maintenance of landscaped areas shall be done utilizing off-site personnel: Use of herbicides and pesticides shall be minimized. Low nitrogen fertilizers will be used. Landscape maintenance supplies are not to be stored on site, except during actual landscape construction. Rain gardens shall be maintained in accordance with Section E of the Operation and Maintenance Plan.

7. Any observed pet waste will be cleaned up immediately and disposed of with regular site trash.

8. Snow management shall be in accordance with Section C of the Operation and Maintenance Plan.

H. Notification of Future Property Owners as to Requirements for Maintenance of Stormwater System.

A deed restriction will be placed on any conveyance of all units within the subject property referencing the requirements of this plan.

I. Plan

The proposed storm drainage BMP's are shown on Sheets 4-6 of the Site Development Permit Plan. An as-built plan will accompany the request for a Certificate of Compliance from the Salem Conservation Commission.

J. Operation and Maintenance Budget

An operation and maintenance budget will be provided at the time of a request for a Certificate of Compliance.

K. Illicit Discharges

No illicit discharges from the site shall be allowed to enter the storm drainage system or the North River.

The party responsible for Operation and Maintenance of the Stormwater Management Facilities is:

Riverview Place LLC
c/o Michael O'Brien
6 Cider Mill Road
Peabody, MA. 01960
Tel: 978-979-4072

Or its heirs and assigns.

Redevelopment Checklist
Riverview Place
Mason Street and Flint Street – Salem, Mass.
March 2008

Existing Conditions

The site of Riverview Place consists of 4.3 acres of industrially developed land. It is bounded on the west, in part, by Flint Street and, in part, by private residences along Flint Street, to the north by private residences and Mason St., to the east by an industrial site owned by Mason Realty Trust and to the south by the North River and land of the Commonwealth of Massachusetts. The major portion of the site is occupied by the so-called Salem Suede building and the Bonfanti building on Mason Street.

Those portions of the site not occupied by buildings are either paved or heavily compacted gravel industrial yard areas. Soil are, at best, Hydrologic Group C or D and underlain by fill materials. Some storage areas on site are land uses with higher pollutant loads (auto repair and storage areas). Minimal, if any, stormwater facilities exist on site. The site is directly tributary to the adjacent North River.

The Project

The project proposes to demolish all existing facilities on site and redevelop the property for residential use and a small commercial component.

Stormwater Management Standards

Standard 1: A new storm drainage outfall serving a newly constructed on-site collection system is proposed. BMP's include parking lot sweeping, deep sump hooded catch basins and Stormceptors. The bank of the North River is currently stabilized by placed riprap or a timber bulkhead.

Standard 2: Peak Rate Control and Flood Prevention

The Applicant requests that the Conservation Commission waive Standard 2 since:

a. The site contains land subject to coastal storm flowage.

b. Postdevelopment discharge rate characteristics will diminish slightly due to improved surface characteristics.

Standard 3: Recharge to Groundwater

Postdevelopment recharge conditions will improve slightly over predevelopment conditions for the following reasons:

a. Impervious or near impervious site coverages within the sub-basin will decrease from 4.85 to 4.15 acres.

b. Open space (landscaped) areas will increase on site to 1.15 acres.

c. Assuming that appropriate subsurface soil conditions can be found to the southwest of the 22 unit building, roof recharge by use of Stormtech infiltrators will be practiced for an appropriate portion of the 22 unit building facing Mason Street.

d. An area of porous pavement is proposed along the south boundary of the parking lot.

It is proposed to fully evaluate subsurface soil conditions with respect to type of materials and 21E matters during the demolition phase and report the findings of those investigations together with any required site design modifications relative to Standard 3 to the Salem Conservation Commission.

Standard 4: 80% TSS Removal

The development proposal includes the following items in the source control section of the Operation and Maintenance Plan:

- Sweeping of paved surfaces
- Snow management
- Management of lawn chemicals
- Stabilization of observed eroding surfaces

All impervious areas on site will be new construction and routed through deep sump catch basins and Stormceptors to achieve 80% TSS removal for the first one-half inch of runoff.

Standard 5: Higher Potential Pollutant Loads

The site is residential in character and thus not a land use with Higher Potential Pollutant Loads.

Standard 6: Critical Areas

The proposed stormwater discharge is not into or near a critical area nor into an outstanding resource water nor public water supply areas.

Standard 8: Erosion and Sediment Controls

An erosion control plan is specified on Sheet 8 of the Site Development Permit Plan. A NPDES Notice of Intent and SWPPP shall be prepared and submitted prior to commencement of construction in accordance with Federal requirements. A draft of the SWPPP is included with the Notice of Intent.

Standard 9: Operation and Maintenance

An Operation and Maintenance Plan is included with the Stormwater Report.

Standard 10: Illicit Discharges

The property owner is of the opinion that any illicit discharges were removed several years ago. No pipes were observed to be entering the river from the site other than an apparent storm drain crossing the adjacent property of Mason Realty Trust.

The absence of illicit discharges will be confirmed during the demolition phase. If any are encountered, such will be permanently discontinued by capping or removal.

Demolition Plan
Riverview Place – Salem, Mass.
March 2008

Site preparation of the property upon which Riverview Place is proposed would include demolition of all structures on the site. The general location of those structures is shown on Sheet 2 of the Site Development Permit Plans.

Prior to undertaking any demolition activities, the following steps must be completed:

1. Approval of Salem Historical Society since most of the structures on site are more than 50 years old.

2. Performance of a preliminary demolition inspection by the Salem Fire Department (SFPR #29C).

3. Utility survey as to water and sewer lines serving the site in accordance with the requirements of the City of Salem Department of Public Services.

4. Disconnection of all services discovered in Item 3 in accordance with the requirements of the Salem Department of Public Services.

5. Notify all other utility agencies with facilities servicing the lot to secure required releases under Section 116.1 of the Massachusetts State Building Code.

6. Secure Building Demolition Permit.

Discussions have been conducted with a representative of a potential demolition contractor for the project as to specific procedures which would be followed in the demolition of the Salem Suede building with particular emphasis on avoiding introduction of demolition materials into the North River.

The following general approach is recommended:

- Demolition of the existing building will proceed from northwest to southeast. This will allow the building to be constantly pulled into the site and not toward the river.

- As work approaches the river (the last 100 feet of building), a boom system will be installed to contain any material which might inadvertently get into the river. The upper two floors of the building are of wood construction and the lower two floors of masonry construction.

- In addition to the boom system, personnel will be stationed next to the river so that any material entering the waterway can be removed immediately.

- The bulk demolition will be done with track excavators.

- Staging areas will be maintained more than 100 feet from the river for temporary stockpiling of demolition materials or recyclable demolition materials until such can be removed from the site. Such stockpiles will be protected by erosion control barriers until removed from the site.

- A silt barrier, as shown on Sheet 2, will be installed prior to start of demolition activities and inspected daily as to its stability and condition. Any required repairs will be made immediately.

- Dust control will be accomplished by wetting. The demolition contractor shall coordinate with the City as to the water source (i.e. metered hydrant use vs. trucked supply).

Stormceptor®

MAINTENANCE

Inspection and Maintenance. Easy. Convenient.

When it rains, oils, sediment and other contaminants are captured and contained by over 20,000 Stormceptor units operating worldwide. While Stormceptor's patented scour prevention technology ensures captured pollutants remain in the unit during all rainfall events, the accumulated pollutants must eventually be removed as part of a regular maintenance program.

If neglected, oil and sediment gradually build up and diminish any BMP's efficiency, harming the environment and leaving owners and operators vulnerable to fines, surcharges and bad publicity.

Maintenance is a must

Ease, frequency and cost of maintenance are often overlooked by specifiers when considering the merits of a stormwater treatment system. In reality, maintenance is fundamental to the long-term performance of any stormwater quality treatment device.

While regular maintenance is crucial, it shouldn't be complicated. An ongoing maintenance program with Stormceptor is convenient and practically effortless. With virtually no disruptions, you can concentrate on your core business.

Quick inspections

Inspections are easily carried out above ground from any standard surface access cover through a visual inspection of the orifice and drop tee components. A sludge judge and oil dip-stick are all that are needed for sediment and oil depth measurements.

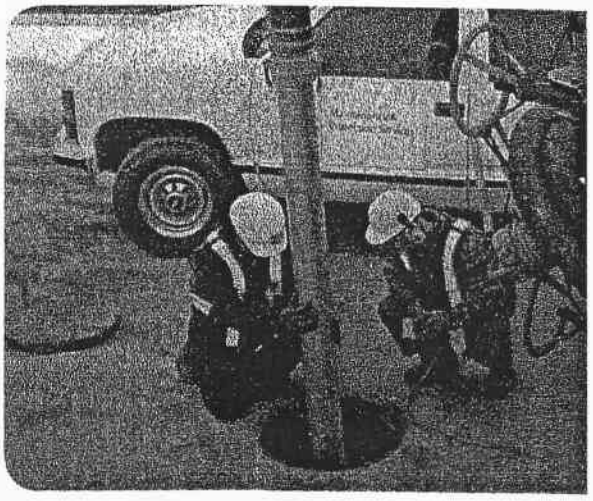
Easy unit access

Maintenance is typically conducted from the same surface access cover, eliminating the need for confined space entry into the unit. Your site remains undisturbed, saving you time and money.

imbrium

No muss, no fuss and fast

Maintenance is performed quickly and inexpensively with a standard vacuum truck. Servicing usually takes less than two hours, with no disruption to your site.



A complete stormwater management plan for Stormceptor extends beyond installation and performance to regular maintenance. It's the smart, cost-effective way to ensure your unit continues to remove more pollutants than any other separator for decades to come.

Stormceptor maintenance recommendations

- Units should be inspected post-construction, prior to being put into service.
- Inspect every six months for the first year of operation to determine the oil and sediment accumulation rate.
- In subsequent years, inspections can be based on first-year observations or local requirements.
- Cleaning is required once the sediment depth reaches 15% of storage capacity, (generally taking one year or longer). Local regulations for maintenance frequency may vary.
- Inspect the unit immediately after an oil, fuel or chemical spill.
- A licensed waste management company should remove captured petroleum waste products from any oil, chemical or fuel spills and dispose responsibly.

With over 20,000 units operating worldwide, Stormceptor performs and protects every day, in every storm.

imbrium

www.imbriumsystems.com
USA: (888) 279 8826
CANADA: (800) 565 4801

Table 2. Stormceptor® Capacities				
Model (Metric)	Model (US)	Sediment Capacity L (US gal)	Oil Capacity L (US gal)	Total Holding Capacity L (US gal)
300	450	1275 (335)	325 (85)	1775 (470)
750	900	2460 (565)	915 (280)	4325 (950)
1000	1200	3260 (845)	915 (280)	5125 (1230)
1500	1800	5660 (1445)	915 (280)	7525 (1830)
2000	2400	6150 (1345)	2945 (880)	10925 (2495)
3000	3600	10415 (2600)	2945 (880)	15195 (3750)
4000	4800	14060 (3475)	3490 (1025)	20180 (5020)
5000	6000	18510 (4550)	3490 (1025)	24635 (6095)
6000	7200	23445 (5425)	4150 (1100)	31210 (7415)

Identification

Even if you do not have plans of your storm drain system you will be able to easily identify where the inline Stormceptor unit(s) (spool or disc insert) are since the name STORMCEPTOR is clearly embossed on the cover. You will be able to determine the location of "inlet" Stormceptor units with horizontal catch basin inlets by looking down the grate since the insert will be visible. The name Stormceptor is not embossed on the inlet models due to the variability of inlet grates used/approved across North America. Once you have found the unit, you may still be uncertain which model number it is. Comparing the measured depth from the water level (bottom of insert) to the bottom of the tank with Table 1 should help determine the size of the unit.

Starting in 1996, a metal serial number tag has been affixed to the inside of the unit. The serial number has the model number written on it. If the unit does not have a serial number, or if there is any uncertainty regarding the size of the interceptor using depth measurements, please contact Stormceptor at 1 800 565-4801 and we will help you determine the size of a particular unit.

What is the Maintenance Procedure?

Maintenance of Stormceptor is performed using vacuum trucks. No entry into the unit is required for maintenance of the spool insert, inlet insert or the smaller disc inserts. Entry to the level of the disc insert may be required for servicing the larger disc insert models. **DO NOT ENTER THE STORMCEPTOR CHAMBER** unless you have the proper equipment, have been trained and are qualified to enter a confined space, as identified by local Occupational Safety and Health Regulations (*e.g.* Canada Occupational Safety and Health Regulations – SOR/86-304). Without the proper equipment and training, entry into confined spaces can result in serious bodily harm and potentially death. Consult local, provincial, and/or state regulations to determine the requirements for confined space entry. Be aware that the insert may be slippery. In addition, be aware that some units do not have a safety grate to cover the outlet riser pipe that leads to the submerged, lower treatment chamber.

The Vacuum Service Industry is a well-established sector of the service industry that cleans underground tanks, sewers and catch basins. Costs to clean a Stormceptor® will vary based on the size of unit and transportation distances.

The depth of oil in the interceptor can be determined by inserting a dipstick tube in the 150 mm (6") oil inspection/cleanout pipe ("disc" design), or in the 914 mm (36") central access way ("spool" design), or in the 100 mm (4") cleanout pipe
("inlet" design).

Similarly, the depth of sediment can be measured from the surface without entry into the Stormceptor via a dipstick tube equipped with a ball valve (Sludge Judge). This tube would be inserted in the central opening ("spool" design) or in the 610 mm (24") opening ("disc" design), or in the 100 mm (4") cleanout pipe ("inlet" design). Maintenance should be performed once the sediment depth exceeds the guideline values provided in Table 3.

For the "spool" design Stormceptor maintenance is performed through the large central 914 mm (36") diameter opening for both the oil and the sediment. In the "disc" design, oil is removed through the 150 mm (6") oil inspection/cleanout pipe and sediment is removed through the 610 mm (24") diameter outlet riser pipe. Alternatively, oil could be removed from the 610 mm (24") opening if water is removed from the lower chamber to lower the oil level to the level of the drop pipes. For the "inlet" design, maintenance is performed through the 305mm (12") inlet drop pipe for the sediment, and oil can be removed from the 100 mm (4") oil/inspection cleanout pipe.

We recommend the following procedure to clean out the Stormceptor:

1. Check for oil (using a dipstick tube)
2. Remove any oil separately using a small portable pump
3. Decant the water from the unit to the sanitary sewer using a portable pump (**prior approval is required from the sewer authority/municipality**)
4. Remove the sludge from the bottom of the unit using a vacuum truck
5. Re-fill the Stormceptor with water where required by the local jurisdiction

How Often Is Maintenance Required?

Generally, annual maintenance is recommended but the required maintenance frequency will vary with the amount of pollution on your site (number of hydrocarbon spills, amount of sediment, etc.). It is recommended that the frequency of maintenance be increased or reduced based on local conditions. If the sediment load is high, maintenance may be required semi-annually. Conversely once the site has stabilized, maintenance may be required less frequently. Maintenance should be performed immediately after an oil spill or once the sediment depth in Stormceptor reaches the value specified in Table 3 based on the unit size.

In the "disc" design and "inlet" design, any potential obstructions at the inlet can be observed from the surface. The "disc" insert has been designed as a platform to facilitate maintenance of the Stormceptor and the storm drain system.

Table 3. Sediment Depths Indicating Required Maintenance		
Model (Metric)	Model (US)	Sediment Depth mm (in.)
300	450	200 (8)
750	900	200 (8)
1000	1200	250 (10)
1500	1800	375 (15)
2000	2400	300 (12)
3000	3600	425 (17)
4000	4800	375 (15)
5000	6000	450 (18)
6000	7200	375 (15)

What Should I do in the Event of an Oil Spill?

Stormceptor® is often implemented in areas where the potential for spills is great. Stormceptor should be cleaned immediately after a spill occurs by a licensed liquid waste hauler. You should also notify the appropriate regulatory agencies as required in the event of a spill.

Disposal of the Trapped Material Removed from Stormceptor

The requirements for the disposal of material from Stormceptor are similar to that of any other Best Management Practices (BMP). Local guidelines should be consulted prior to disposal of the separator contents.

In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste. In some areas, mixing the water with the sediment will create a slurry that can be discharged into a trunk sanitary sewer. In all disposal options, approval from the dsposal facility operator/agency is required. Petroleum waste products collected in Stormceptor (oil/chemical/fuel spills) should be removed by a licensed waste management company.

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

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