

State of Infiltration Basin Designs

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NJDOT – Hydrology & Hydraulics

NJDOT Access Reviews

- Municipality can approve construction to commence without DOT permit
- Projects being submitted in varying stages
- Many projects have received DEP, SCD, and municipal approval

Snapshot – 30 Projects

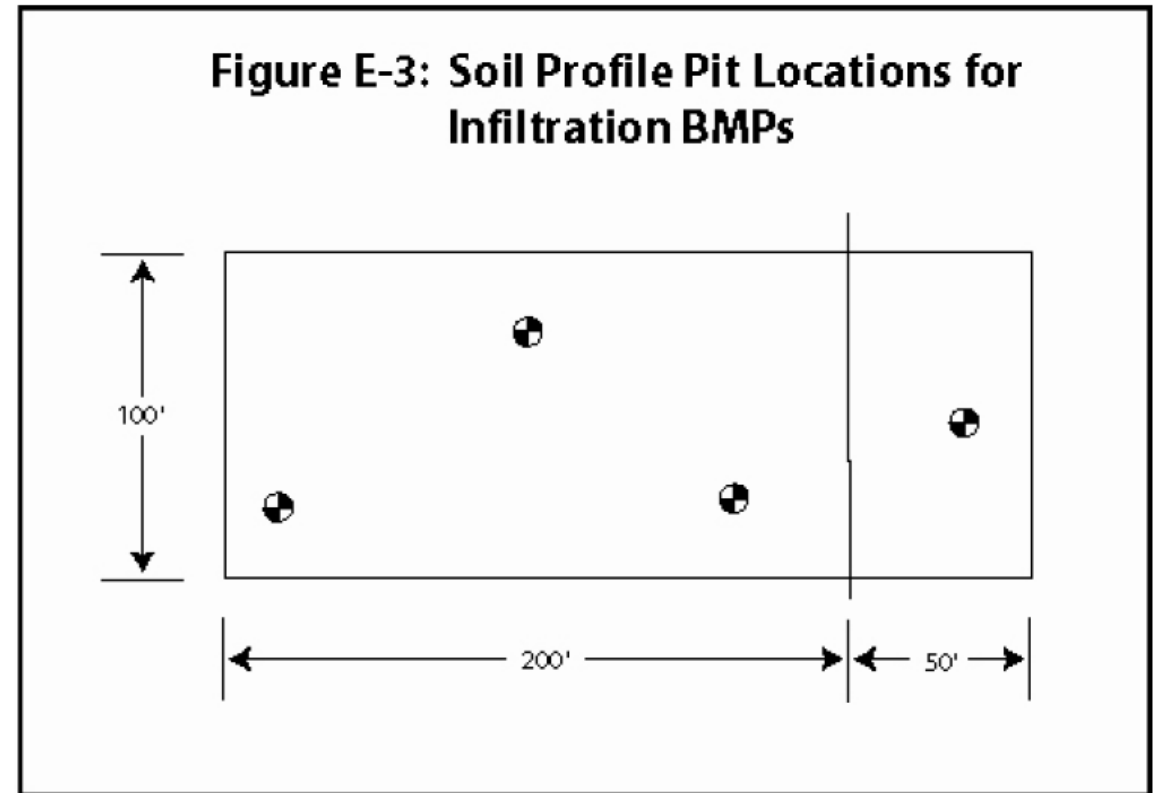
- 2 – Insufficient data
- 14 Projects – Not subject to DOT infiltration basin review
 - Extended Detention
 - Drains Away from DOT roadways
- 14 Projects Reviewed for Infiltration Basin Criteria
 - 12 Projects did not initially provide adequate data
 - 1 Project – modification of previously approved project
 - 1 Project – provided sufficient information

Infiltration Basins – Prior to the BMP Manual

- NRCS soil data utilized to establish depth to SWHT
- Soil evaluation may be taken at the basin
- Permeability
 - Soil Permeability Class Rating Test used
 - Permeability Rate based on NRCS Data

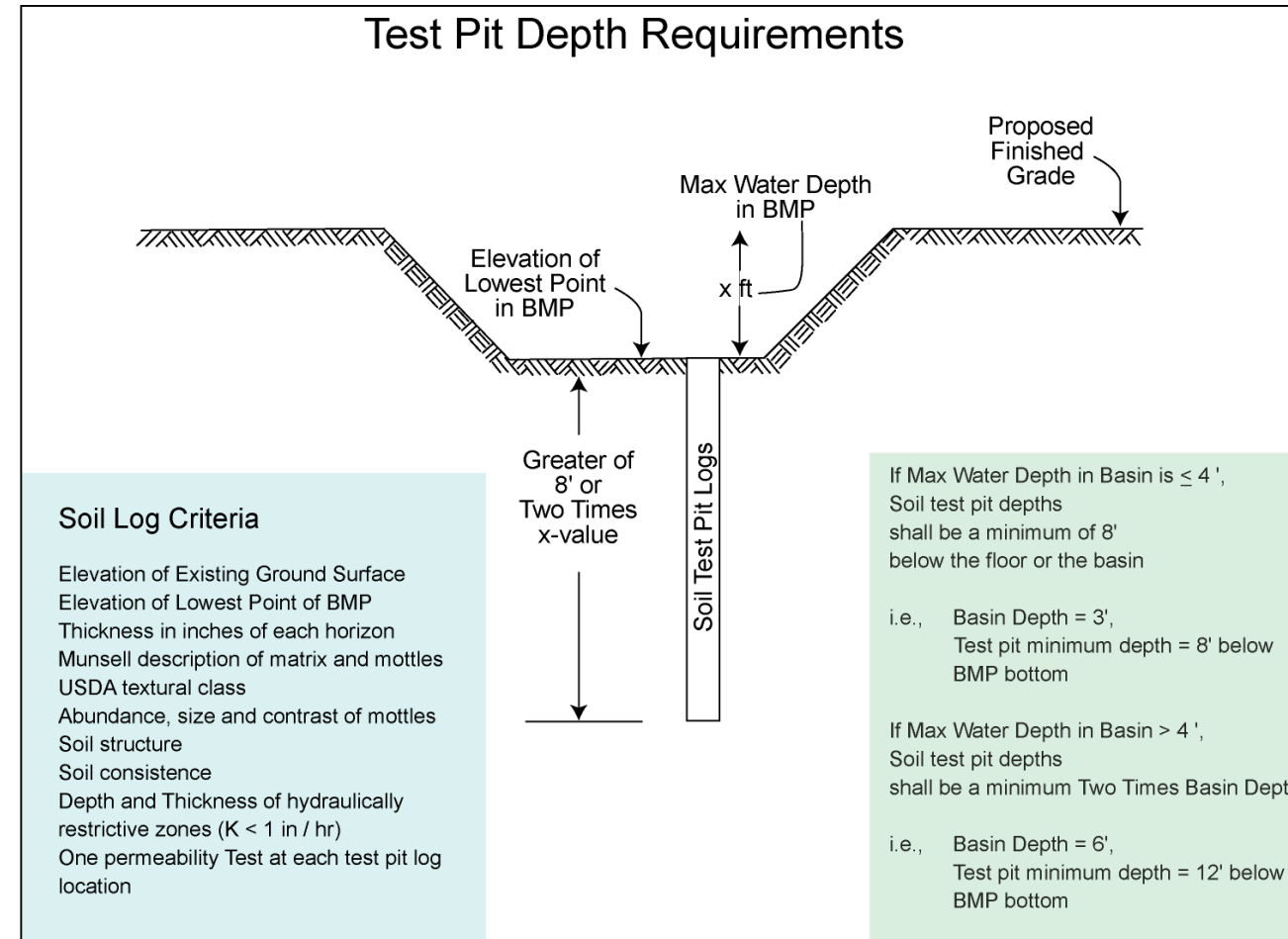
Infiltration Basin **Minimum** Criteria

- Minimum of 2 Soil Profile pits within Basin
- Additional Profile Pit for basins above 10,000 sf
- Additional evaluation per change in soil mapping unit
- Additional evaluation required when soil or groundwater properties significantly vary on site



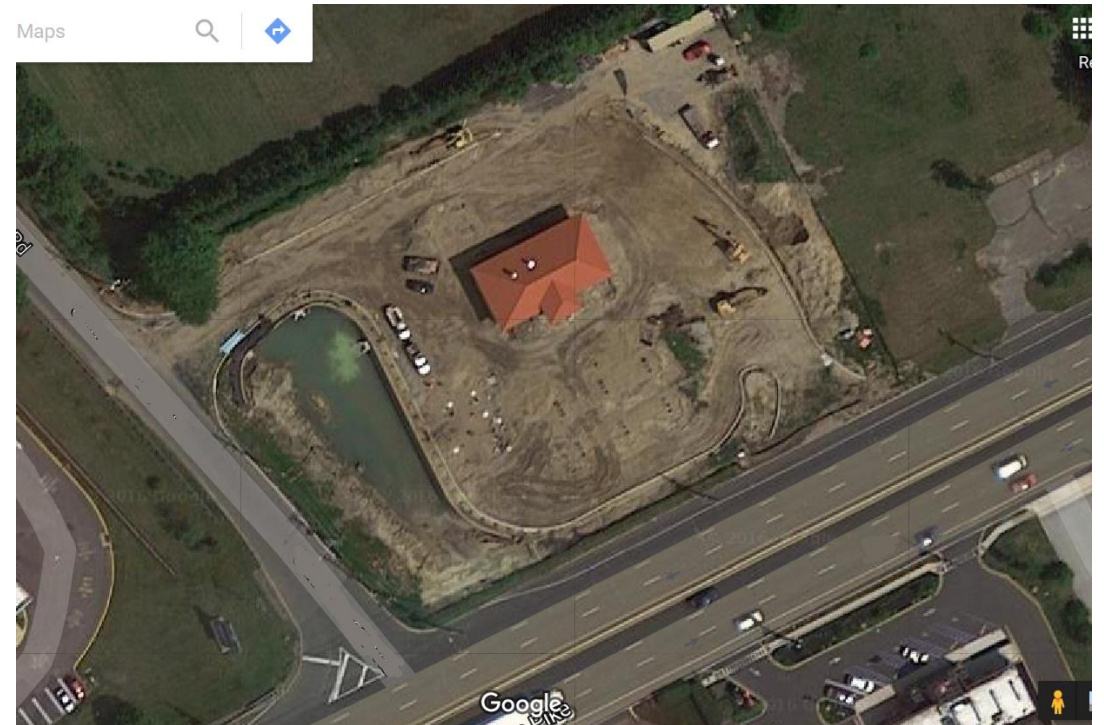
Infiltration Basin Minimum Criteria

- Test a minimum of 8' Below Basin Bottom
- Permeability test a most restrictive layer
- Use of most restrictive permeability rate
- SHWT evaluated when water is high



Typical Issues – Soil Profile Pit

- Not taken within Basin
- Changes in topography assumed not to impact groundwater elevation
- High mottling assumed to be perched

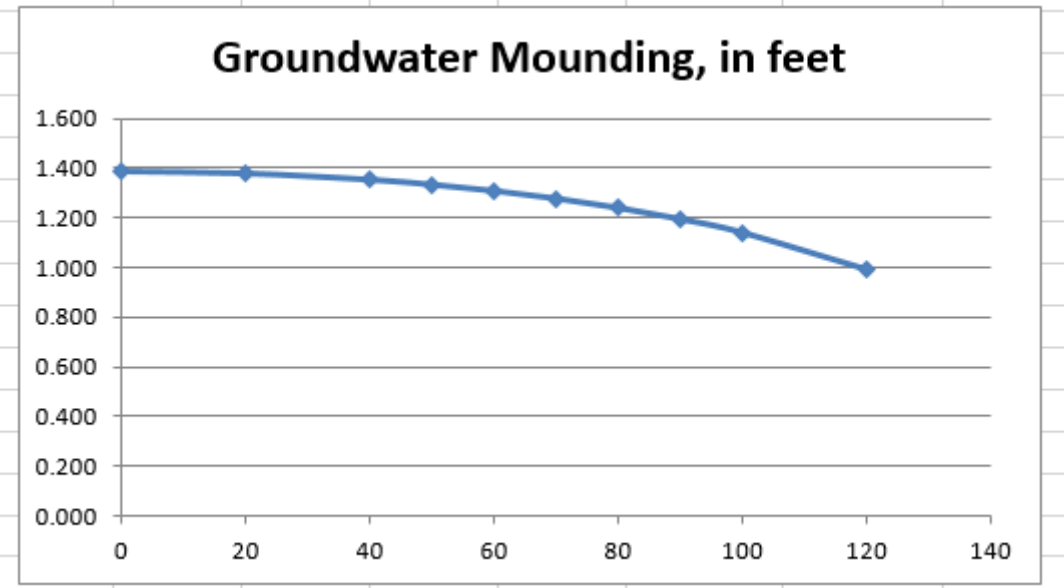


Typical Issues – Permeability Testing

- Changes in topography assumed not to impact groundwater elevation
- High mottling assumed to be perched
- Highest permeability rate used – even if soil being removed

Groundwater Mounding

Input Values		use consistent units (e.g. feet & days or inches & hours)	Conversion
2.6400	R	Recharge (infiltration) rate (feet/day)	inch/hour 0.67
0.150	S_y	Specific yield, S_y (dimensionless, between 0 and 1)	
264.00	K	Horizontal hydraulic conductivity, K_h (feet/day)*	2.00
137.000	x	1/2 length of basin (x direction, in feet)	
15.000	y	1/2 width of basin (y direction, in feet)	hours
0.600	t	duration of infiltration period (days)	36
10.000	$h_i(0)$	initial thickness of saturated zone (feet)	
11.386	$h(\max)$	maximum thickness of saturated zone (beneath center of basin at end	
1.386	$\Delta h(\max)$	maximum groundwater mounding (beneath center of basin at end	



- Most people have never heard of it or used the program
- Issues in Use
 - Recharge Rate
 - Porosity vs. Specific Yield
 - Use larger horizontal hydraulic conductivity or thickness of saturated zone without data

Additional Evaluation Needed

- Municipal compliance with soil evaluation prior to allowance
- Subsurface vs. surface infiltration basin failure rates
- Why basins failed
 - Design
 - Construction
 - Maintenance