

RECHARGE VOLUME

222 SOUTH PLEASANT STREET SITE PLAN
HINGHAM, MA
PROJ. NO. 0307
IMPERVIOUS AREA ASSESSMENT
12/9/2022

PREDEVELOPMENT:

	PAVEMENT AREAS (sf):		ROOF AREAS (sf)	
	"A" SOILS	"B" SOILS	"A" SOILS	"B" SOILS
WS1	1128.0	0.0	968.0	0.0
WS2	387.0	0.0	694.0	988.0
WS3	0.0	0.0	0.0	0.0
TOTAL PRE	1515.0	0.0	1662.0	988.0

POSTDEVELOPMENT:

	PAVEMENT AREAS (sf):		ROOF AREAS (sf)	
	"A" SOILS	"B" SOILS	"A" SOILS	"B" SOILS
WS1	1189.0	0.0	0.0	0.0
WS2	0.0	0.0	0.0	0.0
WS3	0.0	0.0	0.0	0.0
WS4	2043.0	6059.0	1187.0	5224.0
WS5	0.0	5397.0	0.0	0.0
TOTAL POST	3232.0	11456.0	1187.0	5224.0
DIFFERENCE	1717.0	11456.0 (PAVEMENT AREAS)		
DIFFERENCE	1242.0	15692.0 (IMPERVIOUS AREAS)		



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JOB 222 S. PLEASANT ST. SITE PLAN
 SHEET NO. 1 OF 1
 CALCULATED BY A.S DATE 12/12/2022
 CHECKED BY _____ DATE _____
 SCALE _____

CALCULATION OF RECHARGE VOLUME

$$R_v = \sum (F \times \Delta I_A)$$

CHANGE IN IMPERVIOUS AREAS	"A" SOILS	"B" SOILS
PAVEMENTS	1717.0	11,456.0 st
ROOF AREAS	-475.0	4,236.0 st
TOTAL	1242.0 st	15,692.0 st

$F_A = 0.6 \text{ in } (=0.05 \text{ ft}) \Rightarrow$ TARGET FACTOR FOR "A" SOILS *

$F_B = 0.35 \text{ in } (=0.029 \text{ ft}) \Rightarrow$ " " FOR "B" SOILS *

$$R_v = (0.05 \text{ ft})(1242.0 \text{ st}) + (0.029 \text{ ft})(15,692.0 \text{ st})$$

$$R_v = 517.2 \text{ ct}$$

* TABLE 2.3.2. - RECHARGE TARGET DEPTH BY HYDROLOGIC SOIL GROUP

Attention must be given to ensure consistency in units. In particular, the Target Depth Factors must be converted to feet.

NRCS HYDROLOGIC SOIL TYPE	APPROX. SOIL TEXTURE	TARGET DEPTH FACTOR (F)
A	sand	0.6-inch
B	loam	0.35-inch
C	silty loam	0.25-inch
D	clay	0.1-inch

Table 2.3.2: Recharge Target Depth by Hydrologic Soil Group

When a site contains multiple Hydrologic Soil Groups, determine the *Required Recharge Volume* for each impervious area by Hydrologic Soil Group and then add the volumes together.

Example: Assume a ten (10) acre site. 5.0 acres are proposed to be developed for a retail use. A section of the entrance roadway is to be bridged over a stream that is classified as land under water. As such, the bridging is subject to the Wetlands Protection Act Regulations, and the Stormwater Management Standards apply to stormwater runoff from all proposed roads, parking areas, and rooftops. Of the 5.0 acres proposed to be developed, 2 acres of impervious surfaces are proposed atop Hydrologic Soil Group (HSG) "A" soils, 1 acre of impervious surfaces atop HSG "B" soil, 1.5 acres of impervious surfaces atop HSG "C" soil, and 0.5 acres are proposed to be landscaped area. The remaining 5.0 acres, located on HSG "A" soil, are proposed to remain forested. Determine the *Required Recharge Volume*.

Solution: The *Required Recharge Volume* is determined only for the impervious surfaces. The 5.0-acre forested area and the 0.5-acre landscaped area are not impervious areas. Although converted from forest, landscaped area is pervious area for purposes of Standard 3. Use *Equation (1)* to determine the *Required Recharge Volume* for each Hydrologic Soil Group covered by impervious area. Add together the *Required Recharge Volumes* determined for each HSG.

$$Rv = F \times \text{impervious area}$$

$$Rv = [(F_{\text{HSG "A"}}) (\text{Area}_1)] + [(F_{\text{HSG "B"}}) (\text{Area}_2)] + [(F_{\text{HSG "C"}}) (\text{Area}_3)] + [(F_{\text{HSG "D"}}) (\text{Area}_4)] \text{ Equation (2)}$$

$$Rv = [(0.6\text{-in}/12)(2 \text{ acres})] + [(0.35\text{-in}/12)(1 \text{ acre})] + [(0.25\text{-in}/12)(1.5 \text{ acres})] + [(0.1\text{-in}/12)(0 \text{ acres})]$$

$$Rv = 0.1605 \text{ acre-feet}$$

$$Rv = 0.1605 \text{ acre-feet} \times 43560 \text{ square feet/acre-foot} = 6,991 \text{ cubic feet or } 258.9 \text{ cubic yards}$$