Standard Practice for

Conducting Geotechnical Subsurface Investigations

AASHTO Designation: R 13-12 (2020)[1]

Technical Subcommittee: 1b, Geotechnical Exploration, Instrumentation, Stabilization, and Field Testing

Release: Group 3 (July)

ASTM Designation: D420-98(2003)

AASHTO

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INTRODUCTION

Investigation and identification of subsurface materials and conducting subsurface investigations involve complex techniques that may be accomplished by many different procedures and may be variously interpreted. These studies are frequently site specific and are influenced by geological and geographical settings; by the purpose of the investigation; by the design requirements for the project proposed; and by the background, training, and experience of the investigator.

This standard practice for soil, rock, and groundwater investigation based on standard procedures will provide a more consistent, uniform, and rational methodology for site evaluations. An acceptable and consistent investigation, sampling, testing, and evaluation program will determine subsurface site conditions and thereby provide the information needed to bring about safer and more cost-effective transportation facilities.

1. SCOPE

1.1. This standard practice identifies recognized methods by which soil, rock, and groundwater conditions may be determined. The objective of the investigation should be to identify and locate, both horizontally and vertically, significant soil and rock types and groundwater conditions present within a given site area and to establish the characteristics of the subsurface materials by sampling and *in situ* testing. Laboratory testing of soil and rock samples is governed by other AASHTO and ASTM standards.

1.2. *This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all safety concerns associated with its usage. It is the duty and responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use*.

Note 1—The values stated in SI units are to be regarded as the standard.

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- M 145, Classification of Soils and Soil–Aggregate Mixtures for Highway Construction Purposes

- R 90, Sampling Aggregate Products
- T 206, Penetration Test and Split-Barrel Sampling of Soils
- T 207, Thin-Walled Tube Sampling of Soils
- T 221, Repetitive Static Plate Load Tests of Soils and Flexible Pavement Components for Use in Evaluation and Design of Airport and Highway Pavements
- T 223, Field Vane Shear Test in Cohesive Soil
- T 225, Diamond Core Drilling for Site Investigation
- T 306, Progressing Auger Borings for Geotechnical Explorations

2.2. *ASTM Standards*:

- C119, Standard Terminology Relating to Dimension Stone
- C294, Standard Descriptive Nomenclature for Constituents of Concrete Aggregates
- D1586/D1586 M, Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils
- D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)
- D2607, Classification of Peats, Mosses, Humus, and Related Products (withdrawn 1990)
- D3385, Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer
- D3441, Standard Test Method for Mechanical Cone Penetration Testing of Soils
- D3550/D3550M, Standard Practice for Thick Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils
- D4083, Standard Practice for Description of Frozen Soils (Visual-Manual Procedure)
- D4220/D4220M, Standard Practices for Preserving and Transporting Soil Samples
- D4403, Standard Practice for Extensometers Used in Rock
- D4429, Standard Test Method for CBR (California Bearing Ratio) of Soils in Place (withdrawn 2018)
- D4719, Standard Test Methods for Prebored Pressuremeter Testing in Soils (withdrawn 2016)
- D5079, Standard Practices for Preserving and Transporting Rock Core Samples (withdrawn 2017)
- D6066, Standard Practice for Determining the Normalized Penetration Resistance of Sands for Evaluation of Liquefaction Potential

3. SIGNIFICANCE AND USE

3.1. *An adequate soil, rock, and groundwater subsurface investigation provides pertinent information for decision making on one or more of the following subjects*:

3.1.1. Location of the proposed construction both vertically and horizontally;

3.1.2. Location and preliminary evaluation of suitable borrow and other local sources of construction material;

3.1.3. Need for special excavating and dewatering techniques;

3.1.4. Investigations of stability in natural slopes and cuts, and embankment foundation stability;