

Exhibit A

Soil Investigations

Scope

The work shall consist of inventorying (logging), evaluating, and reporting soil characteristics in the designated areas.

ASTM D 2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), and ASTM D420, Standard Guide to Site Characterization for Engineering, Design, and Construction Purposes, are guides to methods by which soil, rock, and ground water conditions may be determined.

Marking

The extent of the areas to be investigated will be marked by stakes, flags, tree markings, or other suitable methods. The limits may also be shown on a plan view map of the site.

The number, type, and distribution of soil investigation borings or test pits shall be sufficient to characterize the subsurface. Test pits or borings shall be added if there is inconsistency within or between test pits or borings. Individual Conservation Practice Standards may require a minimum number of test pits or borings required.

Equipment

Soil borings shall be created by means of a soil bucket auger, soil probe, split-spoon sampler or Shelby tube having at least a 2 inch diameter. A soil boring may not be created by means of a power auger.

A backhoe or excavator may be used to construct soil test pits.

Soil Boring or Test Pits

Soil test pits shall be of adequate size, depth and construction to enable a person to safely enter and exit the pit, if required.

Soil profile descriptions shall be written in accordance with the descriptive procedures, terminology, and interpretations found in:

- ASTM D-2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)
- NRCS National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 4 Elementary Soil Engineering, "Field Identification and Description of Soils."

<http://directives.sc.egov.usda.gov/17543.wba>

Further guidance can be obtained from Soil Mechanics Level 1 Study Guide, Part C, Unified Soil Classification System Using Field Procedures.

Soil layers shall be described with respect to texture using the Unified Soil Classification System (USCS).

Soil color (Munsell) evaluations shall be performed under natural light conditions to give the most accurate color determinations. Frozen soil material shall be thawed prior to conducting evaluations for soil color, texture, structure and consistence.

Depth

Soil profile descriptions shall extend an adequate depth below the land surface to identify critical soil properties such as bedrock or subsurface water regimes where these properties will affect the project, design, and construction.

Elevation and Location

The site shall have a vertical and horizontal reference point(s) or bench mark(s) established.

The existing undisturbed surface grade elevation and location shall be obtained for all test pits or soil borings and included in the investigation report.

Bedrock

The type of bedrock, if encountered, such as sandstone, limestone, dolomite, or granite, shall be noted. The elevation of the top surface of bedrock will be recorded. Bedrock condition and ability to be excavated should be noted.

Soil Moisture

The in situ moisture content of each layer of soil shall be noted.

Subsurface saturation indicators, if encountered, such as seepage from sand and gravel lenses, lens thickness, estimated volume of flow, and elevation shall be noted.

Redoximorphic features (mottles) and the soil matrix shall be characterized by the use of the Munsell soil color charts.

Investigation Report

The report shall contain a legible site map, drawn to scale, no smaller than 8.5 inches by 11 inches, showing the extent of hole locations evaluated and the vertical and horizontal reference point(s). A soil profile description shall be prepared for each boring or test pit. Each description shall contain the person's name that collected the data and the date and time the data was collected. The soil profile descriptions should contain the following information (as applicable) for each soil horizon or layer:

- USCS group name and modifiers
- USCS group symbol
- Horizon thickness (depth)
- Percent of cobbles or boulders, or both (by volume)
- Percent of gravel, sand, or fines, or all three (by dry weight)
- Particle-size range:
 - Gravel-fine, coarse
 - Sand-fine, medium, coarse
- Particle angularity: angular, subangular, subrounded, rounded
- Particle shape: (if appropriate) flat, elongated, flat and elongated
- Maximum particle size or dimension
- Hardness of coarse sand and larger particles
- Plasticity of fines: nonplastic, low, medium, high
- Dry strength of fines: none, low, medium, high, very high
- Dilatancy: none, slow, rapid
- Toughness: low, medium, high
- Munsell color (in moist condition)
- Redoximorphic feature (Munsell color)
- Odor (mention only if organic or unusual)

- In-situ moisture content: dry, moist, wet, saturated
- Reaction with HCl: none, weak, strong
- Consistency (fine-grained soils only): very soft, soft, firm, hard, very hard
- Structure: stratified, laminated, fissured, slickensided, lensed, homogeneous
- Cementation: weak, moderate, strong
- Local name or soil map unit name
- Seepage depth

Additional comments such as: presence of roots or root holes, presence of mica, gypsum, etc., surface coatings on coarse-grained particles, caving or sloughing of auger hole or pit sides, difficulty in augering or excavating, etc. should be noted.

The depth to standing water in the soil boring or test pit at the end of excavation and when the hole is refilled shall be noted. Time of day shall be noted for these two depths. If no standing water is present, that should be noted.

When describing soil from a given boring or test pit, it is not necessary to follow all the procedures in this exhibit. Soils which are similar can be grouped in one sample being completely described, and others identified and noted as being similar based on performing only a few of the descriptive and identification procedures.

Evaluation of Inventoried Data

A summary of the soil profile descriptions shall be included with the investigation report. The summary shall note limiting features found during the investigation and discuss the conclusions that can be drawn from an analysis of the investigations.