



Land Development Services

Technical Bulletin

Subject: Maximum Infiltration Rates for the Design of Stormwater Management Facilities

Date: 4/13/21

No.: 21-07

Summary: This Technical Bulletin clarifies the process for design engineers to follow to prevent future problems with overestimation of infiltration rate beneath a stormwater facility.

Effective Date: Immediately

Background: Infiltration is an indicator of the soil's ability to allow water movement into the soil profile. If the infiltration rate is overestimated during the field infiltration test, system performance will suffer once the stormwater management facility (SWM) is constructed and it may not function as intended in its design. Volume reduction, mitigation of peak flow rate, and groundwater recharge will all be overestimated during the design phase, resulting in a lack of hydrologic function and pollutant mitigation. In addition, when a stormwater facility is supplied with surface water at a rate that exceeds the soils infiltration capacity, the water runoff can occur on sloping lands and pond on the surface of level lands. These can cause damage to the site and have adverse impacts on adjacent properties. It is also noteworthy to mention that SWM's effective infiltration rates degrade over time leading to premature failure if the facility is sized for high infiltration rates.

Policy: Design engineers must follow the procedure indicated in the Public Facilities Manual (PFM) Chapter 4 (Geotechnical Guidelines) regarding testing for infiltration facilities. The following items must also be met:

1. If measured infiltration rates of greater than 8 inches per hour are encountered in the field for coarse-grained soils, i.e., sand, loamy sand, sandy loam, a maximum value of 8 inches per hour must be used. Further, this value is then divided by a minimum factor of safety of 2 by a civil engineer to obtain the design infiltration rate.
2. If measured infiltration rates of greater than 1 inch per hour are encountered in the field for fine-grained soils, i.e., loam, silt, silt loam, sandy clay loam, a maximum value of 1 inch per hour must be used. Further, this value is then divided by a minimum factor of safety of 2 by a civil engineer to obtain the design infiltration rate.
3. Soil infiltration is not feasible for clay, silty clay, sandy clay, clay loam, or silty clay loam; and the SWM design shall not rely on the soil infiltration if the SWM facility is planned to be placed on these soils.
4. Grain-size sieve analyses and hydrometer tests must be performed to determine the United States Department of Agriculture (USDA) textural and Unified Soil Classification System (USCS) classification at the proposed invert of the facility. The grain-size gradation curve and the USDA soil texture triangle must be included for review.

5. The laboratory must be an approved facility by a recognized accreditation organization i.e., WACEL, American Association of State Highway Transportation Officials (AASHTO), etc.

If you have any questions, please contact Behzad Amir Faryar, Ph.D., P.E. in the Site Development and Inspections Division at behzad.amirfaryar@fairfaxcounty.gov or 703-324-1720, TTY 711.

Approved by: Bijan Sistani, P.E., Acting Director
Site Development and Inspections Division
Land Development Services
12055 Government Center Parkway
(703) 324-1752, TTY 711