Appendix E:
Infiltration Testing Measurement

INFILTRATION TESTING

The infiltration testing must provide information related to the conditions at the bottom of the infiltration BMP. General infiltration test guidelines are as follows:

1. Any test used to determine infiltration rates for BMPs, shall be performed at the location and extend to the bottom elevation of the proposed infiltration BMP.
2. Infiltration tests must not be conducted in the rain, within 24 hours of significant rainfall events {>0.5 inches), when the ground is frozen, or when the temperature is below freezing.
3. Infiltration tests should be conducted in the field.
4. All infiltration rates used for the design of BMPs must be certified by a Professional Engineer licensed in the State of Michigan and submitted to the WRC's office.
5. Following all testing, the surface must be restored.
6. Additional infiltration tests may be necessary due to subsurface variability, water table depth or topography. The Livingston County Drain Commissioner's Office will determine if more tests will be required.

Infiltration tests may include, but not limited to, the following methods:

1. Test Pits used in conjunction with any of the infiltration tests listed below
    a. Double-ring Infiltrometer test – estimate for vertical movement of water through the bottom of the test area
        i. ASTM 2003 Volume 4.08, Soil and Rock (I): Designation D 3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using a Double-Ring Infiltrometer
        ii. ASTM 2002 Volume 4.09, Soil and Rock (II): Designation D 5093-90, Standard Method of Field Measurement of Infiltration Rate Using a Double-Ring Infiltrometer with a Sealed-Inner Ring
    b. Percolation test – Estimate for vertical movement of water through the bottom and sides of the test area
    c. Encased falling head permeability test – estimate for vertical movement of water through the bottom of the test area
    d. Guelph permeameter
    e. Constant head permeameter (Amoozemeter)
2. When using test pits, a minimum of 2 infiltration tests are required per test pit.
3. Soil Borings
    a. The use of soil borings to determine infiltration rates is discouraged. If soil borings are used in lieu of test pits, a safety factor of 2 is applied to the final Ksat Value. This is due to the limited sample and the inability to test in-situ soil characteristics when preforming a soil boring.

Note: Other tests selected by the design engineer that can accurately represent the in-situ infiltration rate may be used at the discretion of the Livingston County Drain Commissioner's Office.

The following infiltration (Ksat) values shall be used to determine the appropriate design methods for infiltration BMPs:

Ksat Values	
Ksat ≥ 0.50 in/hr	No supplemental measures are required for Infiltration BMPs to provide the infiltration volume
0.50 in/hr ≥ Ksat ≥ 0.24 in/hr	Install supplemental measures, which may include subsoil amendment, or an underdrain placed at the top of the storage bed layer to ensure dewatering in the event underlying soils fail to provide adequate drawdown or dewatering time. If underdrains are selected, design shall allow stormwater to percolate through the soils first, with the underdrain serving as a secondary outlet, by placing the underdrain in the upper level of the BMP, with pipe perforations located along the underdrain invert.
Ksat ≤ 0.24 in/hr	***Soil are not suitable for infiltration Alternative volume reducing LID practices must be used to the MEP to reduce stormwater volume.***