Subsurface Investigations and the Role of the Geotechnical Field Professional

A Look at the Requirements, Methods, Product, Problems and Solutions for Field Investigations Performed for NCDOT Projects

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The Issue

• With the increase of private sector contracting work from other NCDOT branches (i.e. Rail) and additional in house investigations, the NCDOT GEOTECHNICAL Unit is striving to create **concise, consistent and efficient** methods for geotechnical subsurface investigations of all kinds.
Key Goal

• Field Professionals working on all aspects of a NCDOT Geotechnical investigation should understand the scope of work for each project, and strive to convey each site in a detailed and accurate manner, in order to make all involved aware of critical geological and geotechnical concerns and conditions.
Requirements of Field Professional

Site Observation

- Geomorphology
- Structural Geology
- Surface Hydrology
- Anthropological and Environmental Concerns
Geomorphology

- Stream Channel Morphology
- Natural and Engineered Slopes
Surficial Hydrology

- Ponds/lakes
- stream flow
- Wetlands
- Seeps/Springs
Anthropological and Environmental Concerns

- Artificial Fills
- Construction Debris
- Contamination
- Vegetation & Wildlife
Structural Geology

- Rock Orientation in Slopes
- Critical geologic mapping
- Correlate exposed rock to subsurface sampling
Various Field Investigation Methods

- SPT and power auger drilling
- Coring
- Hand augers (alluvial mapping)
- Bridge rod soundings
- Geophysical testing (GPR, resistivity, CPT)
- Installation of wells
- slope indicators
Requirements of Field Professional

Subsurface Investigation

- Detailed Reporting (field logs)
- Understanding and Classifying Soils
- Understanding soil and rock origins and depositional environments
- Subsurface Hydrology
Detailed Reporting

- Field logs
- Surveying
- Problem solving
- Mapping
Soil Classification

• AASHTO classification
• Identifying highly plastic soils
• Identifying other problematic soil conditions

Photo Credit J. Howard, AMEC
Rock – Origin, Classification, Descriptions

- Rock Classification
Subsurface Hydrology

• Understanding perched water tables
• Making accurate observations of water conditions in critical sites, particularly roadways and problematic slopes.
Understanding the Relationship Between Field Observation and Final Product
GEU Reporting Methods and NCDOT Legend
Field Observation and Understanding
Stratigraphy
The Solution

• Making sure qualified geologists and engineers are involved and trained to observe and communicate issues effectively.

• Create a field professional manual that details NCDOT methods, processes and key observation points.

• A training program to certify qualified professionals in NCDOT Geotechnical methods for subsurface investigations.
Questions and Comments

Your input is very important as we work to make investigation and reporting more efficient!