

Module 6
Site Evaluation



DEQ
VIRGINIA DEPARTMENT OF
ENVIRONMENTAL QUALITY

The slide features a white background with a dark grey curved bar at the bottom. On the left, there are three vertical bars in dark blue, light blue, and dark green. The text 'Module 6' is in a large, black, serif font, and 'Site Evaluation' is in a smaller, green, sans-serif font below it. The DEQ logo is positioned in the bottom right corner of the slide.





Site Assessment

What resources do we have?

- Soils
- Wetlands & streams
- Geotech report
- Site layout



A VSMP Authority can determine suitability

§ 62.1-44.15:33. C.1.

When the Director or the Board approves the use of any BMP in accordance with its stated conditions, the locality serving as a VSMP authority shall have authority to preclude the onsite use of the approved BMP, or to require more stringent conditions upon its use, for a specific land-disturbing project based on a review of the stormwater management plan and project site conditions. Such limitations shall be based on site-specific concerns.





A VSMP Authority can request additional information

9VAC25-870-340.A

The board, the department, or the VSMP authority may require every state permit applicant or state permittee to furnish when requested such application materials, plans, specifications, and other pertinent information as may be necessary to determine the effect of his discharge on the quality of state waters, or such other information as may be necessary to accomplish the purposes of the Act and this chapter.



What do we need to know for each BMP?

- Contributing drainage area
- Treatment volume used for sizing
- Soil infiltration/percolation rates
- Effective soil depth (bedrock, pan, SHWT)
- Site topography
- Setbacks
- Groundwater protection



BMP-specific considerations

- Design scale
- Mode of storing runoff
- On-line or off-line facility
- Confidence of maintaining efficiency



The Geotech Report

The report is written primarily to give the structural engineer specific information needed to effectively design foundations.

Construction methods and contractor concerns are usually addressed as a minor side issue.



The Geotech Report

For SWM, the report should provide information on:

1. Hydraulic conductivity
2. Depth to groundwater
3. Depth to rock
4. Lenses of less-permeable soil
5. Suitability of on-site material for embankments



A Geotech Report...

HA-1

<u>Depth(in)</u>	<u>Soil Description</u>	<u>Minimum Infiltration Rate (in/hr)</u>	<u>Hydrologic Soil Grouping</u>
0 – 5	Topsoil and root mat	N/A	N/A
5 – 18	yellowish brown and light gray, very fine to medium, moist, plastic, Silty Clay	0.04	D
18 – 46	light gray with yellowish brown, very fine to medium, moist, plastic, Clay	0.02	D
46 – 72	light yellowish brown and light brown, very fine to medium, moist, friable, Silt Loam	0.27	C

Additional Remarks: Indications of a perched seasonal high water table from 15-46 inches. Depth to bedrock anticipated to be greater than 15 feet.





The Geotech Report

What's typically provided with a good report?

1. Description of methods used
2. Narrative on subsurface conditions
3. Summary of field & laboratory tests
4. Recommendations and considerations
5. Boring logs and location map
6. Test data



Geoprofessional Business Association (GBA)

Formerly Associated Soil and
Foundation Engineers (ASFE)



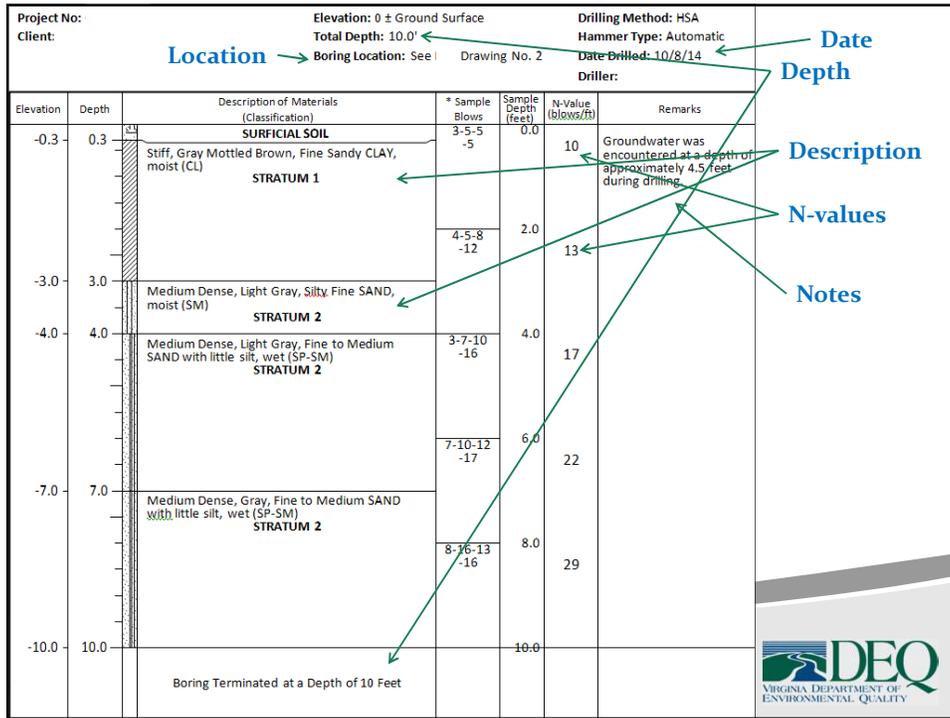
GBA Report Interpretation Guidelines

1. A geotechnical engineering report often does not relate geoenvironmental findings, conclusions, or recommendations.
2. A geotechnical engineering report is subject to misinterpretation, and should therefore be read in it's entirety.
3. A geotechnical engineering report is based on a unique set of project-specific factors.
4. A geotechnical engineering report is based on conditions that existed at the time the study was performed.
5. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions.



Major Divisions	Group Symbols	Typical Names	Laboratory Classification Criteria		
Coarse grained soil (More than half of material is larger than No. 200 sieve)	GW	Well-graded gravel, gravel-sand mixtures, little or no fines	Determine percentage of total gravel from geotechnical analysis (more than 10% fines) and compare against the limits specified in following table: GW, GP, SW, SP G _{max} , G _{mm} , P ₂₀₀ , P ₆₀ , P ₁₀₀ , P ₄₂₅		
	GP	Poorly graded gravel, gravel-sand mixtures, little or no fines			
	GM	Silty gravel, gravel-sand-silt mixtures			
	GC	Clayey gravel, gravel-sand-clay mixtures			
	SW	Well-graded sands, gravelly sand, little or no fines			
Sands (More than half of coarse fraction is smaller than No. 60 sieve)	SP	Poorly graded sands, gravelly sand, little or no fines	Determine percentage of total gravel from geotechnical analysis (more than 10% fines) and compare against the limits specified in following table: SP, SM, SC G _{max} , G _{mm} , P ₂₀₀ , P ₆₀ , P ₁₀₀ , P ₄₂₅		
	SM	Silty sands, sand-silt mixtures			
	SC	Clayey sands, sand-clay mixtures			
	Fine-grained soil (More than half of material is smaller than No. 200 sieve)	ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	Laboratory Classification Criteria $C_u = D_{60}/D_{10}$, greater than 4; $C_c = (D_{30})^2 / (D_{10} \times D_{60})$ between 1 and 3 Not meeting all gradation requirements for GW Amerberg limits below "A" line or PI less than 4 Above "A" line with PI between 4 and 7 are border-line cases requiring use of dual symbols Amerberg limits below "A" line or PI greater than 7 $C_u = D_{60}/D_{10}$, greater than 6; $C_c = (D_{30})^2 / (D_{10} \times D_{60})$ between 1 and 3 Not meeting all gradation requirements for SW Amerberg limits above "A" line or PI less than 4 Above "A" line with PI between 4 and 7 are border-line cases requiring use of dual symbols Amerberg limits above "A" line or PI greater than 7
		CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
OL		Organic silts and organic silty clays of low plasticity			
MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
CH		Inorganic clays of high plasticity, fat clays			
Highly organic soils (Liquid limit greater than 90)	OH	Organic clays of medium to high plasticity	Plasticity Chart 		
	PH	Peat and other highly organic soils			





General SPT Interpretation

DENSITY		CONSISTENCY	
Term	N-Value	Term	N-Value
Very Loose	0-4	Very Soft	0-1
Loose	5-10	Soft	2-4
Medium-Dense	11-30	Medium Stiff	5-8
Dense	31-50	Stiff	9-15
Very Dense	>50	Very Stiff	16-30
		Hard	>30

Industrial/Commercial Site

Infiltration
Bioretention
Detention (quantity)

Infiltration Cell

What do we need to know?

Treatment area	Treatment volume
Practice design & depth	SHWT elevation
Infiltration rate at most restrictive layer within 4 ft below the bottom elevation	

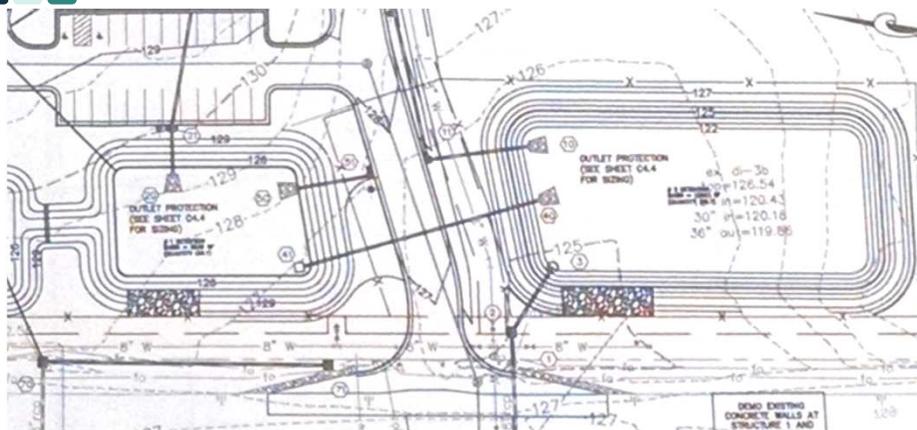
Bioretention



What do we need to know?



Detention



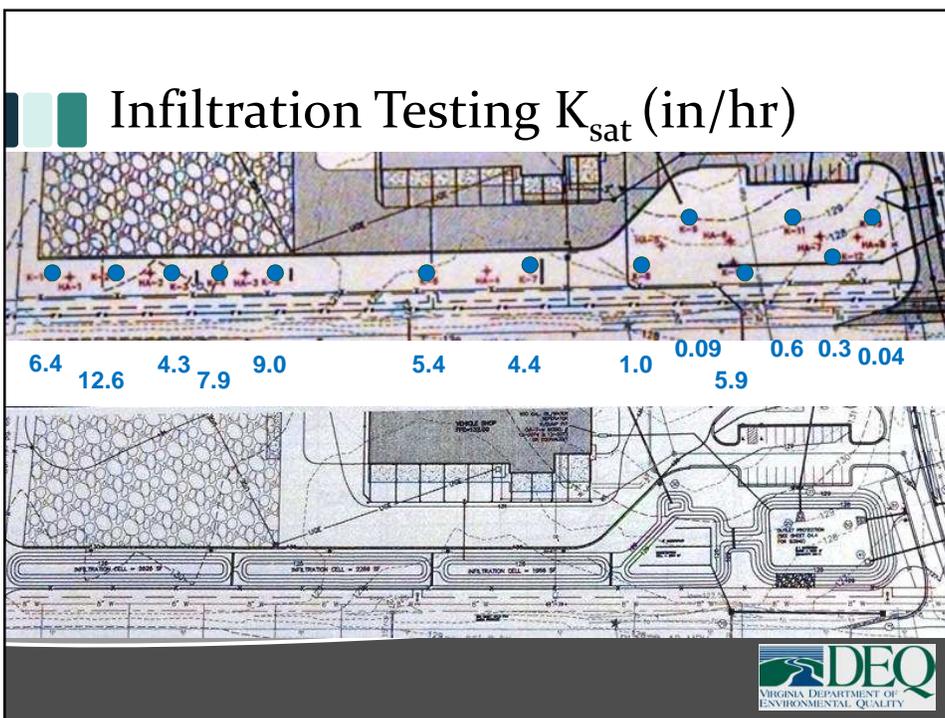
What do we need to know?



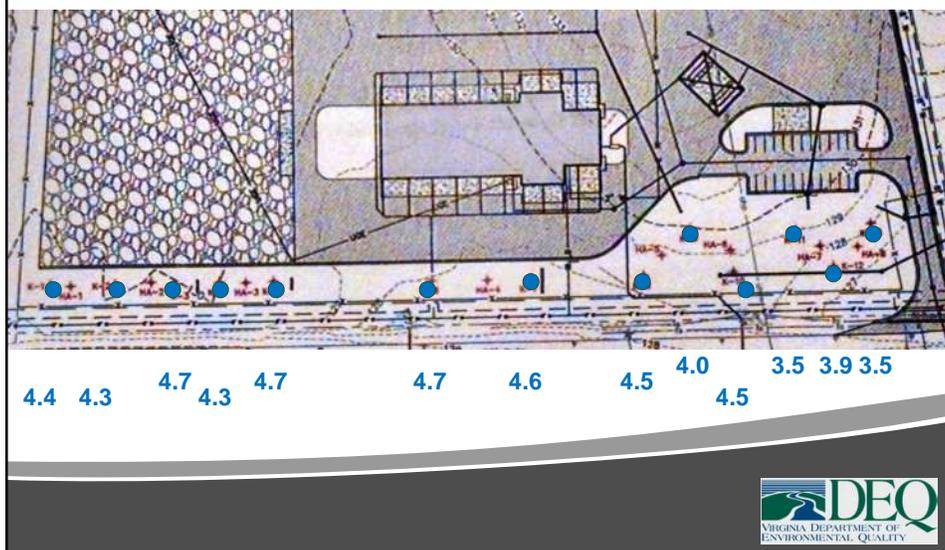
Information Provided

Subsurface Exploration and Geotechnical Evaluation Report

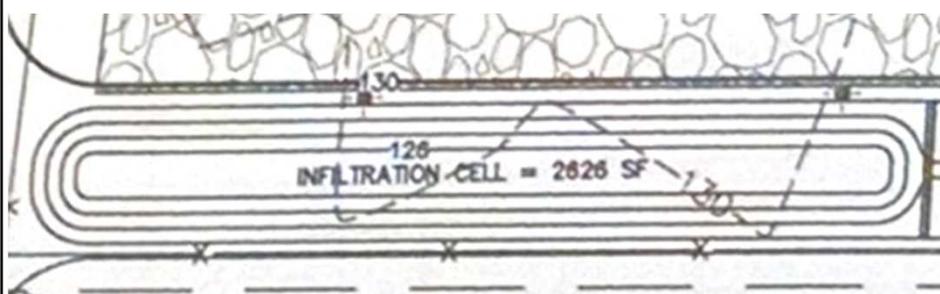
Subsurface Exploration and Infiltration Study - Amoozemeter

Infiltration Testing Depth (ft)



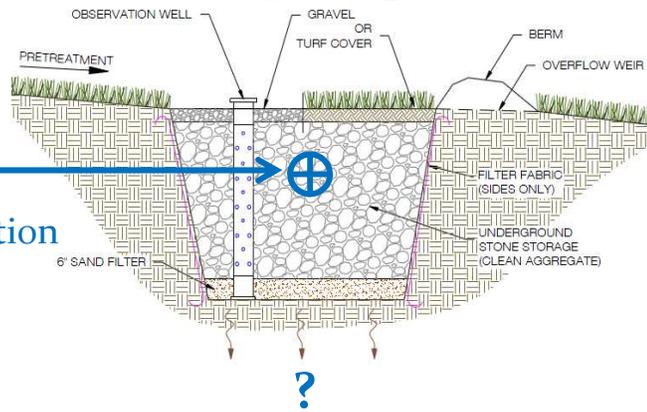
Infiltration Cell



How deep? K_{sat} was determined at
4.3-4.7 ft below the original grade
= 0.5-0.7 ft below final grade

What's the design depth?

Depth of Ksat determination



These practices can be up to 6 ft deep



Depth ft.	Elevation ft.	Legend	Description	USCS Symbol	SPT Blow Count	N-Value	Notes
0.0			Topsoil: approximately 6"		1		Surface: open farm field
-1.0			Sandy Lean CLAY: red-brown, coarse grained sand particles, damp, soft	CL	1	2	
-2.0	128.0		Clayey SAND: red-brown with light brown mottling, fine- to medium-grained sand particles, trace very fine- to fine-grained gravel, damp, very loose to loose	SC	2	2	
-3.0		1					
-4.0	126.0	2					
-5.0		1					
-6.0	124.0		Clayey SAND: red-brown, coarse-grained sand particles, intermittent lenses with some fine-grained gravel, damp to wet, medium dense	SC	3	5	
-7.0		2					
-8.0	122.0	2					
-9.0	120.0		Clayey SAND: red-brown, coarse-grained sand particles, intermittent lenses with some fine-grained gravel, damp to wet, medium dense	SC	1	9	
-10.0		1					
-11.0	118.0	1					
-12.0		1					
-13.0	116.0		Clayey SAND: red-brown, coarse-grained sand particles, intermittent lenses with some fine-grained gravel, damp to wet, medium dense	SC	5	14	
-14.0		6					
-15.0		8					
-15.0	114.0	9					

Subsurface water level upon completion @ 11.3' below existing grade: 11/25/14

Subsurface water level upon completion @ 11'3" below existing grade

Site Suitability

VSMP authority shall have authority to preclude ... or to require more stringent conditions ... based on site-specific concerns.

VSMP authority may require... pertinent information as may be necessary

