Documentation & Calculations for DEP Stormwater Management Policy Standards

This project will meet the Stormwater Management Standards. The proposed Best Management Practices (BMP's) will reduce and improve the water quality leaving the site. The following stormwater management standards pertain to the Massachusetts DEP Stormwater Policy.

Standard #1-Untreated Stormwater

This project was designed to not discharge untreated contaminated stormwater into, or cause erosion to wetlands or waters of the Commonwealth. The stormwater discharge treatment from the proposed project will exceed 80% TSS removal from runoff leaving the site. Refer to Standard #4 below where TSS removal calculations are provided. A small portion of the site is situated below the Water Quality system, but the overall TSS removal will exceed 80% for the site. The small area meets the criteria for De Minimus site discharge in Vol. 3, Chap. 1, page 34 of the Mass Stormwater Handbook.

Standard #2-Post Development Peak Discharge Rates

All performance requirements for this standard have been met. Refer to summary and conclusions in Section 3 of this report where runoff flow summaries for both predevelopment and proposed conditions are given.

Standard #3-Recharge to Groundwater

Full performance requirements for this standard have been met.
Calculations for runoff are based on hydrologic soil groups (HSG) "B" for the site runoff. The target depth factor calculating the required recharge volume in the Stormwater Management Policy (SMP) is as follows:

NRCS Soil Group	Target depth factor (F)
A	0.6-inch
B	0.35-inch
C	0.25-inch
D	0.1-inch

The proposed impervious area for the proposed development = 2.94 Ac.

The required ground water recharge for full build out is:

Rv= F (impervious area)
RV=required recharge volume
F=target depth factor
The factor for HSG "B" is 0.35-inch *@ 2.94 Ac.*

SITE RUNOFF Rv

Rv(DEP)= (0.35-inch) x (1FT/12inches) (2.94 Ac) (43,560 SF/Ac.)=3736 CF

The above Rv and WQF values will be met by the proposed chambers systems as follows:

PROPOSED RECHARGE VOLUME

The "Simple Dynamic Method" was used to determine the available storage volume:

Proposed system capacity calculation using the Simple Dynamic Method:

- Roof Infiltration Simple Dynamic Method.

The proposed method for recharge will be eight(8) chamber systems using Cultec chambers embedded in stone. The material dimensions and quantities are summarized below, as well included on the detail sheet.

CHAMBER SYSTEM SCHEDULE

Chamber System(CS)	Chamber Type	Quantity	No.of Rows	Stone Dimensions (FT)	Storage Below Pipe Invert(CF)
CS#1	R180HD	30	3	12'W x 68'L x 2.8'H	163
CS#2	R180HD	60	4	16'W x 99'L x 2.8'H	317
CS#3	R180HD	45	3	12'W x 99'L x 2.8'H	238
CS#4	R150XLHD	63	7	25'W x 85'L x 2.8'H	425
CS#5	R150XLHD	112	7	25'W x 167'L x 2.8'H	835
CS#6	R180HD	36	4	16'W x 61'L x 2.8'H	195
CS#7	R180HD	99	3	12'W x 212'L x 3.0'H	509
CS#8	C100HD	39	3	12'W x 110'L x 2.8'H	264
				Total retained Runoff Volume= 2946 CF	

The HYDROCAD calculations for the Simple Dynamic Method on the following pages include the recharge and storage capacities for the eight(8) chamber systems. The summary for these calculations is:

- Volume recharged over 2 HR period for 5 chamber systems……=3697 CF
- Volume of storage below pipe inverts in 5 chamber systems……= 2946 CF

Total Recharge Volume provided……= 6643 CF

TOTAL Recharge capacity provided =6643 CF > Rv(3736 CF required)

Check for BMP draw down time:

Roof DW draw down time =2.8 FT/0.689 FT/hr……= 4.1 hr. < 72hr

Standard #4 (Water Quality)

TSS removal will be met by using deep sump yard basins and 15 Water Quality proprietary treatment units by Contech. A long-term pollution prevention & Operation and Maintenance plan is included in Appendix "B" of this report.

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Vwq= DwqxAwq

Vwq= water quality volume (CF)
Dwq= water quality depth (inches)
Awq=On site Impervious area proposed (Ac.)

The required water quality volume is 1-INCH.
The design meets Standard #4 criteria for a 1-inch WQV.

Removal of TSS meets DEP Requirements. See proprietary TSS removal and calculation sheets for TSS removal and Excel spreadsheet included in the next pages.

TSS will be removed by the following means:

- Fifteen (15) Water Quality proprietary treatment units by Contech
- Eight(8) chamber systems

The TSS treatment system is designed to remove greater than 80% of the TSS from the catchment area.

The TSS efficiency values in the TSS calculations were taken from DEP SWMP, Volume 1, Chapter 1, Table 'TSS' (Revised 2008) and the TSS removal for the proprietary units were provided by Contech.

Refer to the following TSS removal calculations showing how TSS is removed from the stormwater

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

This project land use is not subject to higher pollution control requirements

Standard #6 (Protection of Critical Areas)

The project is not located near a Critical area.

Standard #7 (Redevelopment)

This site is not a redevelopment project.

Standard #8 (Erosion /Sediment Control)

This standard has been fully met. Refer to the "Construction Period Operation and Maintenance Plan" included in Appendix 'C'

Standard #9 (Operation & Maintenance Plan)

This standard has been fully met. Refer to the Long-Term Pollution Prevention & Operation and Maintenance Plan in Appendix "B"

Standard #10 (Illicit Discharge Compliance Statement)

This standard has been fully met. The applicant will submit an illicit discharge compliance statement prior to the discharge of any stormwater to post-development BMP's.