Post-Construction Storm Water Questions and Answers
Previously Developed Areas

The NPDES construction general permit (CGP) requires a post-construction storm water best management practice (BMP) on all disturbed areas one acre or larger. To encourage redevelopment, the CGP reduces the water quality volume (WQv) requirement for post-construction BMPs on previously developed areas.

What is a previously developed area?

Ohio EPA considers previously developed areas to be construction projects occurring on land where the area to be disturbed has measurable impervious surface and where the new project will remove or replace some or all of that impervious surface. In many cases, the entire site is considered a previously developed area, including the graded pervious area (landscaping or lawns) associated with the existing impervious surfaces.

What are the post-construction requirements on previously developed areas?

Post-construction BMPs are required on projects that qualify as previously developed areas unless the impervious area on the site is reduced such that there is a 20 percent or greater reduction in the volumetric runoff coefficient [Rv(proposed) ≤ 0.8*Rv(existing)]. Otherwise, treatment must be provided for the WQv as calculated by Equation 3 in the CGP.

Is the post-construction BMP still designed for its entire drainage area?

Yes. A BMP must be sized for the full WQv of the area that drains to it. On previously developed areas, it may be possible to locate a BMP such that only the portion of the site producing the required WQv drains to it. The minimum sub-drainage area producing the required WQv may be back-calculated by re-arranging Equation 1 in the CGP.

$$\text{Sub-drainage area (acres)} \geq \frac{\text{WQv(required)} \times 12}{\text{Rv} \times \text{P}}$$

where:
WQv (required) = result of CGP Equation 3 for the entire project (acre-feet)
Rv = volumetric runoff coefficient of the sub-drainage area
P = 0.9 inches.

The sub-drainage area should be the area likely to generate the highest pollutant loads. In most cases this area will be parking lots, roadways or other impervious surface with a Rv value of 0.95.

What if a portion of my project area is previously developed and a portion is not?

Situations may occur when adjacent open land is purchased and added to a previously developed area, or vice-versa, creating a larger common plan of development or sale that is a combination of new development and redevelopment. In these cases, calculate the WQv of the adjacent open land as new development with CGP Equation 1 and the WQv of the previously developed land with CGP Equation 3 and total them to determine the WQv required for the entire common plan of development.

Contact

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Example Calculations

Example A:

A 5-acre shopping center (fully impervious) will be redeveloped into condominiums featuring an expansive courtyard. The proposed project will total 3.75 acres of impervious surface and 1.25 acres of greenspace.

$$Rv1 = 0.05 + 0.9 \left(\frac{5 \text{ acres}}{5 \text{ acres}} \right) = 0.950 \qquad Rv2 = 0.05 + 0.9 \left(\frac{3.75 \text{ acres}}{5 \text{ acres}} \right) = 0.725$$

The proposed development will reduce the Rv by 23.7%, therefore no additional post-construction BMPs are required for the site.

Example B:

An 8-acre property with vacant warehouses will be redeveloped into a retail complex. The existing warehouse and parking total 7.2 acres of impervious area. Plans for the new development specify 6.5 acres of impervious surface with a 0.5-acre storm water pond and 1.0 acre of greenspace.

$$Rv1 = 0.05 + 0.9 \left(\frac{7.2 \text{ acres}}{8 \text{ acres}} \right) = 0.860 \qquad Rv2 = 0.05 + 0.9 \left(\frac{6.5 \text{ acres} + 0.5 \text{ acres}}{8 \text{ acres}} \right) = 0.838$$

The proposed development will reduce Rv by 2.6%. Therefore, an additional post-construction BMP is required to treat:

$$0.9 \text{ (in)} \times 8 \text{ (ac)} \times [\, (0.860 \times 0.2) + (0.838 - 0.860)] \div 12 = 0.09 \text{ ac-ft}$$

The WQv required can be achieved using a BMP with an impervious sub-drainage area of:

$$\text{Sub-drainage area (acres)} = \frac{0.09 (\text{ac-ft}) \times 12}{0.95 \times 0.90 (\text{in})} = 1.26 \text{ acres}$$

Example C:

A 10-acre parking facility (Rv =0.95) will be removed and replaced with a larger 15-acre development by buying or transferring ownership of an adjacent 5-acre undeveloped (Rv = 0.05) parcel to expand the site.

$$0.9 (\text{in}) \times 10 (\text{ac}) \times [(0.95 \times 0.2) + (0.95 - 0.95)] \div 12 = 0.143 \text{ ac-ft}$$
$$0.9 (\text{in}) \times 0.95 \times 5 (\text{ac}) \times \div 12 = \underline{0.356 \text{ ac-ft}}$$
$$WQv = 0.499 \text{ ac-ft}$$

The WQv required can be achieved using a BMP with an impervious sub-drainage area of:

$$\text{Sub−drainage area (acres)} = \frac{0.499 (\text{ac-ft}) \times 12}{0.95 \times 0.90 (\text{in})} = 7.0 \text{ acres}$$