



Direct Mitigation— Stormwater Recharge Credit

WMA Advisory Committee Meeting
November 7, 2024

To Qualify, Stormwater BMPs must:

1. be part of a stormwater redevelopment project undertaken on or after January 1, 2005. (date applies to all mitigation activities)
2. infiltrate stormwater from qualified impervious areas* that previously discharged directly to a surface waterbody, or into a stormwater drainage system that discharged directly to a surface water body.

*includes roads, rooftops, parking lots, concrete sidewalks, asphalt, or brick pavers that were in place prior to 2005

3. conform to the Massachusetts Stormwater Handbook.

Documentations

- For up to 0.01 MGD Stormwater BMP direct mitigation credits:
 1. Stormwater BMP Direct Mitigation Credit Calculator;
 2. Applicant Certification for Stormwater BMP Direct Mitigation Credit Form.
- For more than 0.01 MGD Stormwater BMP direct mitigation credit:
 1. Stormwater BMP Direct Mitigation Credit Calculator;
 2. Applicant Certification for Stormwater BMP Direct Mitigation Credit Form;
 3. Stormwater BMP Direct Mitigation Information Data List and Supporting documentations for the data (Checklist for Stormwater Reports, Stormwater Reports, Order of Conditions, etc.).

How is the recharge mitigation credits calculated ?!

Acres of Directly Connected Impervious Surface Built Before 2005 Re-directed to a BMP Built On or After Jan 1, 2005 (area)	x	Inches of Runoff Infiltrated Annually, Based on BMP Design Infiltration Depth and Average Annual Precipitation (depth/year)	=	Annual BMP Infiltration Rate (volume/year)
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Stormwater Project Reports:

- Locate the Standard 3: Recharge section;
- Follow the recharge mitigation guidance to identify the data needed for calculation

Stormwater Recharge Mitigation credits★

Basins	Permits # that include Stormwater Recharge Projects	Stormwater Recharge Projects #	Qualifying impervious areas acreages	BMP Design Infiltration Depth	Mitigation credits received (recharge volumes)
South Coastal	1	1	6.7 acres	0.6 inches	0.0117 MGD
Cape Cod	3	20	18.1 acres	Between 0.27 and 4.9 inches	0.031 MGD
Taunton	1	1	1.5 acres	0.5 inches	0.003 MGD
Charles	2	1	3.6 acres	1 inches	0.0085 MGD

★ 93 permits have been renewed and about half of them have mitigation requirements.

Stormwater Recharge Volume Examples

(Based on a single recharge project and 45 inches average annual precipitation)

Qualifying Impervious Area	BMP Design Infiltration Depth	Mitigation credits received (recharge volumes)
61.21 acres	0.5 inches	100,000 gallons per day
45.46 acres	1 inches	100,000 gallons per day
38.39 acres	3 inches	100,000 gallons per day

Questions / Comments?

Shi Chen

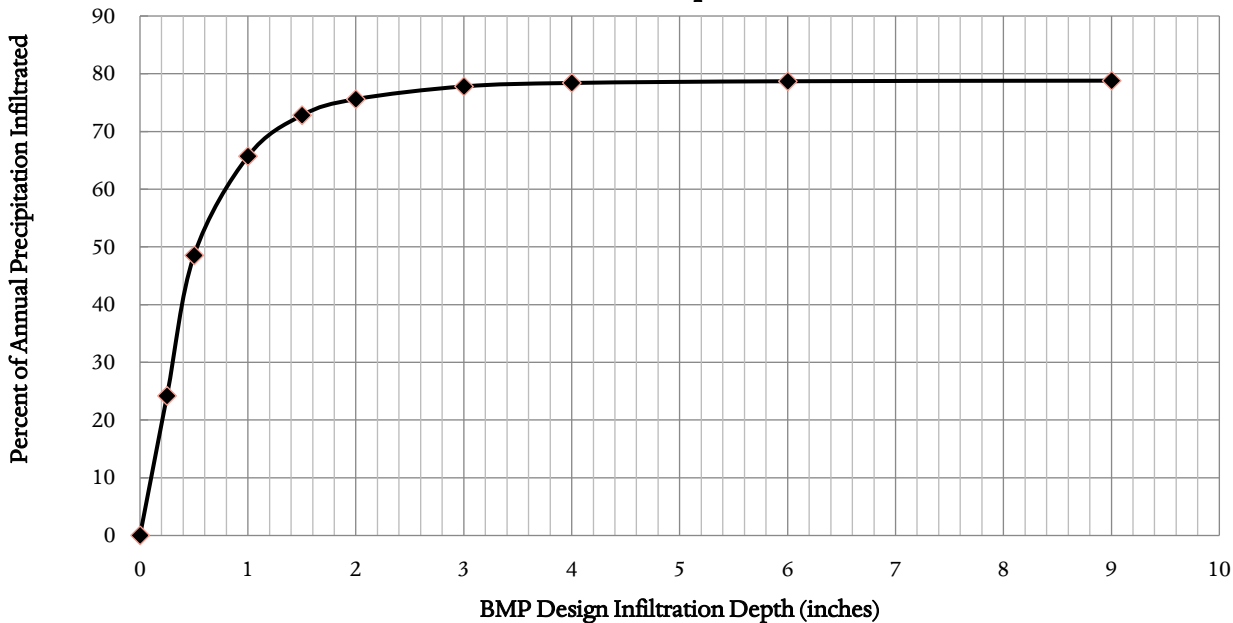
Water Management Program

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Relationship between BMP infiltration depth (inches) and the median percent of total annual precipitation infiltrated

Figure 1 Percent of Annual Precipitation Infiltrated vs. BMP Design Infiltration Depth



BMP Design Infiltration Depth (Inches)	0	0.25	0.5	1.0	1.5	2.0	3.0	4.0	6.0	9.0
Percent of Annual Precipitation Infiltrated	0	24.2	48.8	65.7	72.8	75.6	77.8	78.4	78.7	78.7

Step by Step Calculations on Stormwater Recharge Credits

BMP Design Infiltration Depth=0.5 inches Annual Average Rainfall=45 inches

A BMP with a design infiltration depth of 0.5 inches infiltrates 48.8% of the annual average precipitation, therefore the BMP infiltrates $45 \text{ inches} \times 48.8\% = 21.96 \text{ inches}$ of runoff per year

Acres of Directly Connected Impervious Surface Built Before 2005 Re-directed to a BMP Built On or After Jan 1, 2005 (area)	X	Inches of Runoff Infiltrated Annually, Based on BMP Design Infiltration Depth and Average Annual Precipitation (depth/year)	=	Annual BMP Infiltration Rate (volume/year)
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$$\left(\frac{100,000 \text{ gpd}}{7.48 \text{ gallons/cubic foot}} \times 365 \text{ days} \right) \div \frac{21.96 \text{ inches}}{12 \text{ inches/foot}} \div 43,560 \text{ square feet/acres} = 61.21 \text{ acres}$$