

Practice Notes

Notes regarding current practices and potential changes for the Rainwater and Land Development Manual

Practice Notes is a way to inform users of the Rainwater and Land Development manual of potential changes under consideration for the manual, additional references or factors important to design.

New information will be added occasionally and dated so that readers may know when it was posted.

You are welcome to provide feedback to us by sending a note or email to John Mathews (john.mathews@dnr.state.oh.us).

ISSUES

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2.10 Bioretention



The Issue & Recommendations

Anticipating the rate at which water moves through the soil media is critical to sizing a bioretention area. The Rainwater and Land Development manual (p. 66) advises users to use either actual values of hydraulic conductivity (k , also called the coefficient of permeability) derived from testing the soil media or the predicted hydraulic conductivity for the soil media for designing the facility. This may lead to undersized facilities with greater potential for excessive ponding as the practice ages or some of the water quality volume bypassing the practice and discharging untreated. We recommend using a k that represents the projected value for the soil media after settling and use. This value is used to calculate the area of the bioretention area and subsequently the draintime for the practice.

Using the hydraulic conductivity (k) of the soil media, as initially placed, will give a higher flow-through rate and thus a smaller practice, which may not be sustainable as the practice is used and ages. The soil media is expected to become less permeable as settling occurs, and as fine particles come into the practice through normal functioning.

The question is, what k value should be used to size the practice? The Rainwater and Land Development manual specifies a soil media expected to have a high k value. Design guides from other areas of the country suggest utilizing a k value 0.5 ft/day or 0.25 inches/hour. This value is probably nearer the point at which the soil media would need to be rejuvenated. Utilizing a k value at or near this figure will make the bioretention practice larger, and will also reduce the likelihood of failure due to excessive ponding or discharging portions of the water quality volume untreated.

To summarize:

1. We recommend that soils continue to be specified to meet the current description of soil media in Rainwater and Land Development.
2. We recommend that the k value, used for developing the bioretention area calculation and subsequent drain time, reflect the settled future condition after years of use. Utilizing a figure at or near 0.5 feet/day (0.25 inches/hour) is thought to be more representative of this condition.