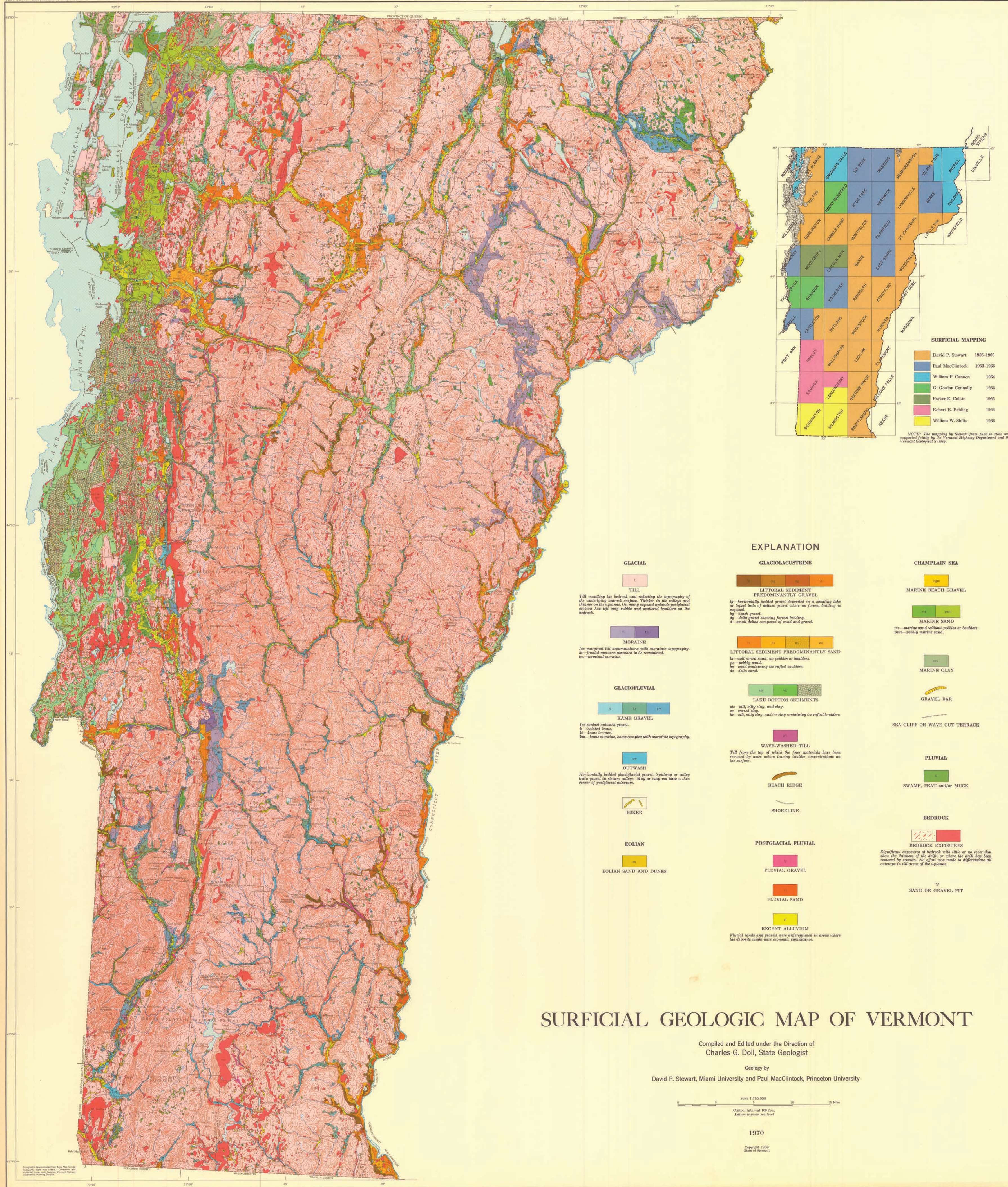
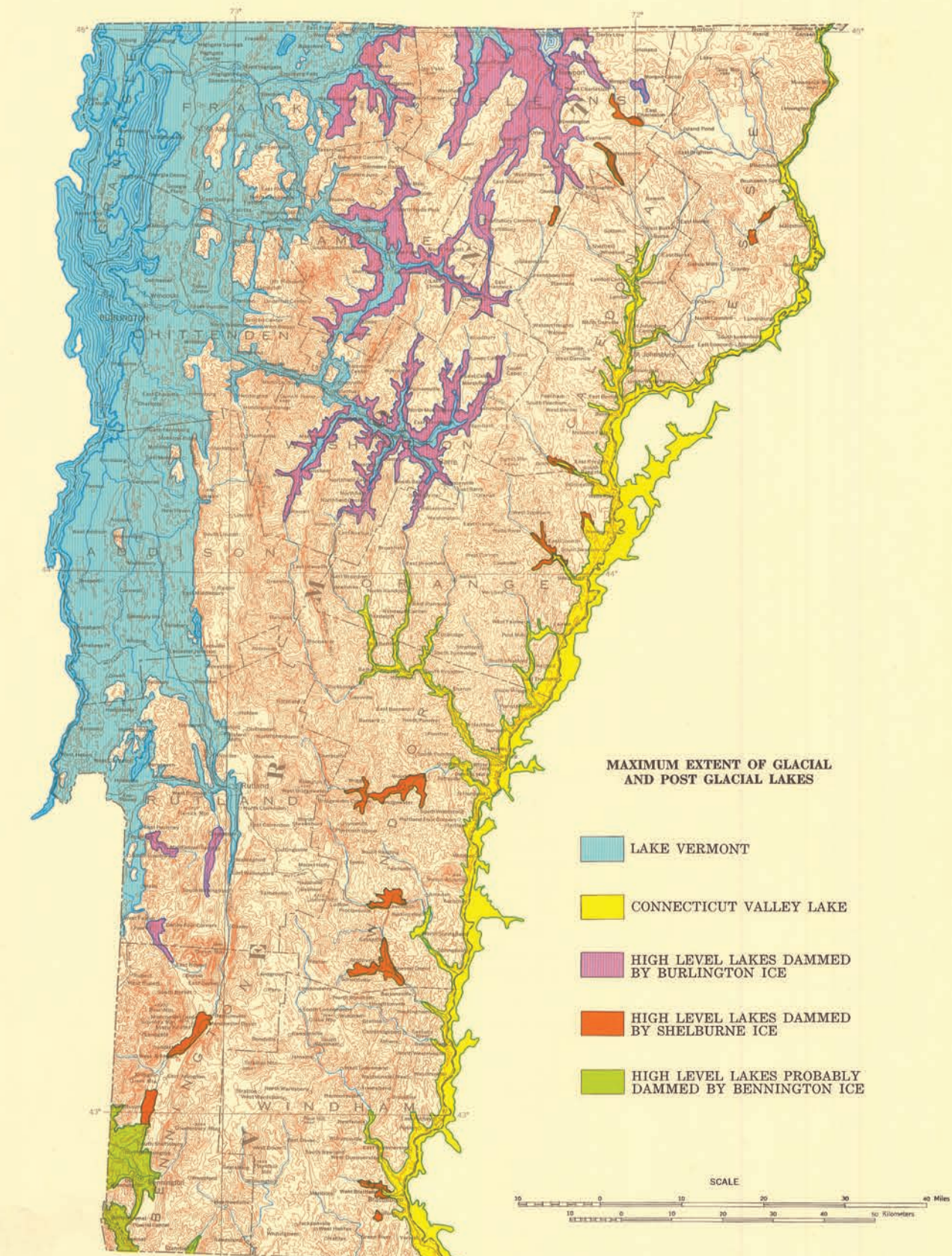
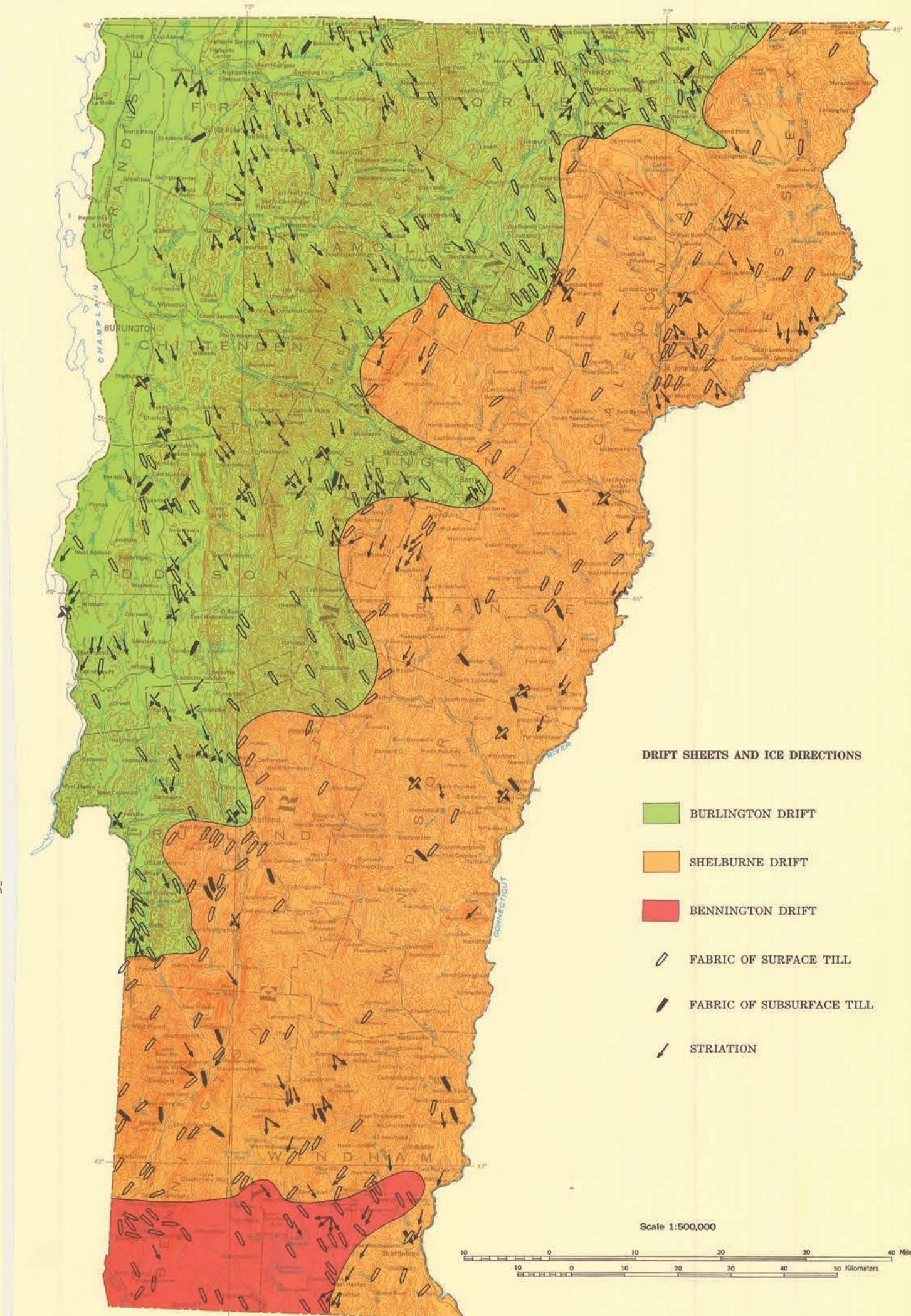




SURFICIAL GEOLOGIC MAP OF VERMONT

Compiled and Edited under the Direction of
Charles G. Doll, State GeologistGeology by
David P. Stewart, Miami University and Paul MacClintock, Princeton UniversityScale 1:500,000
Contour interval 100 feet
Distances in miles and feet

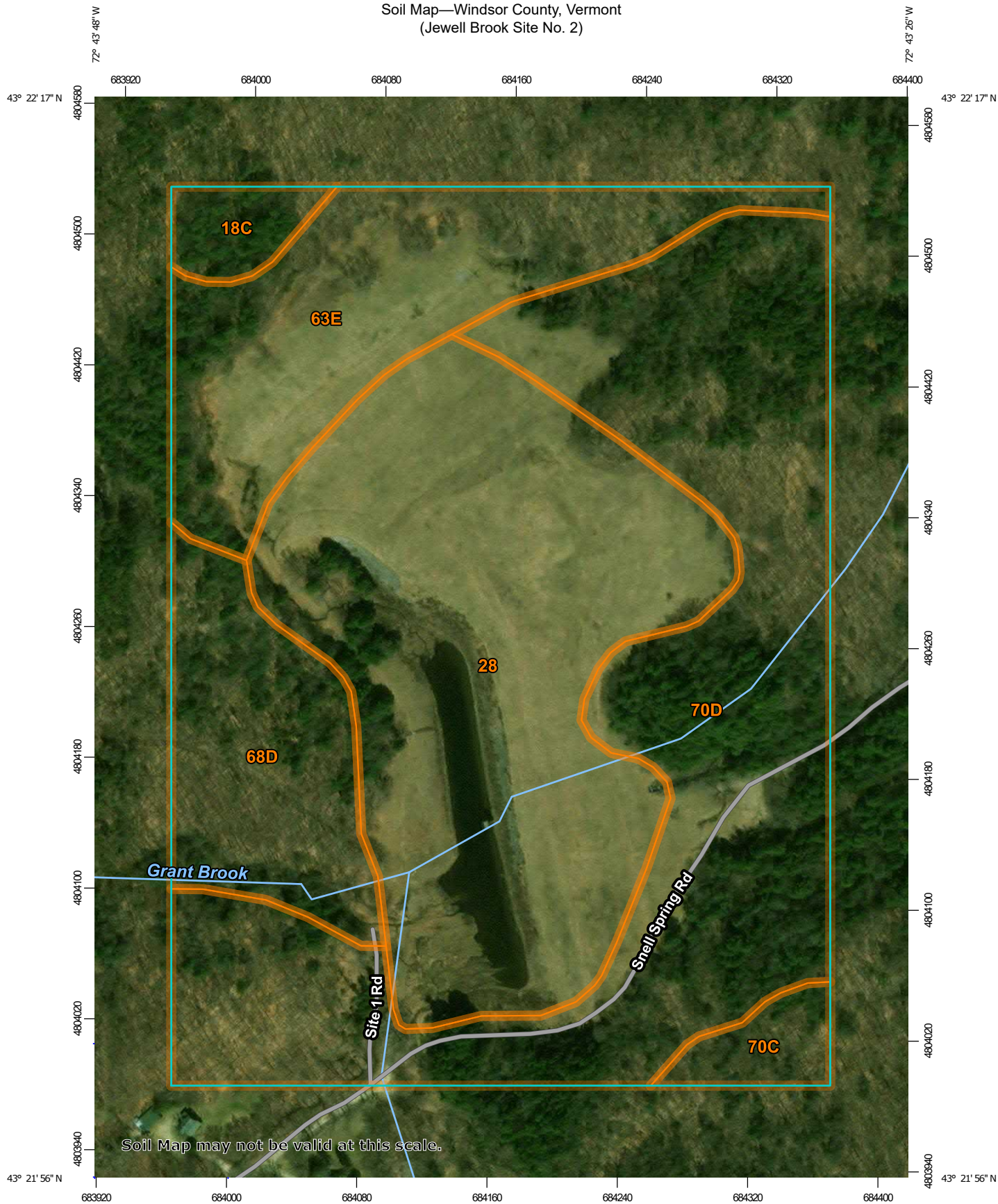
1970

Copyright 1969
State of Vermont

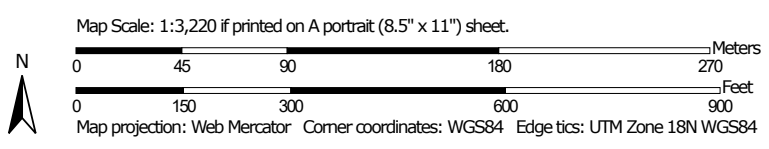
APPENDIX D

USDA NRCS WEB SOIL SURVEY DATA

Soil Map—Windsor County, Vermont
(Jewell Brook Site No. 2)



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Windsor County, Vermont

Survey Area Data: Version 23, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 17, 2012—Mar 29, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
18C	Peru, Skerry, and Colonel soils, 8 to 15 percent slopes, very stony	1.1	1.9%
28	Udorthents and Udipsamments	18.7	33.8%
63E	Monadnock and Berkshire soils, 35 to 60 percent slopes, very stony	8.4	15.2%
68D	Monadnock and Berkshire soils, 15 to 25 percent slopes	5.5	9.9%
70C	Adams loamy sand, 8 to 15 percent slopes	1.1	2.0%
70D	Adams loamy sand, 15 to 25 percent slopes	20.5	37.1%
Totals for Area of Interest		55.2	100.0%

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named, soils that are similar to the named components, and some minor components that differ in use and management from the major soils.

Most of the soils similar to the major components have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Some minor components, however, have properties and behavior characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Windsor County, Vermont

18C—Peru, Skerry, and Colonel soils, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w9r1

Elevation: 750 to 2,260 feet
Mean annual precipitation: 31 to 65 inches
Mean annual air temperature: 36 to 52 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Peru, very stony, and similar soils: 55 percent
Skerry, very stony, and similar soils: 20 percent
Colonel, very stony, and similar soils: 15 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Peru, Very Stony**Setting**

Landform: Hills, mountains
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Mountainbase, mountainflank, side slope, nose slope, interfluvium
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy lodgment till derived from granite and/or mica schist and/or phyllite

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 5 inches: fine sandy loam
E - 5 to 6 inches: fine sandy loam
Bs1 - 6 to 7 inches: fine sandy loam
Bs2 - 7 to 13 inches: fine sandy loam
Bs3 - 13 to 18 inches: fine sandy loam
BC - 18 to 21 inches: fine sandy loam
Cd1 - 21 to 37 inches: fine sandy loam
Cd2 - 37 to 65 inches: fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 1.1 percent
Depth to restrictive feature: 21 to 43 inches to densic material
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 17 to 34 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: C/D
Hydric soil rating: No

Description of Skerry, Very Stony

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Mountainflank, mountainbase, side slope, nose slope, interfluvium
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy lodgment till derived from granite and gneiss and/or schist over sandy lodgment till derived from granite and gneiss and/or schist

Typical profile

Oa - 0 to 2 inches: highly decomposed plant material
E - 2 to 4 inches: fine sandy loam
Bhs - 4 to 6 inches: fine sandy loam
Bs1 - 6 to 20 inches: gravelly fine sandy loam
Bs2 - 20 to 25 inches: gravelly fine sandy loam
Cd1 - 25 to 34 inches: gravelly loamy sand
Cd2 - 34 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 1.1 percent
Depth to restrictive feature: 21 to 43 inches to densic material
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 17 to 34 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C/D
Hydric soil rating: No

Description of Colonel, Very Stony

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainbase, mountainflank, nose slope, side slope, interfluvium
Down-slope shape: Linear
Across-slope shape: Concave

Parent material: Loamy lodgment till derived from granite and/or mica schist and/or phyllite

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
E - 1 to 2 inches: fine sandy loam
Bhs - 2 to 3 inches: fine sandy loam
Bs1 - 3 to 9 inches: fine sandy loam
Bs2 - 9 to 12 inches: fine sandy loam
BC - 12 to 18 inches: gravelly fine sandy loam
Cd - 18 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 1.1 percent
Depth to restrictive feature: 11 to 25 inches to densic material
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components**Marlow, very stony**

Percent of map unit: 4 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainbase, mountainflank, interfluve, side slope, nose slope
Microfeatures of landform position: Rises, rises
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Cabot, very stony

Percent of map unit: 3 percent
Landform: Hills, mountains
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Mountainflank, mountainbase, side slope, nose slope, interfluve
Microfeatures of landform position: Open depressions, closed depressions, closed depressions, open depressions
Down-slope shape: Concave
Across-slope shape: Concave

Hydric soil rating: Yes

Tunbridge, very stony

Percent of map unit: 3 percent

Landform: Hills, mountains

Landform position (two-dimensional): Backslope, summit, shoulder

Landform position (three-dimensional): Mountainbase,
mountainflank, side slope, nose slope, interfluvium

Microfeatures of landform position: Rises, rises

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

28—Udorthents and Udipsamments

Map Unit Setting

National map unit symbol: 9hnn

Elevation: 280 to 2,000 feet

Mean annual precipitation: 35 to 55 inches

Mean annual air temperature: 37 to 52 degrees F

Frost-free period: 90 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 43 percent

Udipsamments and similar soils: 42 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex, concave, linear

Across-slope shape: Convex, concave

Parent material: Human transported material

Typical profile

H1 - 0 to 65 inches: gravelly sandy loam

Properties and qualities

Depth to restrictive feature: More than 80 inches

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.20 to 6.00 in/hr)

Depth to water table: About 24 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydrologic Soil Group: A

Hydric soil rating: No

Description of Udipsamments

Setting

Down-slope shape: Convex, linear, concave

Across-slope shape: Convex, concave

Parent material: Human transported material

Typical profile

H1 - 0 to 65 inches: sand

Properties and qualities

Depth to restrictive feature: More than 80 inches

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 99.90 in/hr)

Depth to water table: About 24 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Water

Percent of map unit: 4 percent

Landform: Depressions

Hydric soil rating: Unranked

Rock outcrop

Percent of map unit: 4 percent

Hydric soil rating: Unranked

Aquents

Percent of map unit: 4 percent

Landform: Depressions

Hydric soil rating: Yes

Udifuvents

Percent of map unit: 3 percent

Landform: Flood plains

Hydric soil rating: No

63E—Monadnock and Berkshire soils, 35 to 60 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2wln2

Elevation: 620 to 1,740 feet

Mean annual precipitation: 31 to 95 inches

Mean annual air temperature: 27 to 52 degrees F

Frost-free period: 90 to 150 days

Farmland classification: Not prime farmland

Map Unit Composition

Monadnock, very stony, and similar soils: 45 percent

Berkshire, very stony, and similar soils: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monadnock, Very Stony

Setting

Landform: Hills, mountains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist over sandy and gravelly supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

Typical profile

Oe - 0 to 3 inches: moderately decomposed plant material

E - 3 to 8 inches: fine sandy loam

Bs1 - 8 to 10 inches: fine sandy loam

Bs2 - 10 to 12 inches: fine sandy loam

Bs3 - 12 to 22 inches: gravelly fine sandy loam

BC - 22 to 25 inches: gravelly fine sandy loam

2C1 - 25 to 45 inches: gravelly loamy sand

2C2 - 45 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 35 to 60 percent

Percent of area covered with surface fragments: 1.1 percent

Depth to restrictive feature: 18 to 36 inches to strongly contrasting textural stratification

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Berkshire, Very Stony

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 4 inches: fine sandy loam
E - 4 to 5 inches: fine sandy loam
Bs1 - 5 to 7 inches: fine sandy loam
Bs2 - 7 to 13 inches: fine sandy loam
Bs3 - 13 to 21 inches: fine sandy loam
BC1 - 21 to 28 inches: fine sandy loam
BC2 - 28 to 33 inches: fine sandy loam
C - 33 to 65 inches: fine sandy loam

Properties and qualities

Slope: 35 to 60 percent
Percent of area covered with surface fragments: 1.1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Becket, very stony

Percent of map unit: 6 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Lyman, very stony

Percent of map unit: 4 percent

Landform: Hills, mountains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank, side slope

Microfeatures of landform position: Rises, rises

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Sunapee, very stony

Percent of map unit: 3 percent

Landform: Hills, mountains

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Mountainflank, side slope

Microfeatures of landform position: Open depressions, open depressions

Down-slope shape: Convex, concave

Across-slope shape: Convex, concave

Hydric soil rating: No

Moosilauke, very stony

Percent of map unit: 2 percent

Landform: Hills, mountains

Landform position (two-dimensional): Toeslope, footslope

Landform position (three-dimensional): Mountainflank, side slope

Microfeatures of landform position: Open depressions, open depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

68D—Monadnock and Berkshire soils, 15 to 25 percent slopes**Map Unit Setting**

National map unit symbol: 2wlmv

Elevation: 560 to 1,870 feet

Mean annual precipitation: 31 to 95 inches

Mean annual air temperature: 27 to 52 degrees F

Frost-free period: 90 to 150 days

Farmland classification: Not prime farmland

Map Unit Composition

Monadnock and similar soils: 45 percent

Berkshire and similar soils: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monadnock

Setting

Landform: Hills, mountains

Landform position (two-dimensional): Backslope, summit, shoulder

Landform position (three-dimensional): Mountainflank, side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist over sandy and gravelly supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam

Bs1 - 7 to 9 inches: fine sandy loam

Bs2 - 9 to 19 inches: gravelly fine sandy loam

BC - 19 to 22 inches: gravelly fine sandy loam

2C1 - 22 to 42 inches: gravelly loamy sand

2C2 - 42 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: 15 to 30 inches to strongly contrasting textural stratification

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Berkshire

Setting

Landform: Hills, mountains

Landform position (two-dimensional): Backslope, summit, shoulder

Landform position (three-dimensional): Mountainflank, side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bs1 - 7 to 13 inches: fine sandy loam
Bs2 - 13 to 21 inches: fine sandy loam
BC1 - 21 to 28 inches: fine sandy loam
BC2 - 28 to 33 inches: fine sandy loam
C - 33 to 65 inches: fine sandy loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components**Marlow**

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Mountainflank, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Peru

Percent of map unit: 4 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Mountainflank, nose slope, side slope
Microfeatures of landform position: Open depressions, open depressions
Down-slope shape: Convex, concave
Across-slope shape: Convex, concave
Hydric soil rating: No

Tunbridge

Percent of map unit: 4 percent
Landform: Hills, mountains

Landform position (two-dimensional): Shoulder, summit, backslope

Landform position (three-dimensional): Mountainflank, nose slope, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Colonel

Percent of map unit: 2 percent

Landform: Hills, mountains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Mountainflank, nose slope, side slope

Microfeatures of landform position: Open depressions, open depressions

Down-slope shape: Linear, concave

Across-slope shape: Linear, concave

Hydric soil rating: No

70C—Adams loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2wqn8

Elevation: 10 to 2,000 feet

Mean annual precipitation: 31 to 95 inches

Mean annual air temperature: 27 to 52 degrees F

Frost-free period: 90 to 160 days

Farmland classification: Not prime farmland

Map Unit Composition

Adams and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Adams

Setting

Landform: Outwash terraces

Landform position (two-dimensional): Backslope, summit

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy glaciofluvial deposits

Typical profile

Ap - 0 to 7 inches: loamy sand

Bs - 7 to 21 inches: sand

BC - 21 to 27 inches: sand

C - 27 to 65 inches: sand

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components**Colton**

Percent of map unit: 8 percent
Landform: Outwash terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Base slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Croghan

Percent of map unit: 3 percent
Landform: Outwash terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Nicholville

Percent of map unit: 2 percent
Landform: Outwash terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sheepscot

Percent of map unit: 2 percent
Landform: Outwash terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

70D—Adams loamy sand, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2wqnd

Elevation: 10 to 2,000 feet

Mean annual precipitation: 31 to 95 inches

Mean annual air temperature: 27 to 52 degrees F

Frost-free period: 90 to 160 days

Farmland classification: Not prime farmland

Map Unit Composition

Adams and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Adams

Setting

Landform: Eskers

Landform position (two-dimensional): Backslope, summit

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy glaciofluvial deposits

Typical profile

Ap - 0 to 7 inches: loamy sand

Bs - 7 to 21 inches: sand

BC - 21 to 27 inches: sand

C - 27 to 65 inches: sand

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (1.42 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Croghan

Percent of map unit: 5 percent

Landform: Eskers

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

Colton

Percent of map unit: 5 percent

Landform: Eskers

Landform position (two-dimensional): Summit, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Salmon

Percent of map unit: 4 percent

Landform: Eskers

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Sheepscot

Percent of map unit: 1 percent

Landform: Eskers

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Data Source Information

Soil Survey Area: Windsor County, Vermont

Survey Area Data: Version 23, Sep 16, 2019

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk "*" denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).



Engineering Properties--Windsor County, Vermont														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
18C—Peru, Skerry, and Colonel soils, 8 to 15 percent slopes, very stony														
Peru, very stony	55	C/D	0-1	Moderately decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	—	—	—	—	—	—
			1-5	Silt loam, loam, sandy loam, fine sandy loam	OL	A-5	0- 2- 18	0- 2- 56	64-97-97	27-91-91	22-80-87	13-55-63	0-46 -76	NP-2 -5
			5-6	Fine sandy loam, loam, very fine sandy loam, sandy loam	ML	A-4	0- 1- 14	0- 1- 43	70-98-98	40-95-95	31-83-88	17-53-58	0-0 -36	NP-0 -6
			6-7	Fine sandy loam, very fine sandy loam, sandy loam, loam	ML	A-4	0- 2- 17	0- 4- 53	65-97-97	31-95-95	23-80-86	14-52-59	0-33 -43	NP-3 -5
			7-13	Loam, fine sandy loam, very fine sandy loam, sandy loam	ML	A-4	0- 2- 16	0- 4- 50	67-98-98	33-95-95	25-81-87	15-52-59	0-0 -34	NP-0 -6
			13-18	Sandy loam, very fine sandy loam, fine sandy loam, loam	ML	A-4	0- 2- 16	0- 4- 50	67-98-98	33-95-95	25-80-86	15-55-60	0-0 -34	NP-0 -6
			18-21	Very fine sandy loam, loam, fine sandy loam, sandy loam	ML	A-4	0- 1- 14	0- 3- 43	70-98-98	40-96-96	31-82-88	17-51-58	0-0 -25	NP-0 -6
			21-37	Loam, very fine sandy loam, fine sandy loam, sandy loam	ML	A-4	0- 1- 13	0- 2- 39	72-98-98	44-97-97	34-82-89	19-52-58	0-0 -23	NP-0 -6

Engineering Properties--Windsor County, Vermont														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
			37-65	Fine sandy loam, very fine sandy loam, loam, sandy loam	ML	A-4	0- 1- 13	0- 2- 39	72-98-98	44-97-97	34-82-89	19-52-58	0-0 -23	NP-0 -6
Skerry, very stony	20	C/D	0-2	Highly decomposed plant material, slightly decomposed plant material, moderately decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	—	—	—	—	—	—
			2-4	Fine sandy loam, sandy loam, gravelly fine sandy loam, loamy sand	ML	A-4	0- 1- 43	0- 4- 43	58-90-95	57-89-95	48-78-89	30-50-59	0-0 -36	NP-0 -6
			4-6	Fine sandy loam, sandy loam, gravelly fine sandy loam	SM	A-4	0- 2- 52	0- 6- 52	49-86-93	47-85-92	38-72-82	24-47-54	0-33 -43	NP-4 -5
			6-20	Gravelly fine sandy loam, fine sandy loam, sandy loam	SC-SM	A-4	0- 1- 50	0- 7- 50	52-79-93	50-78-92	40-66-82	25-43-54	0-26 -34	NP-5 -6
			20-25	Fine sandy loam, sandy loam, gravelly fine sandy loam	SM	A-4	0- 1- 50	0- 7- 50	52-71-92	50-69-91	41-59-84	26-38-57	0-0 -34	NP-0 -6
			25-34	Loamy fine sand, gravelly loamy sand, loamy coarse sand, fine sandy loam, sandy loam	SM	A-2-4	0- 1- 50	0- 5- 50	52-72-94	50-71-94	38-56-77	13-21-30	0-0 -18	NP-0 -2
			34-65	Gravelly loamy sand, loamy fine sand, loamy coarse sand, fine sandy loam, sandy loam	SM	A-2-4	0- 1- 50	0- 5- 50	52-72-94	50-71-94	38-56-77	13-21-30	0-0 -18	NP-0 -2
 Natural Resources Conservation Service					Web Soil Survey National Cooperative Soil Survey								1/10/2020 Page 6 of 12	

Engineering Properties--Windsor County, Vermont														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
Colonel, very stony	15	D	0-1	Highly decomposed plant material	PT	A-8	0- 0- 0	0- 5- 10	—	—	—	—	—	—
			1-2	Very fine sandy loam, sandy loam, loam, fine sandy loam	SM	A-4	0- 0- 0	0- 8- 43	59-91-96	57-91-96	44-79-88	25-48-58	0-0 -34	NP-0 -6
			2-3	Very fine sandy loam, loam, fine sandy loam, sandy loam	SM	A-4	0- 0- 0	0-11- 53	49-88-94	47-87-93	36-75-86	20-46-57	0-0 -60	NP-0 -5
			3-9	Fine sandy loam, sandy loam, very fine sandy loam, loam	SM	A-4	0- 0- 0	0-10- 50	51-89-94	49-88-94	38-76-87	21-46-57	0-0 -43	NP-0 -5
			9-12	Sandy loam, loam, fine sandy loam, very fine sandy loam	SM	A-4	0- 0- 0	0-10- 50	52-89-94	50-88-94	39-76-87	21-46-57	0-0 -34	NP-0 -6
			12-18	Sandy loam, gravelly fine sandy loam, very fine sandy loam, loam	SM	A-4	0- 0- 0	0- 7- 42	59-84-94	57-83-94	44-72-88	25-44-57	0-0 -25	NP-0 -6
			18-65	Loam, gravelly fine sandy loam, sandy loam, very fine sandy loam	SM	A-4	0- 0- 0	0- 6- 44	57-86-95	55-85-95	44-75-91	22-41-55	0-0 -23	NP-0 -6
28—Udorthents and Udipsamments														
Udorthents	43	A	0-65	Gravelly sandy loam	GM, GP, ML, SM	A-1, A-2-4, A-3, A-4	—	0-10- 30	25-80-100	20-60-100	10-50-90	2-41- 80	0-18 -35	NP-5 -10
Udipsamments	42	A	0-65	Sand, gravelly sand	SP	A-1, A-3	—	0- 1- 2	85-93-100	50-80-100	25-58-90	0- 3- 5	0-7 -14	NP

Engineering Properties--Windsor County, Vermont														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
63E--Monadnock and Berkshire soils, 35 to 60 percent slopes, very stony														
Monadnock, very stony	45	B	0-3	Moderately decomposed plant material, slightly decomposed plant material, highly decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	—	—	—	—	—	—
			3-8	Fine sandy loam, sandy loam, silt loam, gravelly fine sandy loam	SM	A-4	0- 1- 27	0- 4- 48	67-92-100	65-91-100	55-80-94	32-47-58	0-0 -30	NP-0 -6
			8-10	Gravelly fine sandy loam, coarse sandy loam, fine sandy loam, loam	SM	A-4	0- 2- 25	0- 6- 25	57-88-100	55-87-100	47-76-94	27-45-58	0-0 -65	NP-0 -5
			10-12	Coarse sandy loam, loam, fine sandy loam, gravelly fine sandy loam	SM	A-4	0- 0- 0	0- 6- 24	59-89-100	57-88-100	49-77-94	28-45-58	0-0 -43	NP-0 -5
			12-22	Coarse sandy loam, loam, gravelly fine sandy loam	SM	A-4	0- 0- 0	0- 5- 23	61-72-100	60-71-100	51-62-94	29-36-58	0-0 -34	NP-0 -6
			22-25	Loam, gravelly fine sandy loam, sandy loam, fine sandy loam	SM	A-2-4	0- 0- 0	0- 7- 20	67-70-100	65-68-100	55-60-94	32-35-58	0-0 -25	NP-0 -6
			25-45	Loamy coarse sand, loamy sand, loamy fine sand, gravelly loamy sand	SM	A-2-4	0- 0- 0	0- 7- 23	38-71-94	35-69-94	28-56-76	11-21-30	0-0 -14	NP

Engineering Properties--Windsor County, Vermont														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
			45-65	Gravelly loamy sand, loamy fine sand, loamy sand, loamy coarse sand	SM	A-2-4	0- 0- 0	0- 7- 23	38-71-94	35-69-94	28-56-76	11-21-30	0-0 -14	NP
Berkshire, very stony	40	B	0-2	Slightly decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	—	—	—	—	—	—
			2-4	Loam, fine sandy loam, gravelly fine sandy loam, sandy loam	SM	A-4	0- 0- 0	0- 0- 0	44-88-88	42-88-88	36-77-84	21-45-52	0-0 -54	NP-0 -5
			4-5	Fine sandy loam, loam, gravelly fine sandy loam, sandy loam	SM	A-4	0- 0- 0	0- 0- 0	53-92-92	51-91-91	44-80-87	26-47-54	0-0 -32	NP-0 -6
			5-7	Sandy loam, loam, fine sandy loam, gravelly fine sandy loam	SM	A-4	0- 0- 0	0- 0- 0	43-88-88	41-88-88	35-76-83	20-45-52	0-0 -65	NP-0 -5
			7-13	Loam, sandy loam, fine sandy loam, gravelly fine sandy loam	SM	A-4	0- 0- 0	0- 0- 0	45-89-89	43-89-89	37-77-84	22-45-52	0-0 -43	NP-0 -5
			13-21	Gravelly fine sandy loam, sandy loam, loam, fine sandy loam	SM	A-4	0- 0- 0	0- 0- 0	47-90-90	44-89-89	38-78-85	22-45-53	0-0 -34	NP-0 -6
			21-28	Sandy loam, loam, fine sandy loam, gravelly fine sandy loam	SM	A-4	0- 0- 0	0- 0- 0	53-92-92	51-91-91	44-80-87	26-47-54	0-0 -27	NP-0 -6
			28-33	Gravelly fine sandy loam, sandy loam, loam, fine sandy loam	SM	A-4	0- 0- 0	0- 0- 0	53-92-92	52-92-92	44-80-87	26-47-54	0-0 -25	NP-0 -6
 Natural Resources Conservation Service			33-65	Sandy loam, loam, fine sandy loam, gravelly fine sandy loam	SM	A-4	0- 0- 0	0- 0- 0	54-85-92	52-84-92	45-73-87	26-43-54	0-0 -23	NP-0 -6

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Engineering Properties--Windsor County, Vermont														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
68D--Monadnock and Berkshire soils, 15 to 25 percent slopes														
Monadnock	45	B	0-7	Fine sandy loam, sandy loam, silt loam, gravelly fine sandy loam	SM	A-4	0- 0- 0	0- 6- 48	66-91-100	65-91-100	55-79-94	32-46-58	0-0 -43	NP-0 -6
			7-9	Loam, gravelly fine sandy loam, coarse sandy loam, fine sandy loam	SM	A-4	0- 0- 0	0- 6- 24	59-89-100	57-88-100	49-77-94	28-45-58	0-0 -43	NP-0 -5
			9-19	Gravelly fine sandy loam, loam, coarse sandy loam	SM	A-4	0- 0- 0	0- 5- 23	61-72-100	60-71-100	51-62-94	29-36-58	0-0 -34	NP-0 -6
			19-22	Gravelly fine sandy loam, sandy loam, loam, fine sandy loam	SM	A-2-4	0- 0- 0	0- 7- 20	67-70-100	65-68-100	55-60-94	32-35-58	0-0 -25	NP-0 -6
			22-42	Loamy sand, loamy coarse sand, gravelly loamy sand, loamy fine sand	SM	A-2-4	0- 0- 0	0- 7- 23	38-71-94	35-69-94	28-56-76	11-21-30	0-0 -14	NP

Engineering Properties--Windsor County, Vermont														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
			42-65	Loamy coarse sand, loamy sand, loamy fine sand, gravelly loamy sand	SM	A-2-4	0- 0- 0	0- 7- 23	38-71-94	35-69-94	28-56-76	11-21-30	0-0 -14	NP
Berkshire	40	B	0-7	Gravelly fine sandy loam, sandy loam, loam, fine sandy loam	SM	A-4	0- 0- 0	0- 0- 0	54-92-92	52-92-92	45-80-87	26-47-54	0-0 -43	NP-0 -5
			7-13	Fine sandy loam, gravelly fine sandy loam, sandy loam, loam	SM	A-4	0- 0- 0	0- 0- 0	45-89-89	43-89-89	37-77-84	22-45-52	0-0 -43	NP-0 -5
			13-21	Sandy loam, loam, gravelly fine sandy loam, fine sandy loam	SM	A-4	0- 0- 0	0- 0- 0	47-90-90	44-89-89	38-78-85	22-45-53	0-0 -34	NP-0 -6
			21-28	Fine sandy loam, sandy loam, loam, gravelly fine sandy loam	SM	A-4	0- 0- 0	0- 0- 0	53-92-92	51-91-91	44-80-87	26-47-54	0-0 -27	NP-0 -6
			28-33	Gravelly fine sandy loam, fine sandy loam, sandy loam, loam	SM	A-4	0- 0- 0	0- 0- 0	53-92-92	52-92-92	44-80-87	26-47-54	0-0 -25	NP-0 -6
			33-65	Loam, gravelly fine sandy loam, fine sandy loam, sandy loam	SM	A-4	0- 0- 0	0- 0- 0	54-85-92	52-84-92	45-73-87	26-43-54	0-0 -23	NP-0 -6

Engineering Properties--Windsor County, Vermont														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
70C—Adams loamy sand, 8 to 15 percent slopes														
Adams	85	A	0-7	Loamy fine sand, loamy sand	SM	A-2-4, A-2	0- 0- 0	0- 0- 0	90-94-100	80-89-100	67-76-88	22-27-32	0-23 -28	NP-2 -3
			7-21	Loamy fine sand, loamy sand, sand	SM	A-2, A-2-4	0- 0- 0	0- 0- 0	90-94-100	81-90-100	67-75-85	18-21-25	0-0 -23	NP-0 -2
			21-27	Sand, fine sand, loamy sand	SM	A-2-4, A-2	0- 0- 0	0- 0- 0	84-93-100	72-87-100	57-70-83	13-17-21	0-0 -19	NP-0 -1
			27-65	Gravelly coarse sand, sand	SW-SM, SP-SM	A-3, A-2-4, A-2	0- 0- 0	0- 0- 8	84-91-100	68-83-100	53-65-81	8-11- 15	0-0 -14	NP
70D—Adams loamy sand, 15 to 25 percent slopes														
Adams	85	A	0-7	Loamy sand, loamy fine sand	SM	A-2-4, A-2	0- 0- 0	0- 0- 0	90-94-100	80-89-100	67-76-88	22-27-32	0-23 -28	NP-2 -3
			7-21	Loamy sand, sand, loamy fine sand	SM	A-2, A-2-4	0- 0- 0	0- 0- 0	90-94-100	81-90-100	67-75-85	18-21-25	0-0 -23	NP-0 -2
			21-27	Fine sand, loamy sand, sand	SM	A-2-4, A-2	0- 0- 0	0- 0- 0	84-93-100	72-87-100	57-70-83	13-17-21	0-0 -19	NP-0 -1
			27-65	Gravelly coarse sand, sand	SW-SM, SP-SM	A-3, A-2-4, A-2	0- 0- 0	0- 0- 8	84-91-100	68-83-100	53-65-81	8-11- 15	0-0 -14	NP

Data Source Information

Soil Survey Area: Windsor County, Vermont
 Survey Area Data: Version 23, Sep 16, 2019



APPENDIX E
SEISMIC DATA

[← Latest Earthquakes](#)

M 6.5 - Central New Hampshire

1638-06-11 19:00:00 (UTC) | 43.400°N 71.600°W | - depth

Overview

Tops of chimneys were thrown down and dishes were knocked from shelves in the Salem-Lynn area, north of Boston, and at Plymouth, on the coast about 55 km southeast of Boston. At Plymouth, people had to hold on to posts to keep from falling. Ships near the coast reportedly were shaken. Also felt in Connecticut and Rhode Island. Aftershocks continued for 20 days. (Ref. 38, 59, 76.)

Interactive Map

Regional Information

Maximum observed Modified Mercalli Intensity (MMI) IX

Impact

From *Seismicity of the United States, 1568-1599 (Revised)*, by Carl W. Stover and Jerry L. Coffman, U.S. Geological Survey Professional Paper 1527, United States Government Printing Office, Washington, 1993.

The earthquake was also felt strongly at Trois-Rivières, Quebec.

Felt Report - Tell Us!

Adapted from *Earthquake History of the United States*, by Jerry L. Coffman, Carl A. von Hake and Carl W. Stover, National Oceanic and Atmospheric Administration and U.S. Geological Survey, Publication 41-1, Revised Edition, Reprinted with Supplement 1982, United States Government Printing Office, Washington, 1982.

Technical

Note that the original location for this event in the St. Lawrence Valley given by source USHS has been determined to be incorrect. Also, contemporary accounts of the event say it occurred about 1-2 PM local time, which corresponds to a UTC time of about 1900, instead of 0700 given by USHS.

Origin

[← Latest Earthquakes](#)

M 4.7 - New York

1931-04-20 19:54:30 (UTC) | 43.471°N 73.785°W | 5.0 km depth

Maximum observed Modified Mercalli Intensity (MMI) VII

Overview

[← Latest Earthquakes](#)

M 4.5 - New Hampshire

1982-01-19 00:14:42 (UTC) | 43.500°N 71.600°W | 8.0 km depth

Overview

Interactive Map

Regional Information

Impact

Felt Report - Tell Us!

ShakeMap

ShakeMap

Catalog	MMI	Source	Description
✓ ATLAS	V	ATLAS ²	1 km NW of Sanbornton, New Hampshire
US	VI	ATLAS ²	Shakemap Atlas v4

Slight damage (VI) at Bristol, Canaan, Danbury and Laconia, New Hampshire, also North Hartland and White River Junction, Vermont. Felt throughout most of New England, northeastern New York and as far as southern Quebec and northeastern Ontario.

Maximum observed Modified Mercalli Intensity (MMI) VI

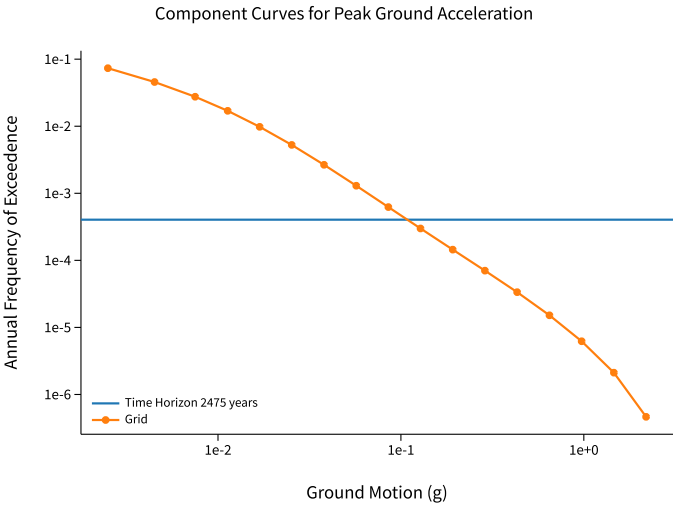
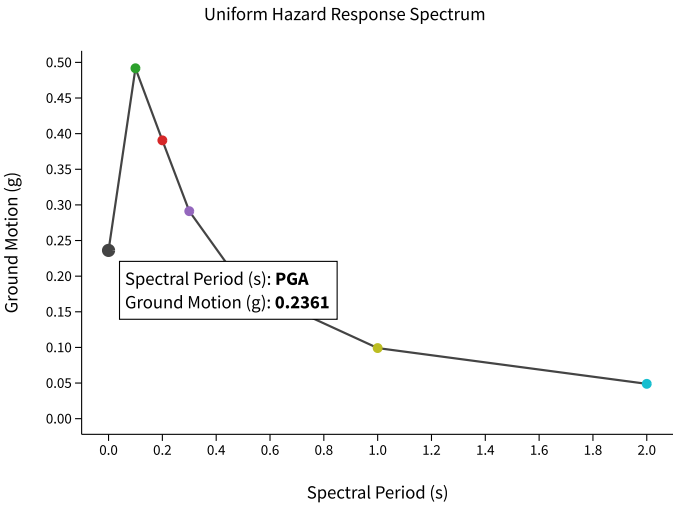
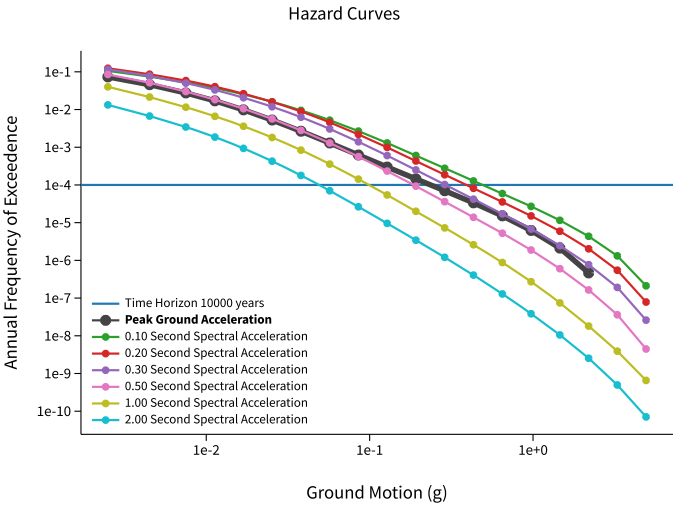
Unified Hazard Tool

 Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the [U.S. Seismic Design Maps web tools](#) (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

^ Input

Edition Dynamic: Conterminous U.S. 2014 (update) (v4.2.0)	Spectral Period Peak Ground Acceleration
Latitude Decimal degrees 43.368	Time Horizon Return period in years 10000
Longitude Decimal degrees, negative values for western longitudes -72.727	
Site Class 760 m/s (B/C boundary)	

^ Hazard Curve

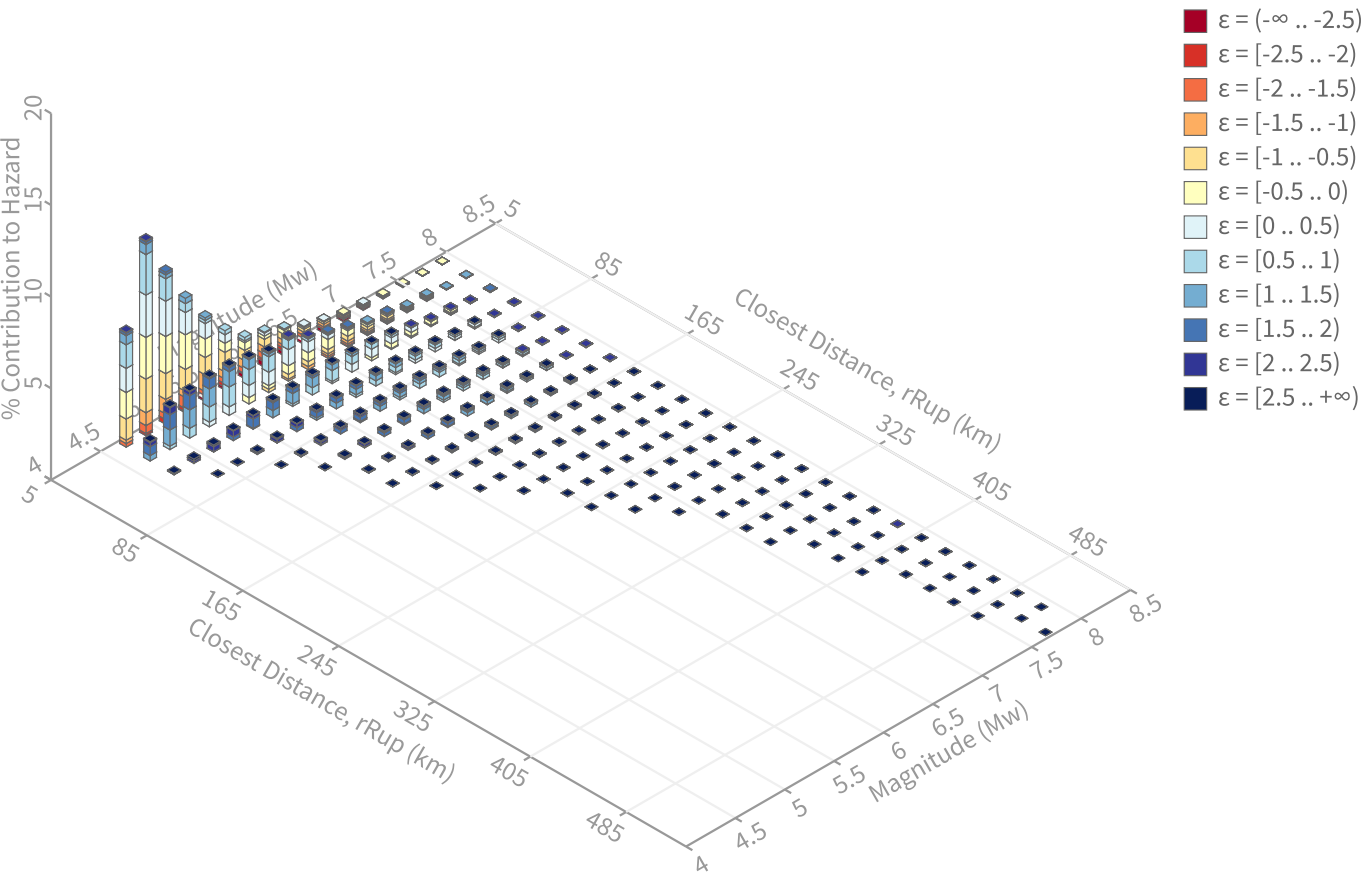


[View Raw Data](#)

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 10000 yrs
Exceedance rate: 0.0001 yr⁻¹
PGA ground motion: 0.23613153 g

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.86 %

Mode (largest m-r bin)

m: 4.9
r: 11.72 km
ε_m: -0.04 σ
Contribution: 10.62 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Recovered targets

Return period: 9997.0759 yrs
Exceedance rate: 0.00010002925 yr⁻¹

Mean (over all sources)

m: 5.76
r: 36.92 km
ε_m: 0.29 σ

Mode (largest m-r-ε_m bin)

m: 4.9
r: 12.23 km
ε_m: 0.24 σ
Contribution: 2.31 %

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set	Source	Type	r	m	ϵ_0	lon	lat	az	%
USGS Fixed Smoothing Zone 2 (opt)		Grid							32.84
	PointSourceFinite: -72.727, 43.435		8.86	5.21	-0.73	72.727°W	43.435°N	0.00	4.61
	PointSourceFinite: -72.727, 43.480		13.12	5.29	-0.24	72.727°W	43.480°N	0.00	4.55
	PointSourceFinite: -72.727, 43.525		17.60	5.41	0.12	72.727°W	43.525°N	0.00	4.50
	PointSourceFinite: -72.727, 43.615		26.58	5.67	0.53	72.727°W	43.615°N	0.00	2.52
	PointSourceFinite: -72.727, 43.390		5.57	5.16	-1.26	72.727°W	43.390°N	0.00	2.18
	PointSourceFinite: -72.727, 43.570		22.11	5.54	0.37	72.727°W	43.570°N	0.00	2.17
	PointSourceFinite: -72.727, 43.660		31.01	5.81	0.64	72.727°W	43.660°N	0.00	1.73
	PointSourceFinite: -72.727, 43.705		35.40	5.94	0.73	72.727°W	43.705°N	0.00	1.69
SSCn Fixed Smoothing Zone 4 (opt)		Grid							31.91
	PointSourceFinite: -72.727, 43.435		8.86	5.21	-0.73	72.727°W	43.435°N	0.00	4.61
	PointSourceFinite: -72.727, 43.480		13.12	5.29	-0.24	72.727°W	43.480°N	0.00	4.55
	PointSourceFinite: -72.727, 43.525		17.60	5.41	0.12	72.727°W	43.525°N	0.00	4.50
	PointSourceFinite: -72.727, 43.615		26.58	5.67	0.53	72.727°W	43.615°N	0.00	2.52
	PointSourceFinite: -72.727, 43.390		5.57	5.16	-1.26	72.727°W	43.390°N	0.00	2.18
	PointSourceFinite: -72.727, 43.570		22.11	5.54	0.37	72.727°W	43.570°N	0.00	2.17
	PointSourceFinite: -72.727, 43.660		31.01	5.81	0.64	72.727°W	43.660°N	0.00	1.73
	PointSourceFinite: -72.727, 43.705		35.40	5.94	0.73	72.727°W	43.705°N	0.00	1.69
USGS Adaptive Smoothing Zone 2 (opt)		Grid							17.18
	PointSourceFinite: -72.727, 43.435		8.86	5.21	-0.73	72.727°W	43.435°N	0.00	2.21
	PointSourceFinite: -72.727, 43.525		17.60	5.41	0.12	72.727°W	43.525°N	0.00	2.02
	PointSourceFinite: -72.727, 43.480		13.12	5.29	-0.24	72.727°W	43.480°N	0.00	2.00
	PointSourceFinite: -72.727, 43.615		26.58	5.67	0.53	72.727°W	43.615°N	0.00	1.12
	PointSourceFinite: -72.727, 43.570		22.11	5.54	0.37	72.727°W	43.570°N	0.00	1.04
SSCn Adaptive Smoothing Zone 4 (opt)		Grid							16.71
	PointSourceFinite: -72.727, 43.435		8.86	5.21	-0.73	72.727°W	43.435°N	0.00	2.21
	PointSourceFinite: -72.727, 43.525		17.60	5.41	0.12	72.727°W	43.525°N	0.00	2.02
	PointSourceFinite: -72.727, 43.480		13.12	5.29	-0.24	72.727°W	43.480°N	0.00	2.00
	PointSourceFinite: -72.727, 43.615		26.58	5.67	0.53	72.727°W	43.615°N	0.00	1.12
	PointSourceFinite: -72.727, 43.570		22.11	5.54	0.37	72.727°W	43.570°N	0.00	1.04

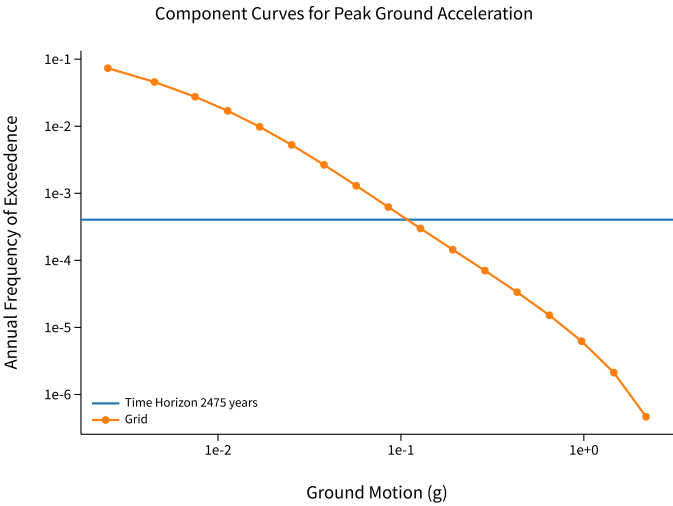
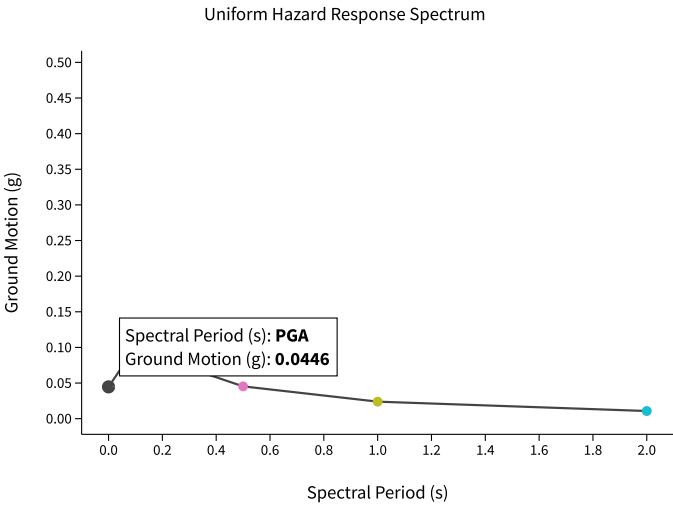
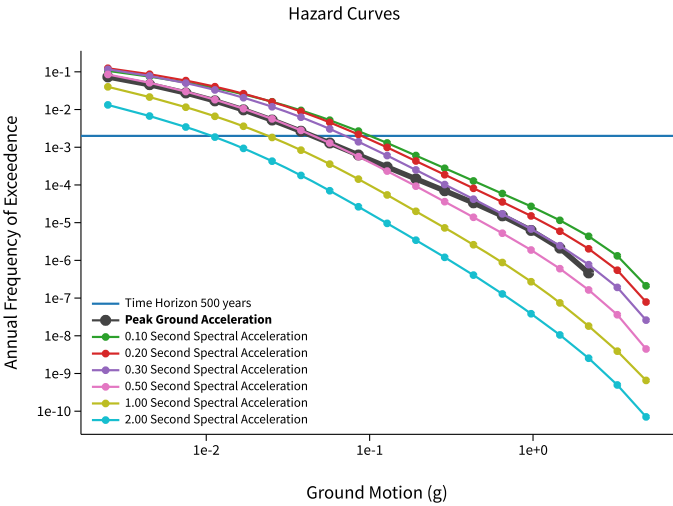
Unified Hazard Tool

 Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the [U.S. Seismic Design Maps web tools](#) (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

^ Input

Edition Dynamic: Conterminous U.S. 2014 (update) (v4.2.0)	Spectral Period Peak Ground Acceleration
Latitude Decimal degrees 43.368	Time Horizon Return period in years 500
Longitude Decimal degrees, negative values for western longitudes -72.727	
Site Class 760 m/s (B/C boundary)	

^ Hazard Curve

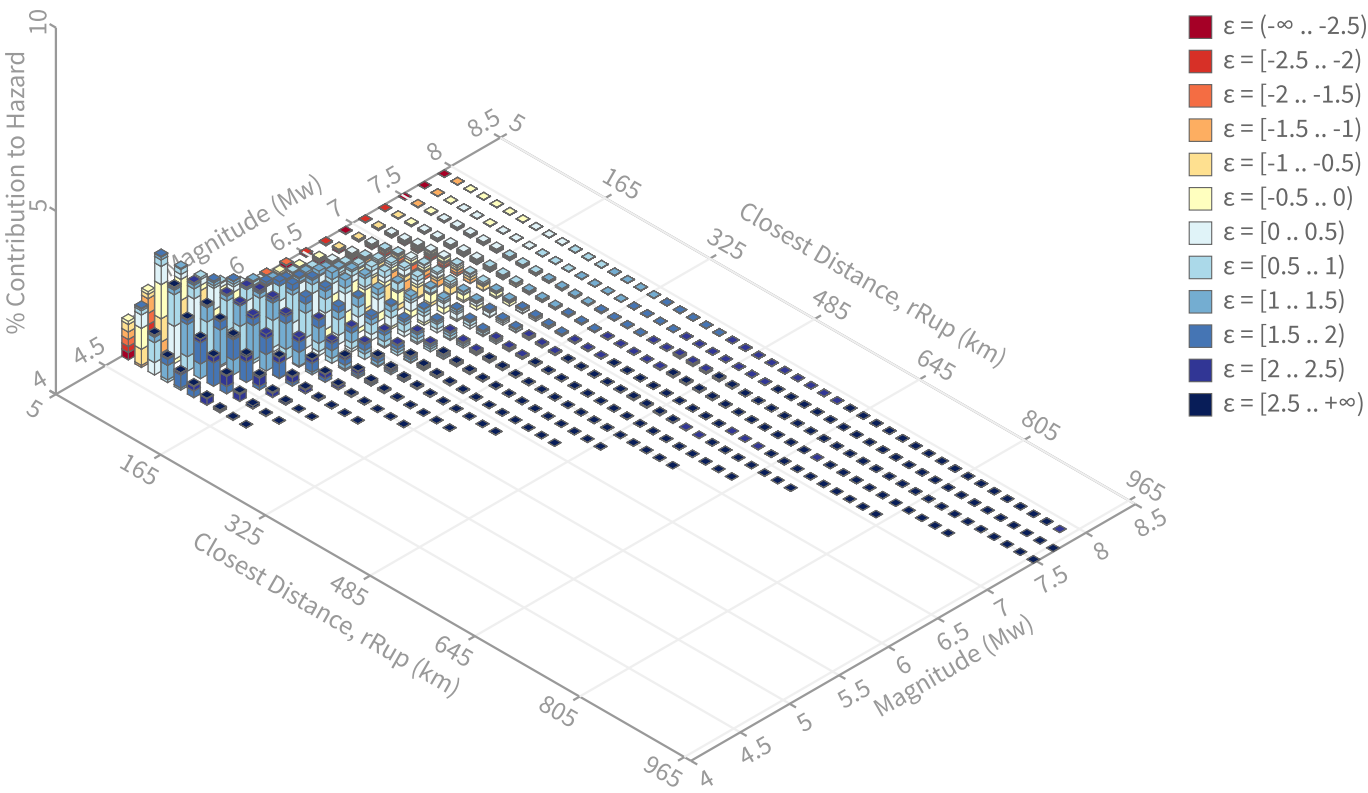


[View Raw Data](#)

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 500 yrs
Exceedance rate: 0.002 yr⁻¹
PGA ground motion: 0.044631616 g

Totals

Binned: 100 %
Residual: 0 %
Trace: 1.76 %

Mode (largest m-r bin)

m: 4.9
r: 31.16 km
ε_m: -0.32 σ
Contribution: 2.72 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Recovered targets

Return period: 498.381 yrs
Exceedance rate: 0.002006497 yr⁻¹

Mean (over all sources)

m: 5.76
r: 107.06 km
ε_m: 0.22 σ

Mode (largest m-r-ε_m bin)

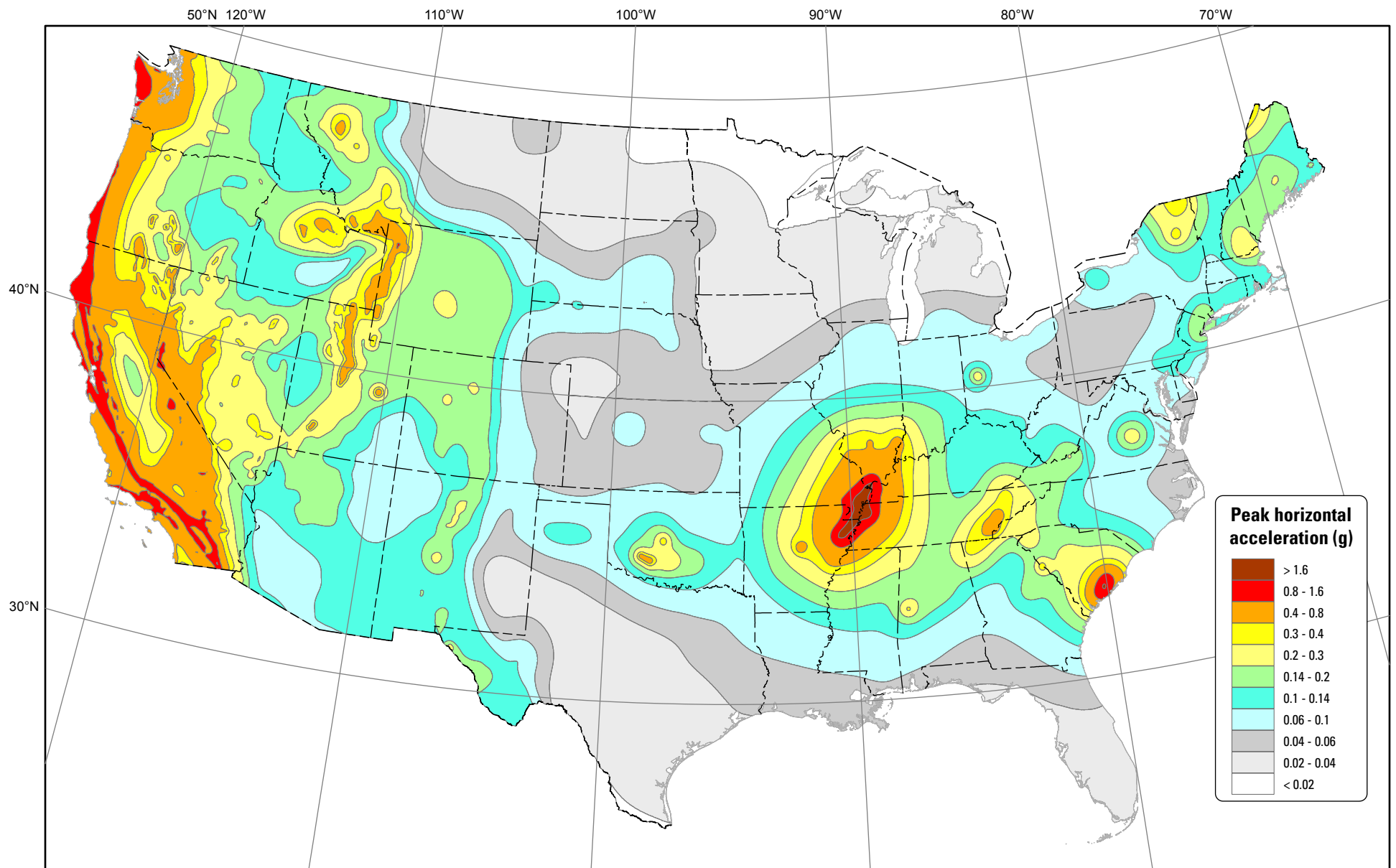
m: 5.09
r: 51.32 km
ε_m: 0.25 σ
Contribution: 1.04 %

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set	Source	Type	r	m	ϵ_0	lon	lat	az	%
USGS Fixed Smoothing Zone 2 (opt)		Grid							29.22
	PointSourceFinite: -72.727, 43.705		37.40	5.28	-0.48	72.727°W	43.705°N	0.00	1.19
	PointSourceFinite: -72.727, 43.840		52.03	5.41	-0.03	72.727°W	43.840°N	0.00	1.07
	PointSourceFinite: -72.727, 43.615		27.65	5.21	-0.94	72.727°W	43.615°N	0.00	1.02
SSCn Fixed Smoothing Zone 4 (opt)		Grid							27.07
	PointSourceFinite: -72.727, 43.705		37.40	5.28	-0.48	72.727°W	43.705°N	0.00	1.19
	PointSourceFinite: -72.727, 43.615		27.65	5.21	-0.94	72.727°W	43.615°N	0.00	1.02
USGS Adaptive Smoothing Zone 2 (opt)		Grid							20.21
SSCn Adaptive Smoothing Zone 4 (opt)		Grid							19.27
SSCn Fixed Smoothing Zone 7 (opt)		Grid							2.21
SSCn Adaptive Smoothing Zone 7 (opt)		Grid							1.03



2018 National Seismic Hazard Model for the conterminous United States

Peak horizontal acceleration
with a 2% probability of exceedance in 50 years
NEHRP site class B/C ($V_{s30} = 760$ m/s)

APPENDIX F

SPT N-VALUE CORRELATION

By: <u>QDW</u>	Date: <u>03/27/20</u>	Subject: <u>Characterization of Soil Strength</u>	Sheet No.: <u> </u> of <u>16</u>
Chkd By: <u>ZSG</u>	Date: <u>05/04/20</u>	<u>Jewell Brook Watershed Site No. 2</u>	Proj. No.: <u>172719-17</u>

N:\2017\172719-17 - Jewell Pond Watershed Plan\Jewell Site 2\[SPT N-Value Correlation.xlsx]SPT Calc

Characterization of Soil Strength Using SPT Correlation
Jewell Brook Watershed Site No. 2
Natural Resources Conservation Service
Ludlow, Windsor County, Vermont

Purpose

The purpose of this calculation is to estimate the effective shear strength (i.e. friction angle ϕ' and cohesion c') of soils within the embankment, foundation, and auxiliary spillway at Jewell Brook Watershed Site No. 2 in Ludlow, Windsor County, Vermont. The calculation uses three methods to correlate standard penetration tests (SPTs) blow counts to friction angle values. The calculation is based on SPT results from thirteen borings that were drilled by DDK.

References

1. Das, B. 2011. *Principles of Foundation Engineering*. Stamford, CT: Cengage Learning.
2. *Manual on Estimating Soil Properties for Foundation Design*. Cornell University, Ithaca, New York.
3. Tan, C.K., Et al. *Geotechnical Engineering: Engineering Manual for Shallow Foundations*. Virginia Tech, Blacksburg, Virginia.
With information from: US Department of Navy (1982), *NAVFAC DM- 7.1-- Soil Mechanics*, Naval Facilities Engineering Command, VA, 348 pp. and Meyerhof G.G. (1956), *Penetration Tests and Bearing Capacity of Cohesionless Soils*, Proc., Journal of Soil Mechanics and Foundation Engineering, ASCE, Vol. 82, No. SM1, pp 1-11.

Correlation Between SPT Number and Friction Angle

Three methods were used to correlate the SPT number and friction angle and are outlined below.

Variables:

- N = measured penetration number
- N_{60} = standard penetration number corrected for field conditions
- $(N_1)_{60}$ = standardized value of N_{60}
- C_N = correction factor
- η_H = hammer efficiency (%)
- η_B = correction for borehole diameter
- η_S = sampler correction
- η_R = correction for rod length
- ϕ' = friction angle
- σ'_{vo} = effective overburden pressure to the center of each layer (psf)
- p_a = atmospheric pressure (2000 psf)

$$N_{60} = \frac{N \eta_H \eta_B \eta_S \eta_R}{60}$$

$$C_N = \sqrt{\frac{1}{\frac{\sigma'_{vo}}{p_a}}}$$

$$(N_1)_{60} = C_N N_{60}$$

$$\phi'_1 = 27.1 + 0.3(N_1)_{60} - 0.00054[(N_1)_{60}]^2$$

Peck, Hanson, and Thornburn (1974)

$$\phi'_2 = \tan^{-1} \left[\frac{N_{60}}{12.2 + 20.3 \left(\frac{\sigma'_{vo}}{p_a} \right)} \right]^{0.24}$$

Schmertmann (1975)

$$\phi'_3 = \sqrt{20(N_1)_{60}} + 20$$

Hatanaka and Uchida (1996)

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

Sheet No.: of 16
 Proj. No.: 172719-17

N:\2017\172719-17 - Jewell Pond Watershed Plan\Jewell Site 2\SPT N-Value Correlation.xlsx\SPT Calc

JB2-19-1

Soil Properties

$\gamma =$ 125 pcf = 0.0625 tons/cf
 $\gamma_{sat} =$ 130 pcf = 0.0650 tons/cf
 $\gamma_{H2O} =$ 62.4 pcf = 0.0312 tons/cf
 $\gamma' =$ 67.6 pcf = 0.0338 tons/cf

Water Table Depth = Dry

Correction Factors (Reference 1)

$\eta_H =$ 60
 $\eta_B =$ 1
 $\eta_S =$ 1
 $\eta_R =$ Varies (see below)

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
0.0	2.0	1.00	9	0.06	4.00	0.75	6.75	27.00	34.8	38.3	43.2
2.0	4.0	3.00	29	0.19	2.31	0.75	21.75	50.23	40.8	48.0	51.7
4.0	6.0	5.00	41	0.31	1.79	0.75	30.75	55.01	42.0	49.9	53.2
6.0	8.0	7.00	51	0.44	1.51	0.75	38.25	57.83	42.6	50.8	54.0
Average =								47.5	40.1	46.7	50.5

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

Sheet No.: of 16
 Proj. No.: 172719-17

N:\2017\172719-17 - Jewell Pond Watershed Plan\Jewell Site 2\SPT N-Value Correlation.xlsx\SPT Calc

JB2-19-1A

Soil Properties

$\gamma =$ 125 pcf = 0.0625 tons/cf
 $\gamma_{sat} =$ 130 pcf = 0.0650 tons/cf
 $\gamma_{H2O} =$ 62.4 pcf = 0.0312 tons/cf
 $\gamma' =$ 67.6 pcf = 0.0338 tons/cf

Water Table Depth = Dry

Correction Factors (Reference 1)

$\eta_H =$ 60
 $\eta_B =$ 1
 $\eta_S =$ 1
 $\eta_R =$ Varies (see below)

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
10.0	12.0	11.00	61	0.69	1.21	0.75	45.75	55.18	42.0	50.4	53.2
12.0	14.0	13.00	28	0.81	1.11	0.75	21.00	23.30	33.8	42.0	41.6
14.0	16.0	15.00	24	0.94	1.03	0.85	20.40	21.07	33.2	40.9	40.5
16.0	18.0	17.00	43	1.06	0.97	0.85	36.55	35.46	37.1	45.8	46.6
18.0	20.0	19.00	61	1.19	0.92	0.85	51.85	47.58	40.2	48.5	50.8
20.0	22.0	21.00	41	1.31	0.87	0.95	38.95	34.00	36.7	45.0	46.1
22.0	24.0	23.00	40	1.44	0.83	0.95	38.00	31.69	36.1	44.2	45.2
24.0	26.0	25.00	40	1.56	0.80	0.95	38.00	30.40	35.7	43.6	44.7
26.0	28.0	27.00	61	1.69	0.77	0.95	57.95	44.61	39.4	47.2	49.9
28.0	30.0	29.00	39	1.81	0.74	0.95	37.05	27.52	34.9	42.3	43.5
30.0	32.0	31.00	69	1.94	0.72	0.95	65.55	47.09	40.0	47.3	50.7
32.0	34.0	33.00	77	2.06	0.70	1.00	77.00	53.62	41.6	48.4	52.7
38.0	40.0	39.00	91	2.44	0.64	1.00	91.00	58.29	42.8	48.8	54.1
42.0	44.0	43.00	143	2.69	0.61	1.00	143.00	87.23	49.2	52.3	61.8
44.0	46.0	45.00	143	2.81	0.60	1.00	143.00	85.27	48.8	52.0	61.3
Average =								45.5	39.4	46.6	49.5

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

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 Proj. No.: 172719-17

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JB2-19-2

Soil Properties

$\gamma =$ 125 pcf = 0.0625 tons/cf
 $\gamma_{\text{sat}} =$ 130 pcf = 0.0650 tons/cf
 $\gamma_{\text{H2O}} =$ 62.4 pcf = 0.0312 tons/cf
 $\gamma' =$ 67.6 pcf = 0.0338 tons/cf

Water Table Depth = Dry

Correction Factors (Reference 1)

$\eta_H =$ 60
 $\eta_B =$ 1
 $\eta_S =$ 1
 $\eta_R =$ Varies (see below)

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
0.0	2.0	1.00	13	0.06	4.00	0.75	9.75	39.00	38.0	41.9	47.9
2.0	4.0	3.00	19	0.19	2.31	0.75	14.25	32.91	36.4	43.9	45.7
4.0	6.0	5.00	46	0.31	1.79	0.75	34.50	61.72	43.6	51.0	55.1
6.0	8.0	7.00	37	0.44	1.51	0.75	27.75	41.95	38.7	47.7	49.0
8.0	10.0	9.00	28	0.56	1.33	0.75	21.00	28.00	35.1	43.9	43.7
10.0	12.0	11.00	37	0.69	1.21	0.75	27.75	33.47	36.5	45.6	45.9
12.0	14.0	13.00	28	0.81	1.11	0.75	21.00	23.30	33.8	42.0	41.6
14.0	16.0	15.00	28	0.94	1.03	0.85	23.80	24.58	34.1	42.4	42.2
16.0	18.0	17.00	45	1.06	0.97	0.85	38.25	37.11	37.5	46.2	47.2
18.0	20.0	19.00	27	1.19	0.92	0.85	22.95	21.06	33.2	40.6	40.5
20.0	22.0	21.00	42	1.31	0.87	0.95	39.90	34.83	36.9	45.3	46.4
22.0	24.0	23.00	37	1.44	0.83	0.95	35.15	29.32	35.4	43.4	44.2
24.0	26.0	25.00	51	1.56	0.80	0.95	48.45	38.76	37.9	46.0	47.8
26.0	28.0	27.00	102	1.69	0.77	0.95	96.90	74.59	46.5	52.1	58.6
28.0	30.0	29.00	24	1.81	0.74	0.95	22.80	16.94	32.0	37.6	38.4
30.0	32.0	31.00	70	1.94	0.72	0.95	66.50	47.78	40.2	47.5	50.9
32.0	34.0	33.00	47	2.06	0.70	1.00	47.00	32.73	36.3	43.6	45.6
34.0	36.0	35.00	51	2.19	0.68	1.00	51.00	34.48	36.8	44.0	46.3
44.0	46.0	45.00	45	2.81	0.60	1.00	45.00	26.83	34.8	40.8	43.2
46.0	48.0	47.00	69	2.94	0.58	1.00	69.00	40.26	38.3	44.6	48.4
48.0	49.7	48.85	48	3.05	0.57	1.00	48.00	27.47	34.9	40.8	43.4
50.0	52.0	51.00	74	3.19	0.56	1.00	74.00	41.45	38.6	44.6	48.8
52.0	54.0	53.00	57	3.31	0.55	1.00	57.00	31.32	36.0	41.8	45.0
54.0	56.0	55.00	49	3.44	0.54	1.00	49.00	26.43	34.7	40.0	43.0
56.0	58.0	57.00	60	3.56	0.53	1.00	60.00	31.79	36.1	41.7	45.2
58.0	59.8	58.90	85	3.68	0.52	1.00	85.00	44.30	39.3	44.8	49.8

Average = 35.5 37.0 44.0 46.3

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

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 Proj. No.: 172719-17

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JB2-19-3

Soil Properties

$\gamma =$ 125 pcf = 0.0625 tons/cf
 $\gamma_{sat} =$ 130 pcf = 0.0650 tons/cf
 $\gamma_{H2O} =$ 62.4 pcf = 0.0312 tons/cf
 $\gamma' =$ 67.6 pcf = 0.0338 tons/cf

Water Table Depth = Dry

Correction Factors (Reference 1)

$\eta_H =$ 60
 $\eta_B =$ 1
 $\eta_S =$ 1
 $\eta_R =$ Varies (see below)

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
0.0	2.0	1.00	11	0.06	4.00	0.75	8.25	33.00	36.4	40.2	45.7
2.0	4.0	3.00	24	0.19	2.31	0.75	18.00	41.57	38.6	46.1	48.8
4.0	6.0	5.00	20	0.31	1.79	0.75	15.00	26.83	34.8	42.9	43.2
6.0	8.0	7.00	57	0.44	1.51	0.75	42.75	64.63	44.2	51.8	56.0
8.0	10.0	9.00	20	0.56	1.33	0.75	15.00	20.00	32.9	40.6	40.0
10.0	12.0	11.00	8	0.69	1.21	0.75	6.00	7.24	29.2	31.2	32.0
12.0	14.0	13.00	7	0.81	1.11	0.75	5.25	5.82	28.8	29.3	30.8
14.0	16.0	15.00	8	0.94	1.03	0.85	6.80	7.02	29.2	30.8	31.9
16.0	18.0	17.00	11	1.06	0.97	0.85	9.35	9.07	29.8	32.9	33.5
18.0	20.0	19.00	6	1.19	0.92	0.85	5.10	4.68	28.5	27.2	29.7
20.0	22.0	21.00	7	1.31	0.87	0.95	6.65	5.80	28.8	28.8	30.8
22.0	24.0	23.00	7	1.44	0.83	0.95	6.65	5.55	28.7	28.2	30.5
24.0	26.0	25.00	11	1.56	0.80	0.95	10.45	8.36	29.6	31.5	32.9
26.0	28.0	27.00	14	1.69	0.77	0.95	13.30	10.24	30.1	33.2	34.3
28.0	30.0	29.00	7	1.81	0.74	0.95	6.65	4.94	28.6	26.9	29.9
30.0	32.0	31.00	16	1.94	0.72	0.95	15.20	10.92	30.3	33.4	34.8
32.0	34.0	33.00	6	2.06	0.70	1.00	6.00	4.18	28.3	25.3	29.1
34.0	36.0	35.00	3	2.19	0.68	1.00	3.00	2.03	27.7	20.2	26.4
36.0	38.0	37.00	7	2.31	0.66	1.00	7.00	4.60	28.5	25.8	29.6
38.0	40.0	39.00	14	2.44	0.64	1.00	14.00	8.97	29.7	31.1	33.4
44.0	46.0	45.00	23	2.81	0.60	1.00	23.00	13.71	31.1	34.5	36.6
46.0	48.0	47.00	36	2.94	0.58	1.00	36.00	21.00	33.2	38.3	40.5
Average =								14.6	31.2	33.2	35.5

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

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 Proj. No.: 172719-17

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JB2-19-4

Soil Properties

$\gamma =$ 125 pcf = 0.0625 tons/cf
 $\gamma_{sat} =$ 130 pcf = 0.0650 tons/cf
 $\gamma_{H2O} =$ 62.4 pcf = 0.0312 tons/cf
 $\gamma' =$ 67.6 pcf = 0.0338 tons/cf

Water Table Depth = Dry

Correction Factors (Reference 1)

$\eta_H =$ 60
 $\eta_B =$ 1
 $\eta_S =$ 1
 $\eta_R =$ Varies (see below)

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
0.0	2.0	1.00	11	0.06	4.00	0.75	8.25	33.00	36.4	40.2	45.7
2.0	4.0	3.00	35	0.19	2.31	0.75	26.25	60.62	43.3	49.8	54.8
4.0	6.0	5.00	25	0.31	1.79	0.75	18.75	33.54	36.6	45.1	45.9
6.0	8.0	7.00	42	0.44	1.51	0.75	31.50	47.62	40.2	48.9	50.9
10.0	12.0	11.00	40	0.69	1.21	0.75	30.00	36.18	37.2	46.3	46.9
12.0	14.0	13.00	44	0.81	1.11	0.75	33.00	36.61	37.4	46.4	47.1
14.0	16.0	15.00	37	0.94	1.03	0.85	31.45	32.48	36.3	45.1	45.5
16.0	18.0	17.00	41	1.06	0.97	0.85	34.85	33.81	36.6	45.3	46.0
18.0	20.0	19.00	18	1.19	0.92	0.85	15.30	14.04	31.2	36.7	36.8
20.0	22.0	21.00	41	1.31	0.87	0.95	38.95	34.00	36.7	45.0	46.1
22.0	24.0	23.00	58	1.44	0.83	0.95	55.10	45.96	39.7	47.8	50.3
24.0	26.0	25.00	46	1.56	0.80	0.95	43.70	34.96	36.9	45.0	46.4
26.0	28.0	27.00	124	1.69	0.77	0.95	117.80	90.68	49.9	53.9	62.6
28.0	30.0	29.00	27	1.81	0.74	0.95	25.65	19.05	32.6	38.7	39.5
30.0	32.0	31.00	71	1.94	0.72	0.95	67.45	48.46	40.4	47.6	51.1
32.0	34.0	33.00	89	2.06	0.70	1.00	89.00	61.97	43.6	49.8	55.2
34.0	36.0	35.00	52	2.19	0.68	1.00	52.00	35.16	37.0	44.2	46.5
38.0	40.0	39.00	47	2.44	0.64	1.00	47.00	30.10	35.6	42.4	44.5
40.0	42.0	41.00	48	2.56	0.62	1.00	48.00	29.99	35.6	42.2	44.5
42.0	44.0	43.00	65	2.69	0.61	1.00	65.00	39.65	38.1	44.7	48.2
44.0	46.0	45.00	45	2.81	0.60	1.00	45.00	26.83	34.8	40.8	43.2
46.0	48.0	47.00	51	2.94	0.58	1.00	51.00	29.76	35.5	41.7	44.4
48.0	50.0	49.00	109	3.06	0.57	1.00	109.00	62.29	43.7	48.7	55.3
50.0	52.0	51.00	42	3.19	0.56	1.00	42.00	23.52	33.9	39.1	41.7
52.0	54.0	53.00	135	3.31	0.55	1.00	135.00	74.17	46.4	50.1	58.5
55.0	57.0	56.00	182	3.50	0.53	1.00	182.00	97.28	51.2	52.5	64.1

Average = 42.8 38.7 45.3 48.5

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

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JB2-19-5

Soil Properties

$\gamma =$ 125 pcf = 0.0625 tons/cf
 $\gamma_{sat} =$ 130 pcf = 0.0650 tons/cf
 $\gamma_{H2O} =$ 62.4 pcf = 0.0312 tons/cf
 $\gamma' =$ 67.6 pcf = 0.0338 tons/cf

Water Table Depth = Dry

Correction Factors (Reference 1)

$\eta_H =$ 60
 $\eta_B =$ 1
 $\eta_S =$ 1
 $\eta_R =$ Varies (see below)

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
0.0	2.0	1.00	34	0.06	4.00	0.75	25.50	102.00	52.1	51.2	65.2
2.0	4.0	3.00	18	0.19	2.31	0.75	13.50	31.18	35.9	43.3	45.0
4.0	6.0	5.00	16	0.31	1.79	0.75	12.00	21.47	33.3	40.8	40.7
6.0	8.0	7.00	23	0.44	1.51	0.75	17.25	26.08	34.6	43.0	42.8
8.0	10.0	9.00	34	0.56	1.33	0.75	25.50	34.00	36.7	45.7	46.1
10.0	12.0	11.00	30	0.69	1.21	0.75	22.50	27.14	34.8	43.5	43.3
12.0	14.0	13.00	44	0.81	1.11	0.75	33.00	36.61	37.4	46.4	47.1
14.0	16.0	15.00	27	0.94	1.03	0.85	22.95	23.70	33.9	42.0	41.8
16.0	18.0	17.00	39	1.06	0.97	0.85	33.15	32.16	36.2	44.8	45.4
18.0	20.0	19.00	31	1.19	0.92	0.85	26.35	24.18	34.0	41.9	42.0
20.0	22.0	21.00	46	1.31	0.87	0.95	43.70	38.14	37.8	46.1	47.6
22.0	23.8	22.90	49	1.43	0.84	0.95	46.55	38.91	38.0	46.2	47.9
Average =								36.3	37.0	44.6	46.2

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

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JB2-19-5A

Soil Properties

$\gamma =$ 125 pcf = 0.0625 tons/cf
 $\gamma_{sat} =$ 130 pcf = 0.0650 tons/cf
 $\gamma_{H2O} =$ 62.4 pcf = 0.0312 tons/cf
 $\gamma' =$ 67.6 pcf = 0.0338 tons/cf

Water Table Depth = Dry

Correction Factors (Reference 1)

$\eta_H =$ 60
 $\eta_B =$ 1
 $\eta_S =$ 1
 $\eta_R =$ Varies (see below)

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
24.0	25.8	24.90	51	1.56	0.80	0.95	48.45	38.84	37.9	46.0	47.9
Average =								38.8	37.9	46.0	47.9

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

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JB2-19-201

Soil Properties

$\gamma =$ 125 pcf = 0.0625 tons/cf
 $\gamma_{sat} =$ 130 pcf = 0.0650 tons/cf
 $\gamma_{H2O} =$ 62.4 pcf = 0.0312 tons/cf
 $\gamma' =$ 67.6 pcf = 0.0338 tons/cf

Water Table Depth = 16.1 ft

Correction Factors (Reference 1)

$\eta_H =$ 60
 $\eta_B =$ 1
 $\eta_S =$ 1
 $\eta_R =$ Varies (see below)

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
0.0	2.0	1.00	11	0.06	4.00	0.75	8.25	33.00	36.4	40.2	45.7
2.0	4.0	3.00	38	0.19	2.31	0.75	28.50	65.82	44.5	50.6	56.3
4.0	6.0	5.00	56	0.31	1.79	0.75	42.00	75.13	46.6	52.9	58.8
6.0	8.0	7.00	99	0.44	1.51	0.75	74.25	112.26	54.0	56.9	67.4
8.0	10.0	9.00	21	0.56	1.33	0.75	15.75	21.00	33.2	41.1	40.5
10.0	12.0	11.00	15	0.69	1.21	0.75	11.25	13.57	31.1	36.9	36.5
12.0	14.0	13.00	12	0.81	1.11	0.75	9.00	9.98	30.0	34.0	34.1
14.0	16.0	15.00	25	0.94	1.03	0.85	21.25	21.95	33.4	41.3	41.0
16.0	18.0	17.00	29	1.04	0.98	0.85	24.65	24.21	34.0	42.1	42.0
18.0	20.0	19.00	19	1.10	0.95	0.85	16.15	15.37	31.6	37.7	37.5
Average =								39.2	37.5	43.4	46.0

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

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JB2-19-202

Soil Properties

$\gamma =$ 125 pcf = 0.0625 tons/cf
 $\gamma_{sat} =$ 130 pcf = 0.0650 tons/cf
 $\gamma_{H2O} =$ 62.4 pcf = 0.0312 tons/cf
 $\gamma' =$ 67.6 pcf = 0.0338 tons/cf

Water Table Depth = 9.2 ft

Correction Factors (Reference 1)

$\eta_H =$ 60
 $\eta_B =$ 1
 $\eta_S =$ 1
 $\eta_R =$ Varies (see below)

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
0.0	2.0	1.00	11	0.06	4.00	0.75	8.25	33.00	36.4	40.2	45.7
2.0	4.0	3.00	5	0.19	2.31	0.75	3.75	8.66	29.7	31.4	33.2
4.0	5.9	4.95	69	0.31	1.80	0.75	51.75	93.04	50.3	54.8	63.1
10.0	11.6	10.80	98	0.63	1.26	0.75	73.50	92.67	50.3	55.3	63.1
Average =								56.8	41.7	45.4	51.3

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

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JB2-19-202A

Soil Properties

$\gamma =$ 125 pcf = 0.0625 tons/cf
 $\gamma_{sat} =$ 130 pcf = 0.0650 tons/cf
 $\gamma_{H2O} =$ 62.4 pcf = 0.0312 tons/cf
 $\gamma' =$ 67.6 pcf = 0.0338 tons/cf

Water Table Depth = 9.2 ft

Correction Factors (Reference 1)

$\eta_H =$ 60
 $\eta_B =$ 1
 $\eta_S =$ 1
 $\eta_R =$ Varies (see below)

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
14.0	16.0	15.00	67	0.77	1.14	0.85	56.95	64.86	44.3	51.9	56.0
16.0	18.0	17.00	89	0.84	1.09	0.85	75.65	82.61	48.2	54.1	60.6
18.0	20.0	19.00	101	0.91	1.05	0.85	85.85	90.18	49.8	54.8	62.5
Average =								79.2	47.4	53.6	59.7

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

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 Proj. No.: 172719-17

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JB2-19-203

Soil Properties

$\gamma = 125 \text{ pcf} = 0.0625 \text{ tons/cf}$
 $\gamma_{\text{sat}} = 130 \text{ pcf} = 0.0650 \text{ tons/cf}$
 $\gamma_{\text{H2O}} = 62.4 \text{ pcf} = 0.0312 \text{ tons/cf}$
 $\gamma' = 67.6 \text{ pcf} = 0.0338 \text{ tons/cf}$

Water Table Depth = 7.8 ft

Correction Factors (Reference 1)

$\eta_H = 60$
 $\eta_B = 1$
 $\eta_S = 1$
 $\eta_R = \text{Varies (see below)}$

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
0.0	2.0	1.00	13	0.06	4.00	0.75	9.75	39.00	38.0	41.9	47.9
2.0	4.0	3.00	46	0.19	2.31	0.75	34.50	79.67	47.6	52.4	59.9
4.0	6.0	5.00	118	0.31	1.79	0.75	88.50	158.31	61.1	59.6	76.3
10.0	11.6	10.80	128	0.59	1.30	0.75	96.00	125.10	56.2	58.0	70.0
Average =								100.5	50.7	52.9	63.5

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

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JB2-19-203A

Soil Properties

$\gamma =$ 125 pcf = 0.0625 tons/cf
 $\gamma_{sat} =$ 130 pcf = 0.0650 tons/cf
 $\gamma_{H2O} =$ 62.4 pcf = 0.0312 tons/cf
 $\gamma' =$ 67.6 pcf = 0.0338 tons/cf
 Water Table Depth = 7.8 ft

Correction Factors (Reference 1)

$\eta_H =$ 60
 $\eta_B =$ 1
 $\eta_S =$ 1
 $\eta_R =$ Varies (see below)

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
14.0	16.0	15.00	67	0.73	1.17	0.85	56.95	66.62	44.7	52.2	56.5
Average =								66.6	44.7	52.2	56.5

DDK Engineering - JV

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

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JB2-19-204

Soil Properties

$\gamma =$ 125 pcf = 0.0625 tons/cf
 $\gamma_{sat} =$ 130 pcf = 0.0650 tons/cf
 $\gamma_{H2O} =$ 62.4 pcf = 0.0312 tons/cf
 $\gamma' =$ 67.6 pcf = 0.0338 tons/cf

Water Table Depth = 0.9 ft

Correction Factors (Reference 1)

$\eta_H =$ 60
 $\eta_B =$ 1
 $\eta_S =$ 1
 $\eta_R =$ Varies (see below)

Depth (feet)			N	σ'_{vo}/p_a (tsf)	C_N	η_R	N_{60}	$(N_1)_{60}$	Friction Angle ($^\circ$)		
Start	End	Center							ϕ'_1	ϕ'_2	ϕ'_3
0.0	2.0	1.00	13	0.06	4.10	0.75	9.75	39.93	38.2	41.9	48.3
2.0	4.0	3.00	29	0.13	2.80	0.75	21.75	60.98	43.4	48.8	54.9
6.0	8.0	7.00	110	0.26	1.95	0.75	82.50	161.04	61.4	59.4	76.8
10.0	12.0	11.00	135	0.40	1.59	0.75	101.25	160.57	61.3	59.9	76.7
16.0	18.0	17.00	132	0.60	1.29	0.85	112.20	144.80	59.2	59.2	73.8
18.0	19.8	18.90	147	0.66	1.23	0.85	124.95	153.26	60.4	59.7	75.4
20.0	22.0	21.00	139	0.74	1.17	0.95	132.05	153.96	60.5	59.7	75.5
28.0	30.0	29.00	90	1.01	1.00	0.95	85.50	85.24	48.7	54.2	61.3
30.0	32.0	31.00	88	1.07	0.97	0.95	83.60	80.68	47.8	53.6	60.2
Average =								115.6	53.4	55.2	67.0

By: QDW Date: 03/27/20 Subject: Characterization of Soil Strength
 Chkd By: ZSG Date: 05/04/20 Jewell Brook Watershed Site No. 2

Sheet No.: of 16
 Proj. No.: 172719-17

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Summary of Results

Calculation of Friction Angle - Correlation to Standard Penetration Tests (SPTs)							
				Estimated Friction Angle From SPTs ⁽²⁾			
Boring No.	G.S. Elevation ⁽¹⁾	Depth Range (ft)	Average (N ₁) ₆₀	ϕ' ₁	ϕ' ₂	ϕ' ₃	Average
JB2-19-1	1573.8	0.0-8.0	47.5	40.1	46.7	50.5	45.8
JB2-19-1A	1573.8	10.0-46.0	45.5	39.4	46.6	49.5	45.2
JB2-19-2	1573.8	0.0-59.8	35.5	37.0	44.0	46.3	42.4
JB2-19-3	1573.2	0.0-48.0	14.6	31.2	33.2	35.5	33.3
JB2-19-4	1573.6	0.0-57.0	42.8	38.7	45.3	48.5	44.2
JB2-19-5	1530.1	0.0-23.8	36.3	37.0	44.6	46.2	42.6
JB2-19-5A	1530.2	24.0-25.8	38.8	37.9	46.0	47.9	43.9
JB2-19-201	1557.9	0.0-20.0	39.2	37.5	43.4	46.0	42.3
JB2-19-202	1560.5	0.0-11.6	56.8	41.7	45.4	51.3	46.1
JB2-19-202A	1560.4	14.0-20.0	79.2	47.4	53.6	59.7	53.6
JB2-19-203	1564.7	0.0-11.6	100.5	50.7	52.9	63.5	55.7
JB2-19-203A	1565.1	14.0-16.0	66.6	44.7	52.2	56.5	51.1
JB2-19-204	1565.9	0.0-32.0	115.6	53.4	55.2	67.0	58.5

Notes:

⁽¹⁾ Represents the approx. elev. at the time the boring was advanced.

⁽²⁾ Friction angles estimated using 3 different methods:

- ϕ'₁ Peck, Hanson, and Thornburn (1974)
- ϕ'₂ Schmertmann (1975)
- ϕ'₃ Hatanaka and Uchida (1996)

Max	67.0
Min	31.2
Average	46.5
Std. Dev.	7.9

APPENDIX G

SITES MATERIAL INPUT PARAMETERS CALCULATION

DDK Engineering - JV

By: ZSG Date: 4/24/2020 Subject: Jewell Brook Watershed Site No. 2 Sheet No.: 1 of 7
Chkd. By: QDW Date: 6/2/2020 SITES Material Properties Proj. No.: 172719-17
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SITES Material Input Parameters
Supplemental Watershed Plan and Environmental Document
Jewell Brook Watershed Site No. 2
Ludlow, Windsor County, Vermont

INTRODUCTION

The purpose of this calculation is to estimate the material input parameters to be used in the SITES analyses for the Jewell Brook Watershed Site No. 2 (Jewell Brook #2) located in Ludlow, Windsor County, Vermont. The material parameters are estimated based on empirical data, subsurface exploration data, and results of laboratory tests performed on soil samples retrieved during the subsurface exploration performed by DDK Engineering - JV (DDK) in November 2019.

Borings JB2-19-201 through JB2-19-204 and offset borings JB2-19-202A and JB3-19-203A were performed in the auxiliary spillway at Jewell Brook #2. Borings were advanced to collect in-situ samples of spillway material for laboratory testing and classification. Borings JB2-19-1 through JB2-19-5 will not be considered in this calculation since they are outside of the auxiliary spillway area. Due to the topsoil layer being very thin or nonexistent, no estimation of material parameters for topsoil was performed.

REFERENCES

- 1) Carter, Michael and Bentley, Stephen P., "Correlations of Soil Properties", John Wiley & Sons, Ltd., 2016
- 2) Das, Braja M., "Principles of Geotechnical Engineering (8th Ed.)", Cengage, 2010.
- 3) NRCS National Engineering Handbook Part 628, Chapter 52 "Field Procedures Guide for the Headcut Erodibility Index", (2001).
- 4) "SITES 2005 Water Resource Site Analysis Computer Program: User Guide", NRCS, October 2007.
- 5) "SPT Average N-Value Correlation", D'Appolonia, March 2020.

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SITES Input Parameters

Unit Weights of Soils

The unit weight of existing auxiliary spillway soils at Jewell Brook #2 were estimated using laboratory testing of disturbed (SpT) samples, as well as assumed void ratios for each soil type (Ref. 1 & 2). The approximated dry unit weight is used for all layers.

		Approximated		
Layer	USCS Class.	Avg. $G_s^{(1)}$	Void Ratio $(e)^{(2)}$	Dry Unit Weight (lb./cu. Ft.)
1	SM	2.69	0.4	119.7
2	ML	2.69	0.4	119.7
3	SM	2.63	0.4	117.2
4	SM/ML	2.68	0.5	111.5

⁽¹⁾ From Laboratory Index Testing Data

⁽²⁾ Based on values presented in Reference No. 2, Table 3.2

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Plasticity Index

The plasticity index of each soil type was estimated using average values from laboratory index testing data.

Layer	Boring	Sample ID	Atterberg Limits		
			USCS Symbol ⁽¹⁾	LL (%)	PI (%)
1	JB2-19-201	SpT-1/2	Non-Plastic		
		SpT-3/4	Non-Plastic		
	JB2-19-202	SpT-1	Non-Plastic		
	JB2-19-203	SpT-1/2	Non-Plastic		
	JB2-19-204	SpT-1/2	Non-Plastic		
2	JB2-19-202	SpT-5/6	Non-Plastic		
	JB2-19-202A	SpT-1/2/3	Non-Plastic		
	JB2-19-203	SpT-4/5	Non-Plastic		
		SpT-6/7	Non-Plastic		
	JB2-19-203A	SpT-1/2	Non-Plastic		
	JB2-19-204	SpT-4/5	Non-Plastic		
		SpT-6/7	Non-Plastic		
		SpT-9/10	Non-Plastic		
		SpT-13/14	Non-Plastic		
3	JB2-19-204	SpT-15/16	Non-Plastic		
		SpT-18/19	Non-Plastic		
		SpT-23/24	Non-Plastic		
4	JB2-19-201	SpT-5/6	Non-Plastic		
		SpT-9/10	Non-Plastic		

Layer	Avg. PI (%)
1	N.P.
2	N.P.
3	N.P.
4	N.P.

⁽¹⁾ This denotes the USCS symbol for the fines portion of each sample.

Clay Content (%)

The clay content of each soil type was determined using the average sieve and hydrometer results of each soil type from the laboratory index testing data.

Layer	Boring	Sample No.	USCS Class.	Clay Content (%)
1	201	SpT-1/2	SM	2.83
	203	SpT-1/2	SM	4.15
	204	SpT-1/2	SM	7.43
2	202A	SpT-1/2/3	ML	11.94
	204	SpT-6/7	SM	14.69
		SpT-9/10	SM	11.21
4	201	SpT-5/6	SM	1.33

Layer	Avg. Clay Content (%)
1	4.80
2	12.61
3 ⁽¹⁾	4.80
4	1.33

⁽¹⁾ Since no samples in Layer 3 underwent hydrometer testing, it was assumed that the clay content for Layer 3 was equivalent to that of Layer 1.

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Headcut Erodibility Index

The headcut erodibility index was estimated using the procedures and typical values described in NRCS Part 628, Chapter 52 of the National Engineering Handbook. For factors which use soil characteristics (IDM, UCS, LL), this calculation uses the average value for each layer (Ref. 3). Due to the high blow count values, Layers 2 and 3 are to be taken as rock for calculation of the Material Strength Number as per note 4 of Table 52-2.

The equation given for the headcut erodibility index is:

$$K_h = M_s \times K_b \times K_d \times J_s \quad [52-1]$$

where:

M_s = material strength number of the earth material

K_b = block or particle size number

K_d = discontinuity or interparticle bond shear strength number

J_s = relative ground structure number

For cohesionless soil:

$$M_s = 1.7(\text{IDM})^{0.832} \quad (\text{MPa})$$

$$K_b = 1 \quad \text{Using cohesionless soil with } D < 0.1 \text{ m}$$

$$K_d = \tan(\Phi'_r) \quad \text{where:}$$

$$\Phi'_r = 169.58(\text{LL})^{-0.4925} \quad \text{For soils with clay content } < 20\%$$

$$J_s = 1 \quad \text{Intact soil}$$

Table 52-2 Material strength number, M_s , for cohesionless soil ^{1/}

Relative density	Field identification tests	SPT ^{2/} $\frac{2 \frac{1}{2} \text{ in}}{0.3 \text{ m}}$ $\frac{4 \frac{1}{2} \text{ in}}{1 \text{ m}}$	In situ deformation modulus (IDM) (MPa) ^{3/}	M_s ^{3/}
Very loose	Particles loosely packed. High percentage of voids. Very easily dislodged by hand. Matrix crumbles easily when scraped with point of geologic pick. Raveling often occurs on excavated faces.	< 5	< 0.005	< 0.02
Loose	Particles loosely packed. Some resistance to being dislodged by hand. Large number of voids. Matrix shows low resistance to penetration by point of geologic pick.	5 - 10	0.005 - 0.01	0.02 - 0.05
Medium dense	Particles closely packed. Difficult to dislodge individual particles by hand. Voids less apparent. Matrix has considerable resistance to penetration by point of geologic pick.	10 - 30	0.01 - 0.03	0.05 - 0.10
Dense	Particles very closely packed and occasionally very weakly cemented. Cannot dislodge individual particles by hand. The mass has very high resistance to penetration by point of geologic pick. Requires many blows of geologic pick to dislodge particles.	30 - 50	0.03 - 0.08	0.10 - 0.20
Very dense	Particles very densely packed and usually cemented together. Mass has high resistance to repeated blows of geologic pick. Requires power tools for excavation.	> 50	0.08 - 0.2	0.20 - 0.45

^{1/} Cohesionless soil is a material with a plasticity index (PI) less than or equal to 10. Use table 52-3 for cohesive soils.

^{2/} Standard Penetration Test, SPT (ASTM D 1586) used for most sandy-type cohesionless soils. In situ deformation modulus (IDM) (ASTM D 1194) used for most gravel-type soils and coarse detritus.

^{3/} M_s of a cohesionless soil is approximately determined from results of IDM testing by the following relationship:

$$M_s = 1.7 (\text{IDM})^{0.832} \quad \text{for IDM in MPa}$$

^{4/} Cohesionless soils in which blow counts are greater than 50 or IDM is greater than 200 kPa to be taken as rock, for which the hardness may be obtained from table 52-4.

^{5/} Correlation between SPT and IDM should be used as a guide only as results may vary in different geologic areas. Lab strength tests are recommended on soil materials to support SPT or field assessment tests.

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For cohesive soil:

$$M_s = 0.78(UCS)^{1.09} \quad (\text{MPa}) \quad \text{For UCS } (<= 10)$$

$$M_s = UCS \quad (\text{MPa}) \quad \text{For UCS } (>10)$$

$$K_b = 1 \quad \text{Massed cohesive soil}$$

$$K_d = \tan(\Phi'_r) \quad \text{where:}$$

$$\Phi'_r = 169.58(LL)^{-0.4925} \quad \text{For soils with clay content } <20\%$$

$$J_s = 1 \quad \text{Intact soil}$$

Table 52-3 Material strength number, M_s , for cohesive soil

Consistency	Field identification tests	SPT (blows/0.3 m)	Unconfined compressive strength (UCS) (kPa)	M_s
Very soft	Exudes between fingers when squeezed in hand.	< 2	< 40	< 0.02
Soft	Easily molded with fingers. Point of geologic pick easily pushed into shaft of handle.	2 - 4	40 - 80	0.02 - 0.05
Firm	Penetrated several centimeters by thumb with moderate pressure. Molded by fingers with some pressure.	4 - 8	80 - 150	0.05 - 0.10
Stiff	Indented by thumb with great effort. Point of geologic pick can be pushed in up to 1 centimeter. Very difficult to mold with fingers. Just penetrated with hand spade.	8 - 15	150 - 300	0.10 - 0.20
Very stiff	Indented only by thumbnail. Slight indentation by pushing point of geologic pick. Requires hand pick for excavation.	15 - 30	300 - 625	0.20 - 0.45

- Notes:**
1. Cohesive soil is material with a plasticity index (PI) greater than 10. Use table 52-2 for cohesionless soils.
 2. 1 kPa equals 1 kN/m².
 3. Vane shear strength (ASTM D 2573, field; ASTM D 4648, lab) also may be used for unconfined compressive strength (ASTM D 2166).
 4. Cohesive soils in which blow counts are greater than 30 or strengths greater than 625 kPa are to be taken as rock, for which the hardness can be obtained from table 52-4.
 5. Cohesive soils must be evaluated for hardness in the saturated condition.
 6. M_s of a cohesive soil also can be determined as the product of unconfined compressive strength (in MPa) times its coefficient of relative density. For most cohesive soils, M_s is approximately determined by:

$$M_s = 0.78(UCS)^{1.09} \text{ for } UCS \leq 10 \text{ MPa, and } M_s = UCS \text{ for } UCS > 10 \text{ MPa.}$$
 7. Correlation between SPT and UCS should only be used as a guide, as results may vary in geologic areas. Lab strength tests are recommended on soil materials to support SPT or field assessment tests. Vane shear strength values also are applicable in the lower strength ranges.

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For Rock:

$$M_s = 0.78(UCS)^{1.09} \quad (\text{MPa}) \quad \text{For UCS } (\leq 10)$$

$$M_s = UCS \quad (\text{MPa}) \quad \text{For UCS } (> 10)$$

Table 52-4 Material strength number, M_s , for rock

Rock material hardness ^{1/}	Uniaxial compressive strength (MPa) ^{2/}	Field identification tests	M_s ^{3/}
Very soft rock or Hard, soil-like material	0.6 - 1.25	Scratched with fingernail. Slight indentation produced by light blow of point of geologic pick. Requires power tools for excavation. Peels with pocket knife.	0.45 - 1.0
Soft rock	1.25 - 5.0	Hand-held specimen crumbles under firm blows with point of geologic pick.	1.0 - 4.5
Moderately soft rock	5.0 - 12.5	Shallow indentations (1 to 3 mm) produced by light blows with point of geologic pick. Peels with pocket knife with difficulty.	4.5 - 12.5
Moderately hard rock	12.5 - 50.0	Cannot be scraped or peeled with pocket knife. Intact hand-held specimen breaks with single blow of geologic hammer. Can be distinctly scratched with 20d common steel nail.	12.5 - 50
Hard rock	50.0 - 100.0	Intact hand-held specimen requires more than one hammer blow to break it. Can be faintly scratched with 20d common steel nail.	50 - 100
Very hard rock	100.0 - 250.0	Intact specimen breaks only by repeated, heavy blows with geologic hammer. Cannot be scratched with 20d common steel nail.	100 - 250
Extremely hard rock	> 250.0	Intact specimen can only be chipped, not broken, by repeated, heavy blows of geologic hammer.	> 250

^{1/} Hardness categories are based solely on hardness characteristics, not geologic origin. For example, a highly weathered shale may classify as firm cohesive soil, and a partially lithified recent soil may classify as moderately soft rock. The transition, however, generally occurs within the 0.60 to 1.25 MPa range.

^{2/} 1.0 MPa approximately equals 145 pounds per square inch, or 10.4 tons per square foot.

^{3/} M_s is equal to the product of uniaxial compressive strength, UCS (ASTM D 2938), and coefficient of relative density. For most rock or rock-like materials, M_s is approximately determined by:

$$M_s = 0.78 (UCS)^{1.09} \text{ for } UCS \leq 10 \text{ MPa, and } M_s = UCS \text{ for } UCS > 10 \text{ MPa.}$$

52-6

(210-VI-NEH, August 1997)

Layer	M_s	K_b	K_d ⁽¹⁾	J_s	Headcut Erodibility Index
1	0.068	1	0.675	1	0.046
2	0.450	1	0.625	1	0.281
3	0.450	1	0.675	1	0.304
4	0.066	1	0.625	1	0.041

⁽¹⁾ K_d was calculated using friction angle values from Table 6.4 of Ref. 1.

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Representative Diameter

The representative diameter was taken as the average diameter in which 75% of soil particles are equal to or smaller in diameter (D_{75}) for each soil layer. (Ref. 4)

Layer	Average D_{75} (in.)
1	0.061
2	0.022
3	0.026
4	0.038

**SITES Material Input Parameters
Jewell Brook Watershed Site No. 2
Natural Resources Conservation Service
Ludlow, Windsor County, Vermont**

Project No. 172719-17

Layer	Avg. USCS	Dry Density (lb/cu.ft.)	Plasticity Index	Clay Content (%)	Head Cut Index	Representative Diameter (in.)
1	SM	119.7	N.P.	4.80	0.046	0.061
2	ML	119.7	N.P.	12.61	0.281	0.022
3	SM	117.2	N.P.	4.80	0.304	0.026
4	SM/ML	111.5	N.P.	1.33	0.041	0.038

Sample Information															
Layer	Boring	Sample ID	Blows				N-Value	Avg. N-Value ⁽¹⁾	Avg. IDM (Mpa)	Avg. UCS (Mpa)	PI	Boring Avg. Φ'_r ⁽²⁾ (deg)	Use Φ'_r ⁽³⁾ (deg)	D75 (in)	Avg. D75 (in)
			1	2	3	4									
1	201	SpT-1	2	4	7	12	11	20.75	0.02075	N/A	0	50.8	34.0	0.0335	0.061
		SpT-2	8	17	21	23	38				0			0.1654	
		SpT-3	32	35	21	30	56								
		SpT-4	36	55	44	33	99								
	202	Spt-1	2	4	7	3	11				0	36.1		0.0512	
		Spt-2	2	3	2	2	5				-			0.0709	
	203	SpT-1	1	5	8	15	13				0	47.9		0.0291	
		SpT-2	16	21	25	35	46								
	204	SpT-1	2	6	7	10	13				0	45.9		0.0157	
		SpT-2	11	14	15	21	29								
2	202	Spt-3	1	16	53	50/0.4	69	N/A	N/A	N/A	-	46.1	32.0	-	0.022
		Spt-4	48	39	50/0.2		-				-			-	
		Spt-5	16	50/0.4			-				0			0.0220	
		Spt-6	17	36	62	50/0.1	98				-			-	
		Spt-7	50/0.2				-								
	202A	SpT-1	19	28	39	42	67				0	53.6		0.0433	
		SpT-2	39	44	43	54	87								
		SpT-3	21	48	53	51	101								
	203	SpT-3	21	57	61	68	118				-	65.6		-	
		SpT-4	56	50/0.1			-				0			0.0154	
		SpT-5	29	50/0.2			-					63.5		0.0228	
		SpT-6	44	61	67	50/.01	128				0				
		SpT-7	62	68	50/0.1		-								
	203A	SpT-1	19	35	32	31	67				0	51.1		0.0071	
		SpT-2	22	46	50/0.2		-				-			-	
		SpT-3	50/0.2				-								
	204	SpT-3	45	50/0.3			-				-	63.5		-	
		SpT-4	36	49	61	68	110				0			0.0177	
		SpT-5	44	50/0.3			-								
		SpT-6	32	69	66	61	135				0			0.0114	
		SpT-7	57	70/0.4			-				-			-	
		SpT-8	37	63	69	72	132								
		SpT-9	41	65	82	80/0.3	147				0			0.0472	
		SpT-10	39	61	78	84	139				-			-	
		SpT-11	60/0.3				-				-			-	
		SpT-12	43	84	70/0.3		-								
		SpT-13	46	90/0.4			-								
		SpT-14	30	39	51	63	90				0			0.0130	

Sample Information																
Layer	Boring	Sample ID	Blows				N-Value	Avg. N-Value ⁽¹⁾	Avg. IDM (Mpa)	Avg. UCS (Mpa)	PI	Boring Avg. Φ'_r ⁽²⁾ (deg)	Use Φ'_r ⁽³⁾ (deg)	D75 (in)	Avg. D75 (in)	
			1	2	3	4										
3	204	SpT-15	29	32	56	81	88	N/A	N/A	N/A	0	53.9	34.0	0.0087	0.026	
		SpT-16	47	59	80/0.4		-				-			-		
		SpT-17	48	80/0.3			-				-			-		
		SpT-18	62	60/0.1			-				-			-		
		SpT-19	72	80/0.2			-				-			-		
		SpT-20	80/0.4				-				-			-		
		SpT-21	36	60/0.1			-				-			-		
		SpT-22	80/0.3				-				-			-		
		SpT-23	54	80/0.3			-				0			-		
		SpT-24	84	90/0.4			-							0.0311		
4	201	SpT-5	7	10	11	10	21	20.16667	0.020167	N/A	0	36.5	32.0	0.0087	0.038	
		SpT-6	6	8	7	6	15				-			-		-
		SpT-7	4	5	7	6	12				-			-		-
		SpT-8	3	10	15	11	25				0			0.0669		
		SpT-9	14	12	17	18	29									
		SpT-10	23	7	12	15	19									

⁽¹⁾ N values over 50 taken as refusal and not used in calculation of average N-value.

⁽²⁾ Φ'_r calculated using SpT N-Value Correlation from Reference 5.

⁽³⁾ Assumed value for Φ'_r from table 6.3, 6.4, and 6.5 of Reference 1.

Report of Detailed Geologic Investigation – Rev. 1

Supplemental Watershed Plan and Environmental Document Jewell Brook Watershed Site No. 3

Ludlow, Windsor County, Vermont

National Inventory of Dams ID: VT00016 (Main Dam)

National Inventory of Dams ID: VT00262 (Saddle Dike)

May 24, 2021



Jewell Brook Watershed Site No. 3

Submitted to:



**United States
Department of
Agriculture**

Natural Resources Conservation Service

USDA is an equal opportunity provider, employer, and lender.

Vermont State Office
365 Mountain Drive
Colchester, Vermont 05446

Submitted by:



28 North Main Street
Randolph, VT 05060

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1.0 INTRODUCTION

DDK Engineering – JV (DDK) completed a subsurface investigation and developed geotechnical recommendations for Site No. 3 of the Jewell Brook Watershed (Jewell Brook No. 3) as part of the Supplemental Watershed Plan and Environmental Document. The Jewell Brook Watershed is located in Ludlow, Windsor County, Vermont and includes four independent high hazard earthen flood control dams, denoted as Jewell Brook No. 1, No. 2, No. 3, and No. 5 (there is no No. 4). Refer to Figure 1 for the location of Jewell Brook No. 3, as well as the locations of Jewell Brook No. 1, No. 2, and No. 5 for reference. The subsurface investigation at Jewell Brook No. 3 consisted of advancing four (4) borings within the dam embankment and foundation and six (6) in the auxiliary spillway. Refer to Figure 2 for boring locations. Borings were not advanced in other ancillary areas, such as borrow areas, as part of this subsurface investigation.

DDK is under contract with the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) as the Architect-Engineer (A-E) to prepare a combined Supplemental Watershed Plan and Environmental Document for the Jewell Brook Watershed. The NRCS authorized DDK to perform the services described herein via Order No. 12FPC219F0156 dated September 23, 2019. DDK performed the services in general accordance with the Statement of Work Exhibit #2 – Geologic and Geotechnical Investigation Statement of Work provided by NRCS dated July 10, 2019 and our Revised Price Proposal dated September 12, 2019. This Report of Detailed Geologic Investigation for Jewell Brook No. 3 is the instrument of service for the Geologic and Geotechnical Investigation completed as part of Phase 1 – Identify Problems and Determine Objectives of the Supplemental Watershed Plan and Environmental Document. This report is only for Jewell Brook No. 3. Similar reports for Jewell Brook No. 1, No. 2, and No.5 have been prepared under a separate cover for each.

Jewell Brook No. 3 is located on a Parker Brook, a tributary of Jewell Brook, approximately 0.6 miles west-southwest of the Town of Ludlow, Vermont. The latitude and longitude in decimal degrees to the center of the project site are 43.3919 and -72.7122, respectively. Jewell Brook No. 3 consists of a main dam embankment (National Inventory of Dams ID VT00016 and Vermont Dam ID 117.04) and a saddle dike embankment (National Inventory of Dams ID VT00262 and Vermont Dam ID 117.12). The main dam and saddle dike embankments are divided by a natural topographic knob that the two embankments abut to. The Jewell Brook No. 3 main dam is a zoned earthen embankment with an approximate height of 64 feet, length of 675 feet, and embankment crest at El. 1251.2. The upstream slope of the main dam embankment ranges from 2.7 horizontal to 1 vertical (2.7H:1V) to 2.8H:1V, and the downstream slope of the main embankment ranges from 2.3H:1V to 2.5H:1V. The Jewell Brook No. 3 saddle dike is a zoned earthen embankment with an approximate height of 15 feet, length of 340 feet, and embankment crest at El. 1250.6, which is slightly lower than the main dam embankment crest at El. 1251.2. The low area of the saddle dike crest which is at El. 1250.6 approximately from Station 12+50 to Station 12+90 of the dam alignment stationing. The upstream and downstream slopes of the saddle dike embankment are approximately 3H:1V and 2H:1V, respectively. The normal pool and auxiliary spillway are located at El. 1229.7 and 1242.8, respectively. All elevations are based on a topographic survey completed by DDK in 2019 in the North American Vertical Datum of 1988 (NAVD88). The principal spillway consists of a

two stage cast-in-place concrete intake riser, 275-foot long and 30-inch diameter reinforced concrete pipe which discharges into Parker Brook. The two stage principal spillway concrete intake riser has a 1'-0" by 1'-5" orifice at El. 1229.7, which controls the normal pool, and the riser crest is at El. 1239.4. The auxiliary spillway is a 200-foot wide (bottom width), vegetated, trapezoidal earthen channel with approximate 3H:1V side slopes and is located on the left abutment of the main dam embankment. Jewell Brook No. 3 is currently classified as a Class 1 (High Hazard Class) dam; therefore, the structure falls within the Group A structure site classification as described in Chapter 2 of Part 631 of the National Engineering Handbook.

The subsurface investigation was completed to explore and verify embankment and foundation conditions for the dam embankment and to characterize subsurface conditions within the auxiliary spillway to support evaluations of their stability and integrity. This report summarizes DDK's subsurface investigation and laboratory testing program, describes observed subsurface conditions, provides DDK's evaluation of site conditions as they pertain to the project, and provides recommendations concerning geotechnical aspects based on the findings of the subsurface investigation. This report also includes recommended parameters for use in the NRCS SITES analyses, evaluations of site seismic hazards and liquefaction potential, and discussion of the feasibility of using previously identified borrow areas as future sources of borrow material.

1.1 General

DDK performed subsurface investigation activities at Jewell Brook No. 3 between October 21, 2019 and October 31, 2019. Ten borings were completed as part of this investigation. Borings JB3-19-1, JB3-19-2, and JB3-19-3 were completed to verify subsurface conditions related to the main dam embankment and foundation, and to support evaluation of the seepage conditions and stability of the existing main dam. Boring JB3-19-4 was completed to verify subsurface conditions related to the saddle dike embankment and foundation soils, and to support evaluation of the seepage conditions and stability of the saddle dike. Borings JB3-19-201, JB3-19-202, JB3-19-203, JB3-19-203A, JB3-19-204, and JB3-19-204A were completed to verify subsurface conditions related to the auxiliary spillway and to support evaluation of the existing auxiliary spillway stability and erodibility. The subsurface exploration plan, included as Figure 2, presents the locations of the borings completed by DDK as well as the approximate locations of previously completed borings and test pits indicated on the NRCS As-Built drawings for Jewell Brook No. 3 dam. Offset borings are denoted with an "A" after the boring number and are not shown on Figure 2 for clarity.

The purpose of the borings is to characterize the soil, rock, and groundwater conditions at their locations, obtain samples for geotechnical laboratory testing, and support the development of geotechnical design parameters for the performance of analyses. The borings were surveyed in the Vermont State Plane North American Datum of 1983 (NAD83) and the North American Vertical Datum of 1988 (NAVD88), and the surveyed coordinates and elevations of the borings are summarized in Table 1.

DDK subcontracted drilling services required to complete the borings to New England Boring Contractors (NEBC) out of Derry, New Hampshire. A DDK representative approved by the NRCS with knowledge of conducting geological investigations was on-site full-time during subsurface investigation activities. NEBC completed the borings using a Mobile B53 track-mounted ATV drill rig. The borings were advanced through soil using either 4.25" inside diameter (ID), 8" outside diameter (OD), hollow stem augers, or using the drive and wash method with 4" ID, 4.5" OD, flush joint casing and a side discharging roller bit. The drive and wash method was only used when auger refusal was encountered at a depth shallower than the target drill depth. The drive and wash method was used in borings JB3-19-203A and JB3-19-204A, which are located in the Auxiliary Spillway. Water was used to assist with the removal of cuttings at these locations and was considered suitable due to their position within the auxiliary spillway and outside the dam embankment.

Disturbed soil samples were collected using a 2" OD split-barrel sampler and the standard penetration test (SPT) method with an automatic hammer drop system in accordance with ASTM D1586. Disturbed soil samples were used for field classification, estimation of soil density or consistency, and for laboratory testing. Rock was sampled continuously in Borings JB3-19-3 and JB3-19-204A using a NX size rock core barrel and water to remove the cuttings.

All borings were backfilled with a cement/bentonite grout mix using the tremie method. The boreholes were backfilled with grout to within 12 inches of the ground surface, and natural soil material was placed above the grout to the approximate ground surface to facilitate revegetation. Tremie pipe was installed to the final depth in boreholes located in the auxiliary spillway upon completion, and boreholes within the auxiliary spillway were left open a minimum of 24 hours and until the static water level had stabilized. A water level measurement was taken in the auxiliary spillway borings after the 24 hours (minimum). Embankment boreholes were backfilled upon completion. The approximate volume of grout used to backfill each boring is recorded on the boring logs, which are included in Appendix A. Boring locations and other areas disturbed during the subsurface investigation were raked and ruts were smoothed out as practical by DDK and NEBC.

A DDK field representative classified all soil and rock samples that were encountered based on split-barrel samples, visual observations of the cuttings during drilling, and rock core samples. DDK's field representative documented observed subsurface conditions and the results of drilling activities on the boring logs in Appendix A. Rock core photographs are included in Appendix B.

DDK subcontracted geotechnical laboratory testing on soil and rock samples collected in the borings to Geotechnics, Inc. of East Pittsburgh, Pennsylvania. The complete laboratory test results are included as Appendix C. The laboratory index test results are summarized in Table 2. Partial laboratory test results for soil samples are also shown on the boring logs in Appendix A. The geotechnical laboratory testing program consisted of:

- ▶ Moisture Content (ASTM D2216),
- ▶ Sieve Analysis (ASTM D6913),

- ▶ Hydrometer Analysis (ASTM D7928),
- ▶ Atterberg Limits (ASTM D4318),
- ▶ Unified Soil Classification System (ASTM D2487),
- ▶ Specific Gravity (ASTM D854), and
- ▶ Unconfined Compressive Strength of Rock (ASTM D7012).

DDK intended on completing Crumb Test (ASTM D6572) to estimate potential dispersive characteristics of clayey soils, but based on the hydrometer and Atterberg limits test results, ASTM D6572 was not applicable to the subject soils.

1.2 Geology and Physiography

Jewell Brook No. 3 is located near the boundary of the Green Mountain and New England Upland, also known as the Vermont Piedmont, physiographic subdivisions of the New England physiographic province. The Green Mountain physiographic subdivision is characterized by steep, rugged mountains with average summit elevations of 2,000 feet. The New England Upland physiographic subdivision, the largest physiographic region in the state, is described as a plateau dissected by streams and subdued by glaciation and is characterized by rolling hills and valleys with isolated mountains known as monadnocks that are generally comprised of granitic rocks. Bedrock throughout these physiographic subdivisions is generally comprised of metamorphic and sedimentary rocks. More specifically, bedrock beneath Jewell Brook No. 3 is classified as metasedimentary rock.

The majority of bedrock beneath the site is comprised of the chlorite-muscovite phyllite and schist member of the Tyson Formation, which is Lower Cambrian to Neoproterozoic in age. The chlorite-muscovite phyllite and schist member of the Tyson Formation is described as pale greenish-gray to yellowish-greenish-gray, chlorite-muscovite-quartz phyllite and schist containing beds of pebbly metawacke and magnetite phyllite. The eastern portion of the site is underlain by the feldspathic quartzite member of the Plymouth Formation, which is Cambrian in age. The feldspathic quartzite member of the Plymouth Formation is described as thinly laminated but massive-appearing, gray and brownish gray to tan-weathering flaggy biotite-muscovite feldspathic quartzite and phyllic quartzite. The Tyson and Plymouth Formations are separated by a thrust fault that is generally oriented north-south.

Surficial deposits at Jewell Brook No. 3 are comprised of glacial till and glaciofluvial deposits. The glaciofluvial deposits are mapped on the eastern half of the site and are described as kame terrace deposits. The glacial till, located on the western half of the site, generally reflects the topography of the underlying bedrock surface and thins when moving away from the center of the valley as described on the Surficial Geology Map of Vermont by Stewart and MacClintock (1970). Site-specific surficial and bedrock geologic maps derived from available published geology maps are presented on Figures 3 and 4. Available published geologic maps are included in Appendix D.

The USDA NRCS Web Soil Survey indicates that surficial soils at Jewell Brook No. 3, excluding human transported material, generally consist of Marlow fine sandy loam; Peru, Skerry, and Colonel soils;

Tunbridge-Lyman complex soils; Monadnock and Berkshire soils; and Adams loamy sand. Marlow fine sandy loam is present beneath the center to southwestern portion of the Jewell Brook No. 3 embankment and in the valley to the east of the embankment. Marlow fine sandy loam is found on the slopes of hills and mountains on glaciated uplands and has a parent material of loamy lodgment till derived from granite, mica schist, and/or phyllite. Peru, Skerry, and Colonel soils are located south of the Jewell Brook No. 3 reservoir and are generally found on the slopes and at the bases of hills and mountains. Peru, Skerry, and Colonel soils have the same parent material as Marlow fine sandy loam. Tunbridge-Lyman complex soils are found to the south of the site and near the Jewell Brook No. 3 saddle dam. Tunbridge-Lyman complex soils are generally present on the slopes of hills and mountains on glaciated uplands, and the parent material consists of loamy supraglacial till derived from granite, gneiss, phyllite, and/or mica schist. Monadnock and Berkshire soils, located on the southeast corner of the site, are found on hills and mountains on glaciated uplands and have a parent material of loamy supraglacial meltout till overlying sandy and gravelly supraglacial meltout till which are derived from phyllite, granite, gneiss, and/or mica schist. Adams loamy sand, present in the northeast portion of the site, is found on outwash terraces and has a parent material of sandy glaciofluvial deposits. The Web Soil Survey Map, Map Unit Description, and Engineering Properties Table are included as Appendix E.

2.0 SUBSURFACE GEOLOGY

The following section presents a summary of subsurface conditions based on the borings completed as part of this subsurface investigation. The subsurface conditions encountered in the borings are described in the boring logs included as Appendix A and generalized in geotechnical profiles and cross sections presented on Figures 5, 6, and 7. Profiles and cross sections also include information from drill holes completed during previous subsurface investigations performed by others. A summary of the subsurface conditions within previously identified borrow areas based on existing geology reports and NRCS As-Built drawings is also included in this section. Refer to the boring logs in Appendix A for ground water levels recorded in the borings during drilling. Large variations in recorded ground water level on the boring logs are likely attributed to drilling methods used to complete each boring. The ground water levels recorded in borings completed using the drive and wash method or borings where rock was cored introduced water or drilling mud to the borehole which likely influenced the recorded ground water levels.

2.1 Embankment and Foundation

DDK completed Borings JB3-19-1, JB3-19-2, JB3-19-3, and JB3-19-4 to characterize subsurface conditions in the dam and dike embankments and foundation soils. JB3-19-1 and JB3-19-2 were advanced through the main embankment crest, JB3-19-3 was advanced at the downstream toe of the embankment, and JB3-19-4 was advanced through the crest of the saddle dike. In total, seventy-seven (77) disturbed SPT samples were collected in the borings. The locations of these borings are shown on Figure 2. The boring logs for JB3-19-1, JB3-19-2, JB3-19-3, and JB3-19-4 are presented in Appendix A.

At Borings JB3-19-1 and JB3-19-2 0.3 to 0.5 feet of topsoil was encountered underlain by embankment fill. The embankment fill ranged in thickness from approximately 31 feet to 36 feet depending on the borings location with respect to the native valley before the dam was constructed. The embankment fill is generalized as Silty Sand (SM) with varying amounts of gravel, isolated cobbles, compact to dense, light brown to brown to grayish brown, and dry to moist. The embankment fill is underlain by Glacial Till deposits. The Glacial Till deposits immediately below the embankment fill consist of Silty Sand (SM), compact to very dense, light brown, and dry to moist. At Boring JB3-19-1 below the Silty Sand Glacial Till deposits, Sandy Silt (ML) deposits. The Sandy Silt material is described as non-plastic, very loose to compact, light brown and olive brown, and wet. Boring JB3-19-1 was terminated within this layer. In Boring JB3-19-2 below the Silty Sand Glacial Till deposits an approximate 3 feet thick layer of Silty Gravel deposits were encountered before reaching bedrock at a depth of 59 feet. The bedrock encountered in Boring JB3-19-2 consists of Schist with Quartz inclusions, gray and dark gray, unweathered, slightly broken to unbroken, and hard. Boring JB3-19-2 was terminated within the Schist bedrock layer.

Boring JB3-19-3 was completed at the downstream toe of the main embankment and encountered 0.3 feet of topsoil underlain by approximately 4 feet of Silty Sand (SM) with gravel. Limited samples were collected in the Silty Sand layer due to the layer being relatively thin and poor sample recovery within the

layer. Bedrock was presumed to be encountered in Boring JB3-19-3 at a depth of 4.5 feet based on drilling conditions and auger refusal. Bedrock was rock cored at Boring JB3-19-3 from a depth of 6 feet to 16 feet. Bedrock encountered consists of Schists with Quartz inclusions, gray and dark gray, slightly weathered to unweathered, and hard. The upper portion of bedrock that was cored, from 6 feet deep to 7.5 feet deep was very broken to broken and the bedrock below 7.5 feet deep was broken to unbroken. Boring JB3-19-3 was terminated within the Schist bedrock layer.

Boring JB3-19-4 was completed from the crest of the saddle dike and encountered 0.3 feet of topsoil underlain by 25 feet of embankment fill. The embankment fill encountered at Boring JB3-19-4 was similar to the embankment fill encountered in Borings JB3-19-1 and JB3-19-2, and is described as Silty Sand (SM) with gravel, compact to dense, brown, and dry to moist. The embankment fill was underlain by presumed bedrock based on difficult drilling conditions, four consecutive split-spoon samples resulting in 50 blow over 0.1 feet, and limited split-spoon recovery that appeared to be powdered Schist.

Geotechnical laboratory testing results indicate that the embankment fill at Jewell Brook No. 3 has a typical USCS classification of SM, average moisture content of 10.2%, average fines content of 39.7%, average specific gravity of 2.71, and non-plastic fines. The following ranges apply to the laboratory testing results for embankment fill: moisture contents between 6.2% and 13.4%, fines contents between 30.8% and 49.2%, and specific gravities between 2.70 and 2.71. Geotechnical laboratory testing results indicate that foundation soils at Jewell Brook No. 3 have a typical USCS classification of SM or ML. The SM foundation soils have an average water content of 12.4%, average fines content of 38.9%, and non-plastic fines. The following ranges apply to the SM foundation soils: moisture contents between 12.1% and 12.9% and fines contents between 26.7% and 48.8%. The ML foundation soils have an average moisture content of 21.6%, average fines content of 56.7%, specific gravity of 2.70, and non-plastic fines. The following ranges apply to the ML foundation soils: moisture contents between 18.1% and 24.1% and fines contents between 56.2% and 57.3%.

2.2 Auxiliary Spillway

DDK completed Borings JB3-19-201, JB3-19-202, JB3-19-203, JB3-19-203A, JB3-19-204, and JB3-19-204A to characterize soil conditions at the auxiliary spillway. In total, fifty-one (51) disturbed SPT samples were collected from the borings at the auxiliary spillway. The locations of these borings are shown on Figure 2. The boring logs for JB3-19-201, JB3-19-202, JB3-19-203, JB3-19-203A, JB3-19-204, and JB3-19-204A are presented in Appendix A. Borings denoted with an “A” after the boring number are offset borings.

Subsurface conditions encountered within the auxiliary spillway consist of 0.3 to 0.4 feet of topsoil underlain by Glacial Till deposits. The Glacial Till deposits consist of layered Silty Sand (SM), Sandy Silt (ML), and Silty Gravel (GM) materials. The three Glacial Till materials encountered are generally consistent from boring to boring, based on laboratory index testing, but the layer thicknesses and number of layers within each boring is inconsistent. The Glacial Till deposits are generally compact to dense, brown to light brown to gray, and dry to moist. The upper Glacial Till deposits were generally dry and

the lower Glacial Till deposits were generally moist with some isolated areas being wet. Borings JB3-19-201 through JB3-19-204 were terminated within the Glacial Till deposits. Boring JB3-19-204A encountered bedrock at a depth of 34 feet and is described as Schist, gray and dark gray, slightly weathered to unweathered, very broken to unbroken, and hard. Boring JB3-19-204A was terminated within the Schist bedrock layer.

Geotechnical laboratory testing results for samples collected within the auxiliary spillway indicate a typical USCS classification of SM or ML. The SM soils within the auxiliary spillway have an average moisture content of 17.9%, average fines content of 37.3%, average specific gravity of 2.65, and non-plastic fines. The following ranges apply to the SM soils within the auxiliary spillway: moisture contents between 7.1% and 34.5%, fines contents between 21.0% and 46.6%, and specific gravities between 2.58 and 2.71. The ML soils within the auxiliary spillway have an average moisture content of 20.5%, average fines content of 66.3%, average specific gravity of 2.72, and non-plastic fines. The following ranges apply to the ML soils within the auxiliary spillway: moisture contents between 16.2% and 23.3%, fines contents between 50.5% and 84.5%, and specific gravities between 2.70 and 2.74. Refer to Table 2 for the results of the geotechnical testing.

For Site No. 3, only the Supplement #2 to the Geology Report is available to DDK at the time this report was prepared. Therefore, the results of geotechnical laboratory testing previously performed by the NRCS cannot be summarized in this report.

2.3 Borrow Areas

The original borrow areas at Jewell Brook No. 3 included the auxiliary spillway excavation, principal spillway and cutoff trench excavations, and west borrow area located directly west of the existing embankment and auxiliary spillway and south of West Hill Road. As shown on the test pit logs presented on the NRCS As-Built drawings, material within the auxiliary spillway excavation mainly consisted of silty sand (SM), sandy silt (ML), and silty gravel (GM) layers. Similar conditions were encountered in Borings JB3-19-201, JB3-19-202, JB3-19-203, JB3-19-203A, and JB3-19-204 completed by DDK within the existing auxiliary spillway. The NRCS As-Built drawings specify the borrow material from the auxiliary spillway excavation as silty sand (SM) similar to TP-203 1'-10'. The Quantities Computation Sheets indicate that 8,236 cubic yards of material was available from the excavated portion of the auxiliary spillway. No laboratory testing results for testing performed by NRCS on representative soil samples from the auxiliary spillway excavation were provided to DDK.

The principal spillway and cutoff trench excavations for Jewell Brook No. 3 are presented on the NRCS As-Built drawings as a source of earth fill material. The material from the principal spillway excavation to be used as borrow material is described on the NRCS As-Built drawings as silty sand (SM) similar to TR-801 1'-7'. The material from the cutoff trench excavation to be used as borrow material is described on the NRCS As-Built drawings as sand & silt (SM & ML) similar to DH-1 1.5'-12'. As described on Log #4 for TR-801 on the NRCS As-Built drawings, silty sand with 30 percent gravel, cobbles, and boulders (SM) was encountered between 1.0 and 7.0 feet in TR-801. Layered sandy silt with 5 to 20

percent gravel (SM & ML) was encountered between 1.5 and 12.0 feet in DH-1 as presented on the DH-1 log on the NRCS As-built drawings. The NRCS As-Built drawings do not indicate available amounts of borrow material resulting from the principal spillway and cutoff trench excavations, but the Quantities Computation Sheets presents combined quantities of 14,622 cubic yards for the principal spillway and reservoir drain excavations and 14,843 cubic yards for the dam foundation, cutoff trench, and foundation drain trench excavations. No laboratory testing results for testing performed by NRCS on representative soil samples from principal spillway and cutoff trench excavations were provided to DDK.

Seventeen test pits, TP-E, TP-F, and TP-105 through TP-119, were performed previously by the NRCS within the west borrow area. As shown on the test pit logs presented on the NRCS As-Built drawings, available material within the West Borrow Area generally consisted of glacial till that was described as silty sand (SM). The NRCS As-built drawings specify the borrow material from the West Borrow Area as silty sand (SM) similar to TP-106 12'-17' and silty sand (SM) similar to TP-117 6'-13'. The glacial till is underlain by soft, micaceous "talc-like" silt as described in the 1967 Supplement #2 to the Geology Report. The "talc-like" silt was not considered suitable borrow material. The 1967 Supplement #2 to the Geology Report indicates 116,000 cubic yards of material was available from the West Borrow Area, but the Quantities Computation Sheets list the West Borrow Area excavation volume as 138,355 cubic yards; therefore the West Borrow Area is likely not a viable source of future borrow. No laboratory testing results for testing performed by NRCS on representative soil samples from the West Borrow Area were provided to DDK.

3.0 INTERPRETATIONS AND CONCLUSIONS (FOR IN-SERVICE USE ONLY)

3.1 Interpretations

Using the information obtained from DDK’s subsurface investigation, information from the NRCS As-Built drawings, and results of geotechnical laboratory testing, DDK estimated engineering properties in Appendix H for the soil within the auxiliary spillway for use in the NRCS SITES analyses. Blow count values provided in the NRCS As-Built drawings for borings completed during previous subsurface explorations were excluded from the development of the recommended properties for the SITES analyses since the confining pressure in some zones has substantially changed as a result of excavation in the auxiliary spillway. Blow count values for SPT samples collected during DDK’s subsurface investigation that were clearly influenced by coarse gravel, cobbles, and boulders were excluded from the development of the recommended properties for the SITES analyses. Recommended properties of site soils for the SITES analyses of the auxiliary spillway, including dry density, plasticity index, clay content, headcut erodibility index, and representative diameter, are calculated in Appendix H and summarized in Table 3. A subsurface profile of the auxiliary spillway is presented on Figure 7. DDK also performed a seismotectonic evaluation and seismic hazard assessment, assessed the liquefaction potential at the site, and evaluated the feasibility of using previously identified borrow areas. The results of these analyses are described in the following sections.

3.1.1 Seismotectonic Evaluation and Seismic Hazard Assessment

In accordance with Technical Release 210-60, “Earth Dams and Reservoirs” (TR-60), DDK compiled data from available resources on magnitude 4 or greater earthquakes and any active or capable faults within 62 miles (100 kilometers) of Jewell Brook No. 3. The USGS U.S. Quaternary Faults Map shows no active faults within 62 miles of Jewell Brook No. 3 and the NOAA Natural Hazards Database lists no significant earthquake within 62 miles of the site. Based on information presented by Wheeler (2006), no seismic/fault zones are located within 62 miles of the site have produced earthquakes with a magnitude of 4 or greater. The USGS Earthquake Hazards Program Map shows three documented earthquakes with a magnitude of 4 or greater within 62 miles of the site. The earliest recorded event occurred in 1638 and is listed as a magnitude (M) 6.5 earthquake with an approximate epicenter location of central New Hampshire. The earthquake had a maximum observed Modified Mercalli Intensity (MMI) of IX and was felt in the Boston area as well as Connecticut, Rhode Island, and Quebec. The second event, a M 4.7 earthquake with a maximum observed MMI of VII, occurred in New York in 1931. The most recent earthquake located within 62 miles of Jewell Brook No. 3 occurred in 1982 in New Hampshire. This M 4.5 earthquake had a maximum observed MMI of VI and was felt throughout the New England region, northeastern New York, southern Quebec, and northeastern Ontario. The approximate epicenter locations of these earthquakes are presented on Figure 8, and the data for each earthquake obtained from the USGS Earthquake Hazards Program is included in Appendix F. Additionally, the fault shown on Figure 4 that separates the Tyson and Plymouth Formations is not considered to be a capable or Holocene.

The resources listed above are compiled from thousands of sources and include data on specific events dating back as far as 2150 B.C. Because it is impossible to have information on every major earthquake and active fault of the Quaternary, which consists of the past 1.6 million years, the existing data cannot definitively evaluate the existence of Quaternary active faults. These resources have made a fair attempt to compile all available information on earthquakes and active faults for incorporation into seismic hazard analyses. Therefore, the existing data, while not definitive, is considered suitable to evaluate the existence of active faults at the site for design purposes. While three seismic events were identified within 62 miles of the site, a deterministic seismic hazard assessment (DSHA) to determine ground motions from these events cannot be performed since these events are not knowingly connected to a defined, specific seismic source or fault zone. Additionally, the fault shown on Figure 4 that separates the Tyson and Plymouth Formations is not considered to be a capable or Holocene active fault since no recorded seismic events are connected to this fault and no sources identify this fault as active or capable. Therefore, a probabilistic seismic hazard assessment (PSHA) was used to estimate peak ground accelerations at the site as described in the following paragraph.

In accordance with Part 4 of TR-60, probabilistic seismic hazard curves were generated using the USGS Earthquake Hazards Program Unified Hazard Tool for the site based on return periods of 10,000 and 500 years. The input data, generated hazard curves, and deaggregation output are included in Appendix F. The peak ground accelerations at the site are 0.2372g for a return period of 10,000 years (0.5% probability of exceedance in 50 years) and 0.0450g for a return period of 500 years (10% probability of exceedance in 50 years) as presented on the seismic hazard curves. The Unified Hazard Tool assumes a default Site Class at the B/C boundary and does not provide values for other Site Classes. Jewell Brook No. 3 is assumed to be at the Site Class B/C Boundary based on average properties in the top 100 feet similar to very dense soil and soft rock to rock; therefore, an amplification factor (F_a) is not necessary for the site.

3.1.2 Liquefaction Potential

Since the probable ground acceleration with 2 percent probability of exceedance in 50 years is between 10 and 20 percent of gravity (%g), the hazard class is high, and the effective dam height is greater than 20 feet, necessary information has been summarized below to evaluate the liquefaction potential of the site in accordance with 210-VI-NEH, Part 631, Chapter 2, Section 631.0207. Available information indicates no historic occurrences of liquefaction in the area of Jewell Brook No. 3. The distribution of surficial geologic units and soils at the sites is presented on the USDA NRCS Web Soil Survey Soil Maps in Appendix E and on the surficial geologic map in Figure 3. Active depositional areas at Jewell Brook No. 3 generally fall within the area where Parker Brook enters the reservoir, and inactive, older terraces are mapped on the eastern half of the site and are classified as kame terrace deposits as shown on Figure 3. Surficial geologic units that are within active or recently active depositional areas are generally more prone to liquefaction because they are typically unconsolidated and have a higher likelihood of being saturated or becoming saturated. The peak ground acceleration for a 500-year return period (10% probability of exceedance in 50 years) obtained from the USGS Earthquake Hazards Program is 0.045g which is less than 0.1g. Therefore, per 210-VI-NEH, Part 631, Chapter 2, Section 631.0207, preliminary assessments to document the presence of unconsolidated sediments in active depositional environments,

moderately consolidated Holocene-age sediments in inactive depositional environments, or late Pleistocene-age deposits that are approximately 15,000 to 12,000 years old are not required.

Since SPTs were performed as part of the geologic investigation and are acceptable as an initial screening for liquefaction potential, correlations were prepared using the SPT results to initially assess if subsurface conditions at the site generally do not exhibit liquefaction potential. See Appendix G for the SPT N-value correlation. Based on case-history data (Seed and Harder, 1990; Castro, 1995; Wride et al., 1999), flow slides resulting from large earthquakes have only occurred where $N_{1,60}$ (SPT blow count, or N-value, corrected for field procedures and overburden pressure) values were 13 or lower. Hence, it is generally accepted that sand-like materials with $N_{1,60}$ values greater than 15 are not susceptible to strength loss. At Jewell Brook No. 3, the average $N_{1,60}$ values performed in soil for all borings are above 15, but some embankment and auxiliary spillway borings contain zones with significant amounts of $N_{1,60}$ values below 15. In embankment Boring JB3-19-1 $N_{1,60}$ values were less than 15 from 42.0 to 58.0 feet deep in sandy silt glacial till and in embankment Boring JB3-19-2 $N_{1,60}$ values were less than 15 from 44.0 to 50.0 feet deep in silty sand glacial till. It is important to note that Boring JB3-19-1 was terminated within the sandy silt glacial till and the $N_{1,60}$ for the last sample taken at the bottom of the boring was still below 15. Strength loss within these glacial till foundation soils should potentially be considered in slope stability analyses. In embankment Borings JB3-19-2 and JB3-19-4 there were four individual $N_{1,60}$ values below 15, but these samples are isolated and generally do not indicate a defined zone. Eleven individual $N_{1,60}$ values from auxiliary spillway borings are below 15. Seven of the eleven individual $N_{1,60}$ values are located within the sandy silt glacial till in Borings JB3-19-201 and JB3-19-202. Based on this information, strength loss in the sandy silt glacial till layer in the area of these borings should potentially be considered in analysis. Additionally three consecutive $N_{1,60}$ values for samples within the silty sand layer in JB3-19-201 are below 15. If structures are proposed in the auxiliary spillway, Strength loss within the layers identified in JB3-19-201 and JB3-19-202 should also potentially be considered.

3.1.3 Feasibility of Borrow Areas

As presented on the NRCS As-Built drawings, the volume of fill required for construction at Jewell Brook No. 3 is 173,500 cubic yards. Using information presented in the Quantities Computation Sheets, DDK estimates the maximum amount of fill available from the original borrow areas prior to construction was 176,056 cubic yards. This amount includes 14,843 cubic yards from the dam foundation, cutoff trench, and foundation drain trench excavations; 14,622 cubic yards from the principal spillway and reservoir drain excavations; 138,355 cubic yards from the west borrow area; and 8,236 cubic yards from the auxiliary spillway excavation. These values indicate that the maximum amount of available material from the original borrow areas is no more than 2,556 cubic yards. Since some zones of earth fill had multiple sources of material and some sources of material were used in multiple zones of earth fill as specified on the NRCS As-Built drawings, the actual amount of borrow material remaining within any specific original borrow areas cannot be determined.

Use of the auxiliary spillway as a source of material for any structural rehabilitation alternatives is not considered feasible unless the design of the alternative takes into account the removal of material from the

auxiliary spillway and does not compromise the stability and structural integrity of the dam. If the auxiliary spillway is considered as a potential source of material, additional investigation and testing should be performed on the soils within the auxiliary spillway to calculate engineering parameters and estimate the volume of fill material available. Use of the principal spillway and cutoff trench excavations as sources of material is not considered feasible due to their locations beneath the dam embankment. Use of the portion of the West Borrow Area outside of the reservoir as a source of material may be considered feasible if any suitable material remains within this portion of the borrow area that can be removed without affecting the building, basketball courts, and parking area currently located within the limits of the original West Borrow Area. As indicated earlier, the West Borrow Area appears to have been exhausted of borrow material. If this portion of the West Borrow Area is considered as a potential source of material for any structural rehabilitation alternatives, additional investigation and testing should be performed on the in-place soils to determine the soil classification, calculate engineering parameters, and estimate the volume of fill material available.

3.2 Conclusions (Recommendations)

Based on the subsurface conditions observed during the subsurface investigation described herein, our current design assumptions and understanding of the project, and the interpretations described in the previous section, DDK has developed the following conclusions that relate to key geotechnical features of the project.

- ▶ This Geologic Investigation generally confirmed consistent subsurface conditions as presented on the NRCS As-Built Drawings.
- ▶ SITES analyses shall be performed using the recommended properties of site soils as calculated in Appendix H and as presented in Table 3 as applicable.
- ▶ The sandy silt and silty sand foundation soils encountered in Borings JB3-19-1 and JB3-19-2 may exhibit liquefaction potential. Due to the presence of this layer, strength loss should potentially be considered in slope stability analyses.
- ▶ The silty sand glacial till encountered in Boring JB3-19-201 and the sandy silt glacial till encountered in both JB3-19-201 and JB3-19-202 may exhibit liquefaction potential. Due to the presence of these layers, and if the auxiliary spillway is required to be modified to a structure, such as a concrete spillway, strength loss should potentially be considered in analyses or design of the structure.
- ▶ Based on the results of the Seismotectonic Evaluation and Seismic Hazard Assessment, special seismic studies are not required.
- ▶ Using the auxiliary spillway as a source of borrow material is not considered feasible unless the design of the alternative takes into account the excavation and lowering of the auxiliary spillway and does not compromise the stability and structural integrity of the dam. If considered,

additional investigation and testing should be performed on the soils within the auxiliary spillway to calculate engineering parameters and estimate the volume of fill material available.

- ▶ Using the portion of the West Borrow Area outside of the reservoir as a source of borrow material may be marginally feasible. If considered, additional investigation and testing should be performed on the in-place soils to determine the soil classification, calculate engineering parameters, and estimate the volume of fill material available.
- ▶ If new structures for the dam rehabilitation are proposed that are susceptible to settlement, consolidation analyses should be performed on applicable soils to support the design.
- ▶ Additional geotechnical investigations using sonic drilling methods should be performed as necessary for the design of the rehabilitation plan after a rehabilitation alternative is selected and verified. The investigations should include proposed borrow areas. Additional geotechnical investigations in the auxiliary spillway should include borings that extend the minimum depth required by Part 531 of Title 210 – National Engineering Manual and the Geologic Report.
- ▶ Future geotechnical investigation should consider or include the installation of piezometers to monitor ground water and phreatic conditions of the dam.
- ▶ If new structures for the dam rehabilitation are proposed that are susceptible to settlement, consolidation analyses should be performed on applicable soils to support the design.
- ▶ The NRCS reported that the toe drains are in poor condition based on an external inspection. The toe drains should be inspected and repairs made if necessary as part of the rehabilitation design.

4.0 REPORT LIMITATIONS

DDK prepared this report for the exclusive use for and specific application to the Supplemental Watershed Plan and Environmental Document project for the Jewell Brook Watershed Site No. 3 located in Ludlow, Windsor County, Vermont. DDK is not responsible for use or interpretation of this report by any parties. The evaluation and recommendations contained in this report are based on the data obtained from the referenced subsurface investigation. The borings indicate subsurface conditions only at the specific locations and times, and only to the depths penetrated. They do not necessarily reflect strata variations that may exist between such locations. The validity of the recommendations is based in part on assumptions about the stratigraphy between borings made by the geotechnical engineer. Such assumptions shall be confirmed during earthwork as part of construction. If subsurface conditions different from those described herein are noted during construction, recommendations in this report must be reevaluated. DDK must observe earthwork construction, particularly borrow area and fill areas, to confirm that our assumptions and recommendations are valid, or to modify them accordingly. DDK cannot assume responsibility or liability for the adequacy of recommendations if it does not observe construction.

If any changes in the nature, design, or location of the structure are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by DDK. DDK is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data or engineering analyses without the express written authorization of DDK.

Our scope of services excludes testing or engineering evaluations associated with environmental conditions at the site, including the investigation or detection of the presence of any “biological pollutants” in or around the site where the phrase “biological pollutants” includes but is not limited to: molds, spores, fungi, bacteria and viruses, and the byproducts of any such biological organisms.

5.0 REFERENCES

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6.0 CLOSING

In preparing this report, the professional services of DDK has been performed, findings obtained, and recommendations prepared per generally accepted engineering principles and practices. This statement is instead of all warranties, either expressed or implied.

If you have questions, please call.

Respectfully Submitted,
DDK ENGINEERING – JV



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Geologist



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Senior Principal Engineer

TABLES

Table 1
As-Drilled Boring Locations
Jewell Brook Watershed Site No. 3
Natural Resources Conservation Service
Ludlow, Windsor County, Vermont

Boring	Northing (ft)	Easting (ft)	Ground Surface Elevation (ft)	Depth (ft)
JB3-19-1	324962.3	1584135.6	1251.6	58.0
JB3-19-2	325173.7	1584003.2	1251.8	69.0
JB3-19-3	325147.7	1584245.8	1190.8	16.0
JB3-19-4	324606.6	1584069.3	1251.1	32.1
JB3-19-201	325412.9	1584117.0	1232.5	23.7
JB3-19-202	325575.6	1583961.5	1241.8	20.0
JB3-19-203	325526.8	1583815.2	1241.6	5.4
JB3-19-203A	325524.4	1583821.7	1242.0	19.8
JB3-19-204	325629.2	1583776.0	1240.0	34.0
JB3-19-204A	325626.2	1583788.2	1240.3	44.0

Notes:

- 1) Horizontal Datum: North American Datum of 1983 (NAD83) Vermont State Plane
- 2) Vertical Datum: North American Vertical Datum of 1988 (NAVD 88)
- 3) Boring locations surveyed using a Trimble GNSS System.

Table 2
Summary of Laboratory Test Results
Jewell Brook Watershed Site No. 3
Natural Resources Conservation Service
Ludlow, Windsor County, Vermont

Sample Information				Test Results												
Boring	Sample ID	Depth		Water Content	Sieve and Hydrometer Analysis						Atterberg Limits			Specific Gravity	Dry Unit Weight	Unconfined Compressive Strength of Rock
		From	To		USCS Symbol ⁽¹⁾	USCS Name	<#4 (%)	<#40 (%)	<#200 (%)	<0.002 mm (%)	USCS Symbol (of fines)	LL (%)	PI (%)			
		(ft)	(ft)	(%)												
JB3-19-1	SpT-2/3	2.0	6.0	6.7	SM	Silty Sand w/ Gravel	78.32	50.58	30.81	3.34	Non-Plastic			-	-	-
	SpT-5/6	8.0	12.0	6.2	-	-	-	-	-	-	-	-	-	2.71	-	-
	SpT-10/11	18.0	22.0	11.2	SM	Silty Sand	90.89	67.01	40.00	-	Non-Plastic			-	-	-
	SpT-15	28.0	30.0	10.4	-	-	-	-	-	-	-	-	-	-	-	-
	SpT-19/20	36.0	40.0	12.9	SM	Silty Sand	96.33	87.48	41.41	2.26	Non-Plastic			-	-	-
	SpT-22	42.0	44.0	22.0	-	-	-	-	-	-	-	-	-	-	-	-
	SpT-24	46.0	48.0	22.5	ML	Sandy Silt	99.38	91.95	56.46	-	Non-Plastic			-	-	-
	SpT-28/29	54.0	58.0	24.1	ML	Sandy Silt	98.71	93.60	57.28	-	Non-Plastic			2.70	-	-
JB3-19-2	SpT-2	2.0	4.0	12.4	-	-	-	-	-	-	-	-	-	-	-	-
	SpT-4/5	6.0	10.0	8.7	SM	Silty Sand w/ Gravel	83.89	61.71	38.71	-	Non-Plastic			-	-	-
	SpT-11/12	20.0	24.0	13.4	-	-	-	-	-	-	-	-	-	2.70	-	-
	SpT-13/14/15	24.0	30.0	12.7	SM	Silty Sand	90.90	70.55	44.27	1.29	Non-Plastic			-	-	-
	SpT-19/20	36.0	40.0	12.3	SM	Silty Sand	94.72	80.62	48.76	-	Non-Plastic			-	-	-
	SpT-24/25	46.0	50.0	18.1	ML	Sandy Silt	95.95	85.23	56.21	3.39	Non-Plastic			2.70	-	-
	SpT-27/28	52.0	54.7	12.1	sm	Silty Sand w/ Gravel	73.94	42.29	26.65	-	-	-	-	-	-	-
	R-1	63.0	64.0	-	-	-	-	-	-	-	-	-	-	-	176.6	7,270
JB3-19-4	SpT-1/2	0.0	4.0	11.0	SM	Silty Sand	90.93	72.77	42.09	4.93	Non-Plastic			-	-	-
	SpT-4/5/6	6.0	12.0	10.9	SM	Silty Sand w/ Gravel	83.66	55.48	33.18	4.29	Non-Plastic			2.71	-	-
	SpT-8	14.0	16.0	8.1	-	-	-	-	-	-	-	-	-	-	-	-
	SpT-11/12	20.0	24.0	11.0	SM	Silty Sand	93.81	78.66	49.16	-	Non-Plastic			-	-	-

Table 2
Summary of Laboratory Test Results
Jewell Brook Watershed Site No. 3
Natural Resources Conservation Service
Ludlow, Windsor County, Vermont

Sample Information				Test Results												
Boring	Sample ID	Depth		Water Content	Sieve and Hydrometer Analysis						Atterberg Limits			Specific Gravity	Dry Unit Weight	Unconfined Compressive Strength of Rock
		From	To		USCS Symbol ⁽¹⁾	USCS Name	<#4	<#40	<#200	<0.002 mm	USCS Symbol (of fines)	LL	PI			
		(ft)	(ft)	(%)			(%)	(%)	(%)	(%)		(%)	(%)		(pcf)	(psi)
JB3-19-201	SpT-2/3	2.0	6.0	27.8	SM	Silty Sand	98.08	88.71	45.60	-	Non-Plastic			2.58	-	-
	SpT-4	6.0	8.0	34.5	SM	Silty Sand	92.89	82.19	44.53	2.76	Non-Plastic			-	-	-
	SpT-6/7	10.0	14.0	20.6	ML	Silt w/ Sand	97.72	92.01	70.91	1.45	Non-Plastic			-	-	-
	SpT-9/10	16.0	20.0	19.0	ML	Sandy Silt w/ Gravel	84.96	68.37	52.05	-	Non-Plastic			2.72	-	-
JB3-19-202	SpT-2/3	2.0	6.0	7.1	sm	Silty Sand w/ Gravel	69.63	51.63	20.97	_(⁽²⁾)	-	-	-	2.67	-	-
	SpT-4/5	6.0	10.0	23.3	ML	Silt w/ Sand	98.80	93.44	79.78	3.16	Non-Plastic			-	-	-
	SpT-6/7	10.0	14.0	22.8	ML	Sandy Silt	96.64	87.32	60.97	-	Non-Plastic			2.71	-	-
	SpT-9/10	16.0	20.0	21.0	ML	Sandy Silt	96.68	90.49	60.29	-	Non-Plastic			-	-	-
JB3-19-203	SpT-1/2	0.0	3.4	14.8	SM	Silty Sand w/ Gravel	74.55	54.28	27.20	0.89	Non-Plastic			-	-	-
JB3-19-203A	SpT-2/3	6.0	10.0	16.2	ML	Sandy Silt	93.13	77.19	53.17	-	Non-Plastic			2.70	-	-
	SpT-5/6	12.0	16.0	18.6	ML	Sandy Silt	94.12	78.93	56.22	1.77	Non-Plastic			-	-	-
	SpT-8	18.0	19.8	19.6	ML	Sandy Silt	86.25	75.75	50.47	-	Non-Plastic			-	-	-
JB3-19-204	SpT-2/3	2.0	6.0	11.4	SM	Silty Sand w/ Gravel	84.71	61.83	34.94	-	Non-Plastic			2.71	-	-
	SpT-4/5	6.0	10.0	16.4	SM	Silty Sand	90.13	73.84	46.58	1.68	Non-Plastic			-	-	-
	SpT-7/8	12.0	16.0	13.6	SM	Silty Sand	88.77	65.65	40.91	-	Non-Plastic			-	-	-
	SpT-11/12	20.0	24.0	21.2	ML	Silt w/ Sand	98.44	93.94	84.52	-	Non-Plastic			-	-	-
	SpT-13/14	24.0	28.0	22.6	ML	Silt w/ Sand	91.96	86.78	80.07	7.25	Non-Plastic			-	-	-
	SpT-15/16	28.0	32.0	21.1	ML	Silt w/ Sand	95.45	89.27	80.59	-	Non-Plastic			2.74	-	-
JB3-19-204A	R-1	37.3	38.1	-	-	-	-	-	-	-	-	-	-	-	174.9	6,180

⁽¹⁾ Laboratory assumed Unified Soil Classification System (USCS) symbols for samples with sieve analysis testing but without Atterberg limits testing are shown as lowercase.

⁽²⁾ Insufficient fines to run hydrometer.

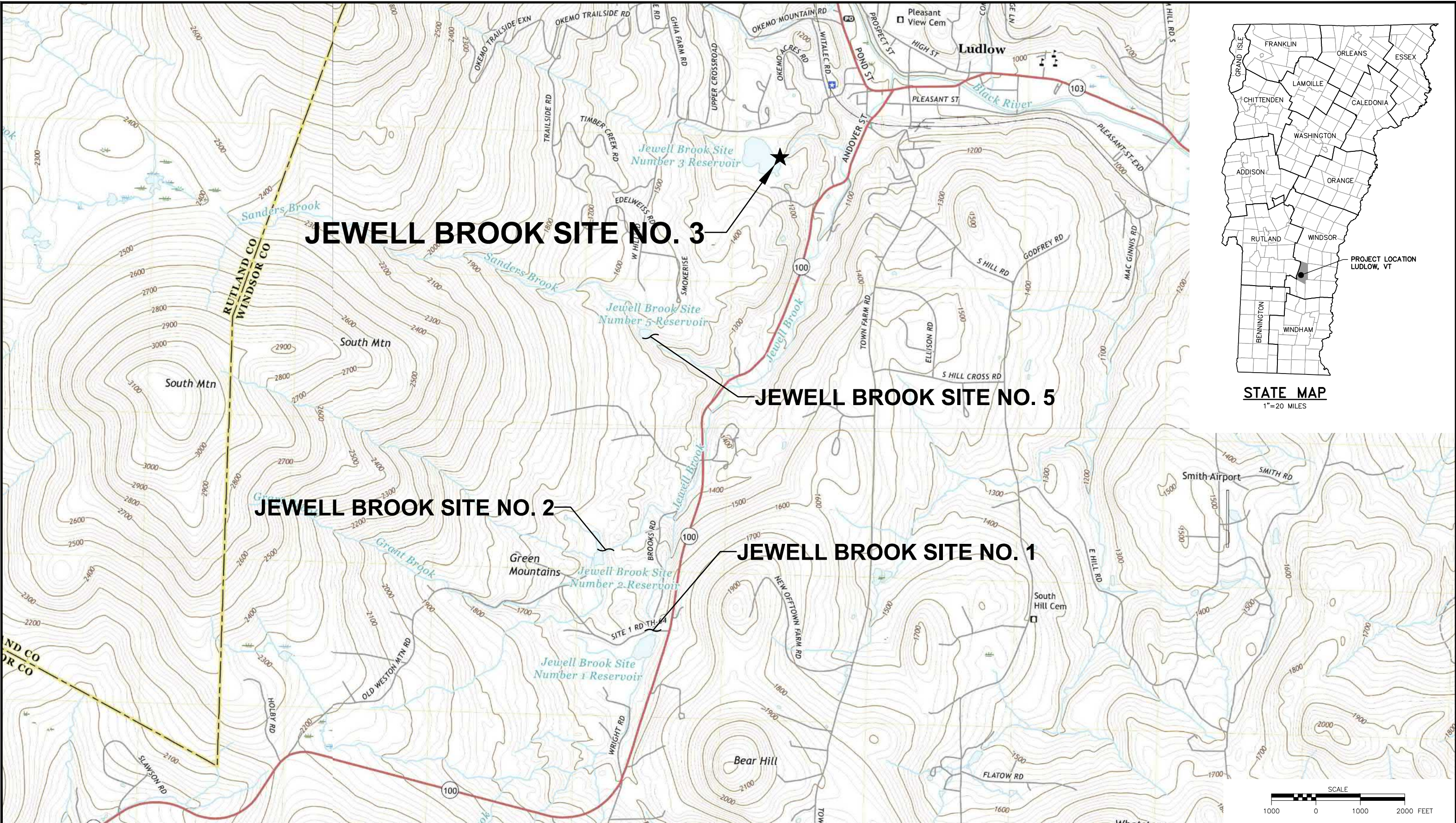
Table 3
Summary of Recommended Properties of Site Soils for SITES Analyses
Jewell Brook Watershed Site No. 3
Natural Resources Conservation Service
Ludlow, Windsor County, Vermont

Layer	Avg. USCS	Dry Density (lb/cu.ft.)	Plasticity Index	Clay Content (%)	Head Cut Index	Representative Diameter (in.)
1	SM	109.2	N.P.	2.00	0.045	0.152
2	GM	112.7	N.P.	0.89	0.055	0.142
3	ML	113.0	N.P.	3.01	0.049	0.013
Schist	-	170.0	0.0	0.00	55.57	2.0

FIGURES

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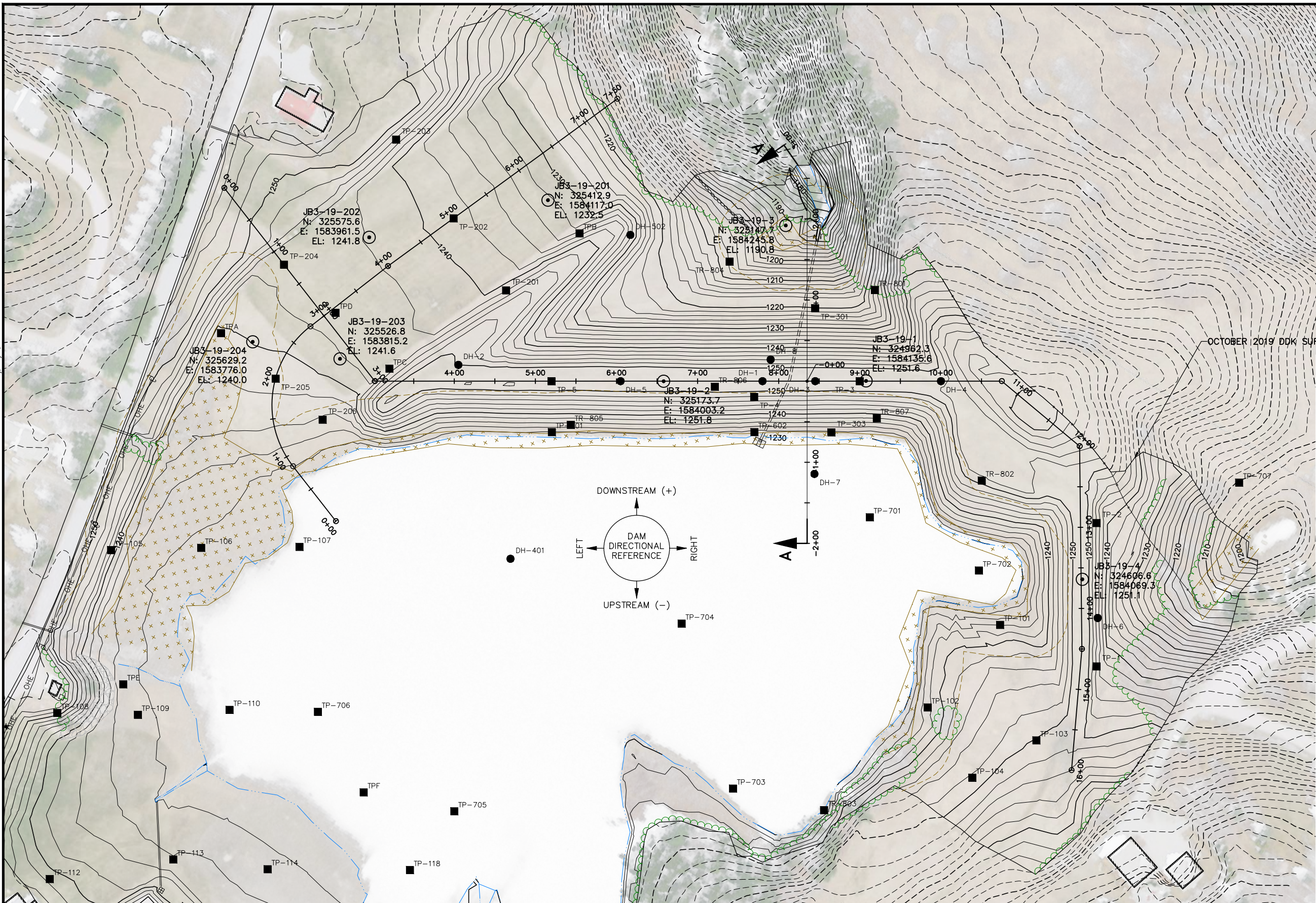
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NOTES / REVISIONS							SEAL:					 United States Department of Agriculture Natural Resources Conservation Service USDA is an equal opportunity provider, employer, and lender.		JEWELL BROOK WATERSHED		
							LUDLOW, WINDSOR COUNTY, VERMONT									
							JEWELL BROOK SITE NO. 3 FIGURE 1 PROJECT LOCATION PLAN									
			4							PROJECT NUMBER: 172719-17	DRAWN BY: AA	DATE: 1/2/2020	SCALE: AS SHOWN FIGURE 1 REV 0			
			3							FILE NAME: Site 3 - Project Location Plan.dwg	CHECKED BY: QDW	DATE: 1/31/2020				
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			1													
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LEGEND

- JB3-19-X
N:
E:
EL:
TEST BORING COMPLETED BY DDK (2019)*
- DH-1
DRILL HOLE COMPLETED BY NRCS (NRCS 1968 AS-BUILT DRAWINGS)
- TP-201
TEST PIT COMPLETED BY NRCS (NRCS 1968 AS-BUILT DRAWINGS)
- 1600
EXISTING GROUND CONTOURS (OCTOBER 2019 DDK SURVEY)
- 1600'
EXISTING GROUND CONTOURS (2016 LIDAR)
- 1600'
POOL LEVEL (OCTOBER 2019 DDK SURVEY)
- TREELINE
- STONE
- RIPRAP
- WETLAND
- WETLAND BUFFER
- OHE
OVERHEAD ELECTRIC LINES
- UTILITY POLE
- FIRE HYDRANT
- 0+00 1+00
CENTERLINE PROFILE
- 0+00 1+00
CROSS SECTION

*OFFSET BORINGS WERE COMPLETED AT BORINGS JB3-19-203, AND JB3-19-204 BUT ARE NOT SHOWN FOR CLARITY

SCALE
60 0 60 120 FEET

NOTES / REVISIONS

- HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 (NAD83). VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
- BORING, TEST PIT, AUXILIARY SPILLWAY, ALIGNMENT, AND THE DAM ALIGNMENT LOCATIONS FROM THE NRCS 1968 AS-BUILT DRAWINGS ARE APPROXIMATE.
- EXISTING CONDITIONS TOPOGRAPHIC MAPPING FROM OCTOBER 2019 DDK SURVEY.
- EXISTING GROUND CONTOURS OUTSIDE OF DDK SURVEY BOUNDARY OBTAINED FROM: VT CENTER FOR GEOGRAPHIC INFORMATION, VERMONT OPEN GEODATA PORTAL. DATE OF LIDAR SURVEY: 2016.
- AERIAL IMAGERY OBTAINED FROM: VT CENTER FOR GEOGRAPHIC INFORMATION, VERMONT OPEN GEODATA PORTAL. DATE OF IMAGERY: 04/14/2016.

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SEAL:

DDK Engineering-JV

PROJECT NUMBER: 172719-17
FILE NAME: Site 3 - Plan-Profiles-Sections.dwg

USDA United States Department of Agriculture
Natural Resources Conservation Service
USDA is an equal opportunity provider, employer, and lender.

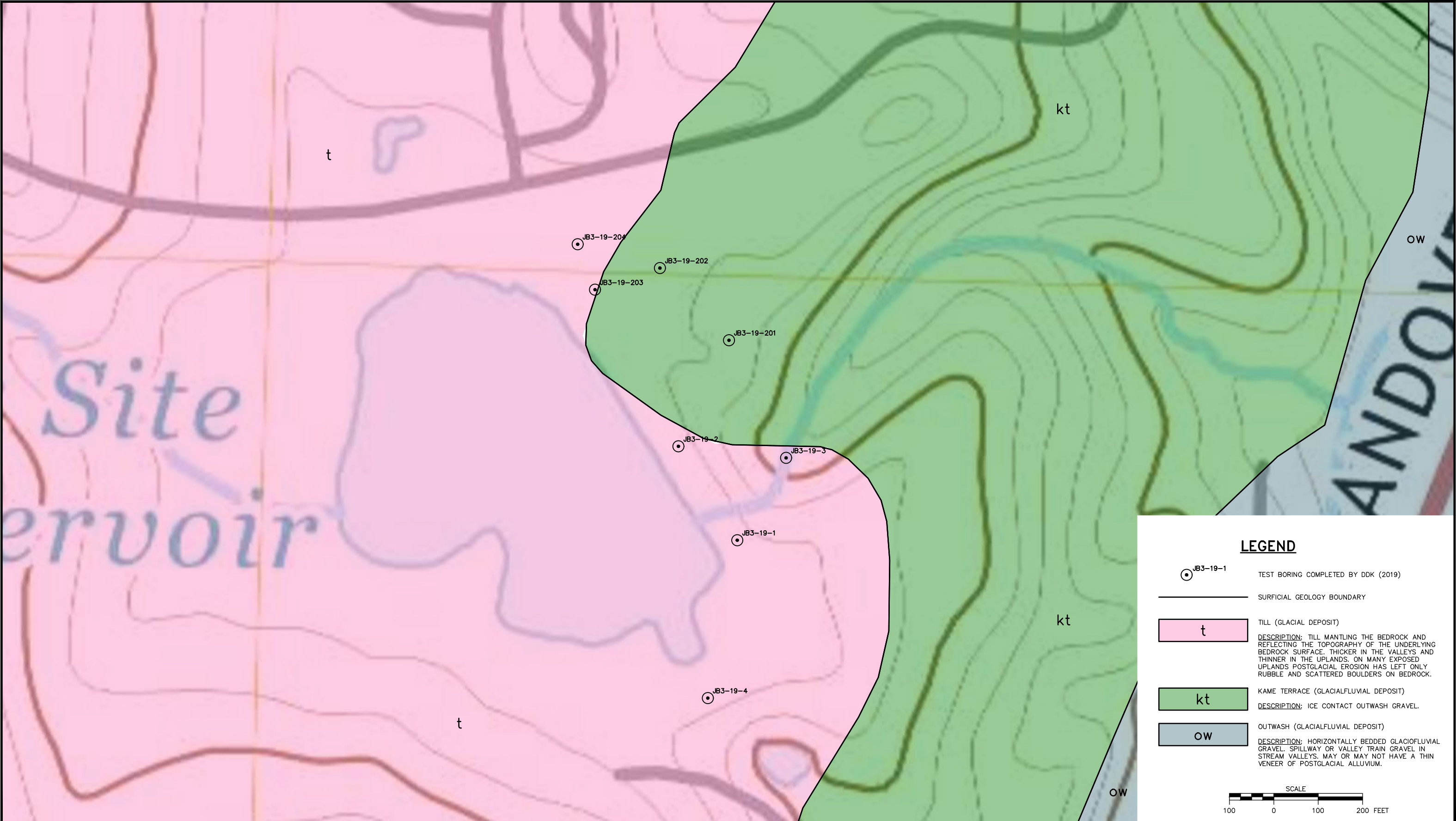
DRAWN BY: AA
CHECKED BY: QDW

DATE: 1/2/2020
DATE: 1/31/2020

**JEWELL BROOK WATERSHED
LUDLOW, WINDSOR COUNTY, VERMONT**

JEWELL BROOK SITE NO. 3
FIGURE 2
SUBSURFACE INVESTIGATION PLAN

SCALE: AS SHOWN
FIGURE 2
REV 0



LEGEND

- JB3-19-1

TEST BORING COMPLETED BY DDK (2019)
- SURFICIAL GEOLOGY BOUNDARY
- t

TILL (GLACIAL DEPOSIT)

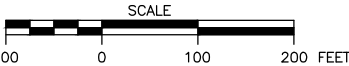
DESCRIPTION: TILL MANTLING THE BEDROCK AND REFLECTING THE TOPOGRAPHY OF THE UNDERLYING BEDROCK SURFACE. THICKER IN THE VALLEYS AND THINNER IN THE UPLANDS. ON MANY EXPOSED UPLANDS POSTGLACIAL EROSION HAS LEFT ONLY RUBBLE AND SCATTERED BOULDERS ON BEDROCK.
- kt

KAME TERRACE (GLACIALFLUVIAL DEPOSIT)

DESCRIPTION: ICE CONTACT OUTWASH GRAVEL.
- ow

OUTWASH (GLACIALFLUVIAL DEPOSIT)

DESCRIPTION: HORIZONTALLY BEDDED GLACIOFLUVIAL GRAVEL. SPILLWAY OR VALLEY TRAIN GRAVEL IN STREAM VALLEYS. MAY OR MAY NOT HAVE A THIN VENEER OF POSTGLACIAL ALLUVIUM.



- NOTES / REVISIONS**
- SURFICIAL GEOLOGY BOUNDARIES OBTAINED FROM THE VERMONT OPEN GEODATA PORTAL PREPARED BY THE VERMONT CENTER FOR GEOGRAPHIC INFORMATION.
 - SURFICIAL GEOLOGY DESCRIPTIONS AND SYMBOLS OBTAINED FROM: STEWART, D.P. AND MACCLINTOCK, P., (1970), "SURFICIAL GEOLOGIC MAP OF VERMONT," VERMONT GEOLOGICAL SURVEY, DEPARTMENT OF WATER RESOURCES, SCALE 1:250,000.

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PROJECT NUMBER: 172719-17
FILE NAME: Site 3 - Surficial Geology Plan.dwg



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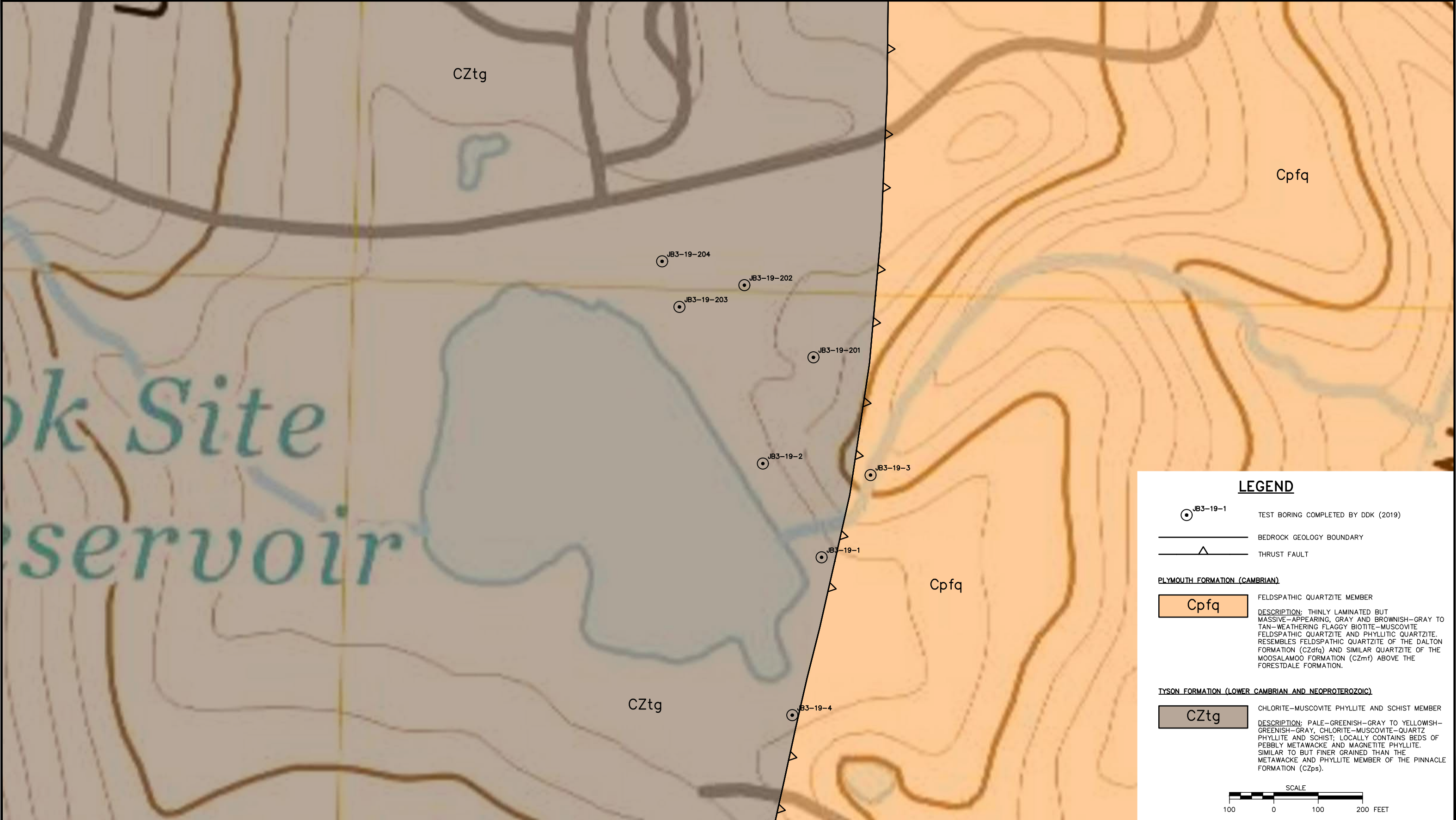
JEWELL BROOK WATERSHED
LUDLOW, WINDSOR COUNTY, VERMONT

JEWELL BROOK SITE NO. 3
FIGURE 3
SURFICIAL GEOLOGIC MAP

SCALE: AS SHOWN
FIGURE 3
REV 0

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LEGEND

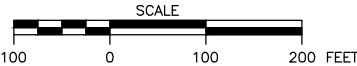
- JB3-19-1 TEST BORING COMPLETED BY DDK (2019)
- BEDROCK GEOLOGY BOUNDARY
- THRUST FAULT

PLYMOUTH FORMATION (CAMBRIAN)

Cpfg FELDSPATHIC QUARTZITE MEMBER
DESCRIPTION: THINLY LAMINATED BUT MASSIVE-APPEARING, GRAY AND BROWNISH-GRAY TO TAN-WEATHERING FLAGGY BIOTITE-MUSCOVITE FELDSPATHIC QUARTZITE AND PHYLITIC QUARTZITE. RESEMBLES FELDSPATHIC QUARTZITE OF THE DALTON FORMATION (CZdfq) AND SIMILAR QUARTZITE OF THE MOOSALAMOO FORMATION (CZmf) ABOVE THE FORESTDALE FORMATION.

TYSON FORMATION (LOWER CAMBRIAN AND NEOPROTEROZOIC)

CZtg CHLORITE-MUSCOVITE PHYLITE AND SCHIST MEMBER
DESCRIPTION: PALE-GREENISH-GRAY TO YELLOWISH-GREENISH-GRAY, CHLORITE-MUSCOVITE-QUARTZ PHYLITE AND SCHIST; LOCALLY CONTAINS BEDS OF PEBBLY METAWACKE AND MAGNETITE PHYLITE. SIMILAR TO BUT FINER GRAINED THAN THE METAWACKE AND PHYLITE MEMBER OF THE PINNACLE FORMATION (CZps).



- NOTES / REVISIONS**
- BEDROCK GEOLOGY BOUNDARIES OBTAINED FROM THE VERMONT OPEN GEODATA PORTAL PREPARED BY THE VERMONT CENTER FOR GEOGRAPHIC INFORMATION.
 - BEDROCK GEOLOGY DESCRIPTIONS AND SYMBOLS OBTAINED FROM: NATURAL RESOURCES ATLAS, VERMONT AGENCY OF NATURAL RESOURCES, VERMONT.GOV, RATCLIFFE, N.M., STANLEY, R.S., GALE, M.H., THOMPSON, P.J., AND WALSH, G.J., 2011, BEDROCK GEOLOGIC MAP OF VERMONT: U.S. GEOLOGICAL SURVEY SCIENTIFIC INVESTIGATIONS MAP 3184, 3 SHEETS, SCALE 1:100,000.

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PROJECT NUMBER: 172719-17
FILE NAME: Site 3 - Bedrock Geology Plan.dwg



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DATE: 1/31/2020

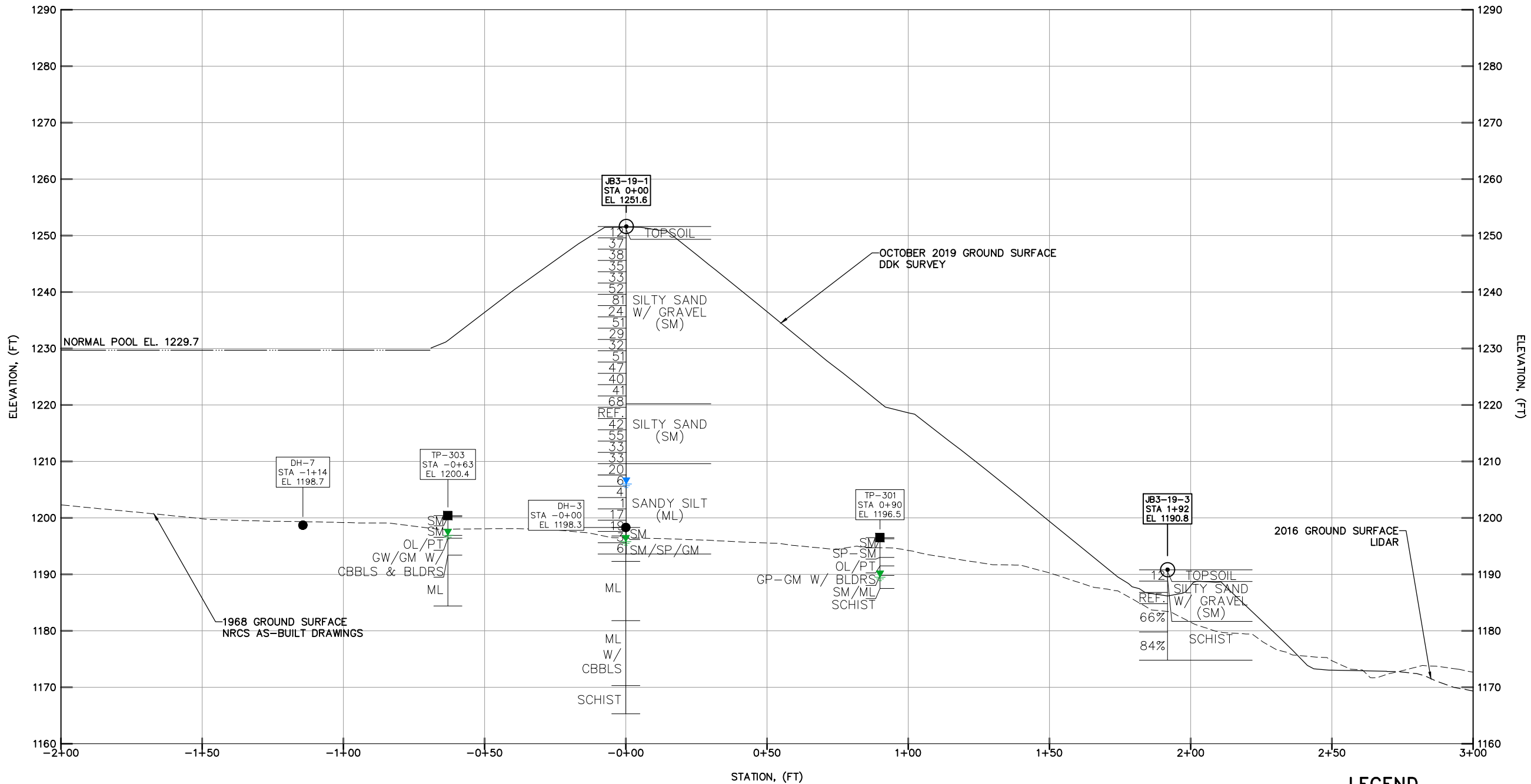
JEWELL BROOK WATERSHED
LUDLOW, WINDSOR COUNTY, VERMONT

JEWELL BROOK SITE NO. 3
FIGURE 4
BEDROCK GEOLOGIC MAP

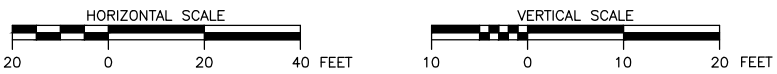
SCALE: AS SHOWN
FIGURE 4
REV 0

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CROSS-SECTION A-A



LEGEND

- JB3-19-1 TEST BORING COMPLETED BY DDK (2019)
- DH-1 DRILL HOLE COMPLETED BY NRCS (NRCS 1968 AS-BUILT DRAWINGS)
- TP-201 TEST PIT COMPLETED BY NRCS (NRCS 1968 AS-BUILT DRAWINGS)
- SOLID LINE EXISTING GROUND SURFACE (OCTOBER 2019 DDK SURVEY)
- DASHED LINE EXISTING GROUND SURFACE (2016 LIDAR)
- DOTTED LINE PRE-CONSTRUCTION GROUND SURFACE (NRCS 1968 AS-BUILT DRAWINGS)
- WATER LEVEL IN BORING RECORDED BY DDK DURING DRILLING
- WATER LEVEL IN BORING OR TEST PIT RECORDED BY NRCS
- REF. REFUSAL

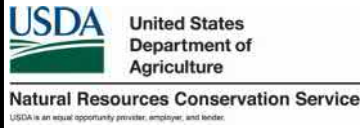
- NOTES / REVISIONS
- HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 (NAD83). VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
 - ALL ELEVATION DATA ON THIS DRAWING THAT WAS OBTAINED FROM THE NRCS 1968 AS-BUILT DRAWINGS HAS BEEN CONVERTED FROM THE NATIONAL GEODETIC DATUM OF 1929 (NGVD29) TO NAVD88. ELEVATION 0.0 IN NGVD29 IS EQUAL TO ELEVATION -0.3' IN NAVD88.
 - BORING AND TEST PIT LOCATIONS AND LITHOLOGY FROM THE NRCS 1968 AS-BUILT DRAWINGS ARE APPROXIMATE.
 - EXISTING GROUND SURFACE OUTSIDE OF DDK SURVEY OBTAINED FROM: VT CENTER FOR GEOGRAPHIC INFORMATION, VERMONT OPEN GEODATA PORTAL. DATE OF LIDAR SURVEY: 2016

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PROJECT NUMBER: 172719-17
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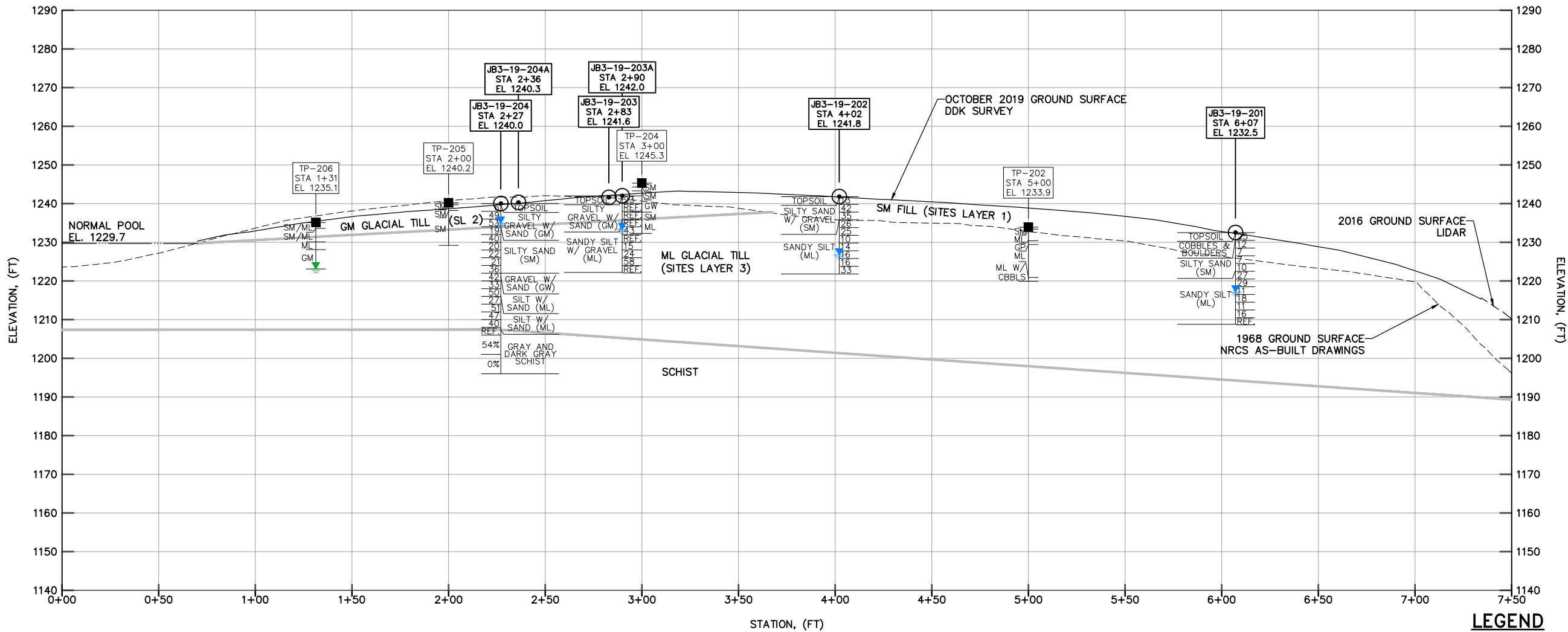
JEWELL BROOK WATERSHED
LUDLOW, WINDSOR COUNTY, VERMONT

JEWELL BROOK SITE NO. 3
FIGURE 6
EMBANKMENT SECTION

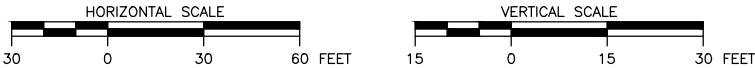
SCALE: AS SHOWN
FIGURE 6
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AUXILIARY SPILLWAY PROFILE



- LEGEND**
- JB3-19-1 TEST BORING COMPLETED BY DDK (2019)
 - DH 1 DRILL HOLE COMPLETED BY NRCS (NRCS 1968 AS-BUILT DRAWINGS)
 - TP 201 TEST PIT COMPLETED BY NRCS (NRCS 1968 AS-BUILT DRAWINGS)
 - SOLID LINE EXISTING GROUND SURFACE (OCTOBER 2019 DDK SURVEY)
 - DASHED LINE EXISTING GROUND SURFACE (2016 LIDAR)
 - DOTTED LINE PRE-CONSTRUCTION GROUND SURFACE (NRCS 1968 AS-BUILT DRAWINGS)
 - THICK SOLID LINE SITES ANALYSIS BOUNDARIES
 - Blue triangle with 'W' WATER LEVEL IN BORING RECORDED BY DDK DURING DRILLING
 - Green triangle with 'W' WATER LEVEL IN BORING OR TEST PIT RECORDED BY NRCS
 - REF. REFUSAL

NOTES / REVISIONS

- HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 (NAD83). VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
- ALL ELEVATION DATA ON THIS DRAWING THAT WAS OBTAINED FROM THE NRCS 1968 AS-BUILT DRAWINGS HAS BEEN CONVERTED FROM THE NATIONAL GEODETIC DATUM OF 1929 (NGVD29) TO NAVD88. ELEVATION 0.0 IN NGVD29 IS EQUAL TO ELEVATION -0.3' IN NAVD88.
- BORING AND TEST PIT LOCATIONS AND LITHOLOGY FROM THE NRCS 1968 AS-BUILT DRAWINGS ARE APPROXIMATE.
- EXISTING GROUND SURFACE OUTSIDE OF DDK SURVEY OBTAINED FROM: VT CENTER FOR GEOGRAPHIC INFORMATION, VERMONT OPEN GEODATA PORTAL. DATE OF LIDAR SURVEY: 2016

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PROJECT NUMBER: 172719-17
FILE NAME: Site 3 - Plan--Profiles--Sections.dwg



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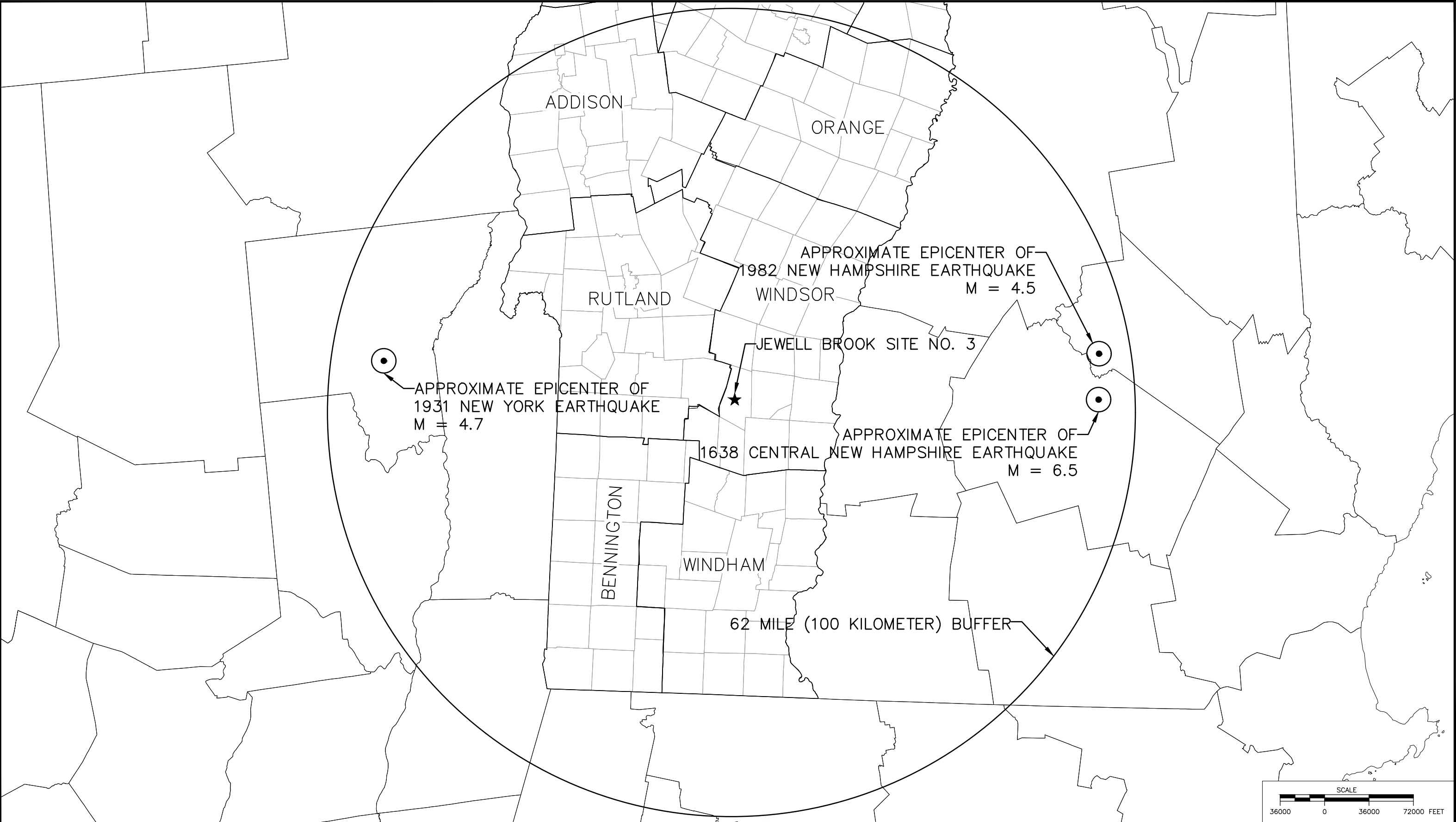
JEWELL BROOK WATERSHED
LUDLOW, WINDSOR COUNTY, VERMONT

JEWELL BROOK SITE NO. 3
FIGURE 7
AUXILIARY SPILLWAY PROFILE

SCALE: AS SHOWN
FIGURE 7
REV 0

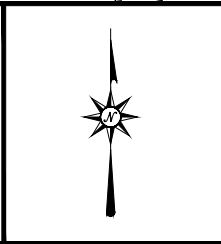
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NOTES / REVISIONS						
REFERENCE: ANSS COMPREHENSIVE EARTHQUAKE CATALOG (COMCAT), UNITED STATES GEOLOGICAL SURVEY, USGS EARTHQUAKE HAZARDS PROGRAM, ACCESSED 1/14/2020.						
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PROJECT NUMBER: 172719-17
FILE NAME: Site 3 - Earthquake and Fault Map.dwg

United States Department of Agriculture
Natural Resources Conservation Service
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DRAWN BY: QDW
CHECKED BY: AA

DATE: 2/18/2020
DATE: 6/12/2020

JEWELL BROOK WATERSHED
LUDLOW, WINDSOR COUNTY, VERMONT

JEWELL BROOK SITE NO. 3
FIGURE 8
EARTHQUAKE AND FAULT MAP

SCALE: AS SHOWN
FIGURE 8
REV 0

APPENDIX A
BORING LOGS

DDK ENGINEERING

(a small business joint venture)

28 North Main Street
Randolph, VT 05060**VISUAL CLASSIFICATION LOG****JB3-19-1**

PAGE 1 OF 2

PROJECT: Jewell Brook Watershed**PROJECT NUMBER:** 172719-17**LOCATION:** Ludlow, Windsor County, VT**CLIENT:** NRCS**DATE STARTED:** 10/24/2019**DRILLING CONTRACTOR:** NEBC**DATE COMPLETED:** 10/25/2019**DRILLER:** Matt Soucy**LOGGED BY:** AA**DRILLING METHOD:** 4.25" ID HSA, 2" OD SBS (8")**CHECKED BY:** QDW**CORING METHOD:** N/A**LOCATION:** Site 3 Main**GROUND WATER LEVELS:**

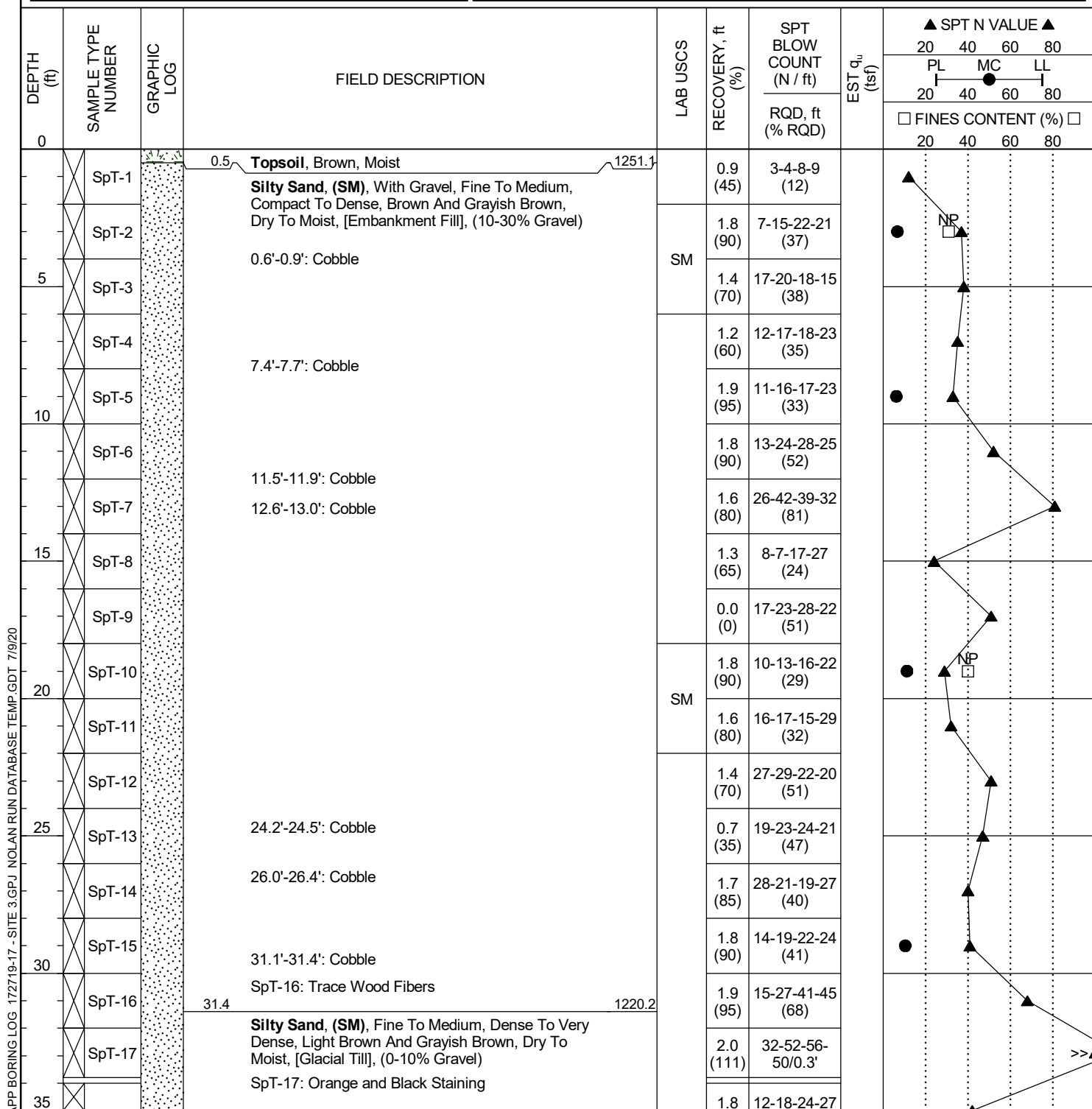
Embankment

TIME OF DRILLING: 45.6 ft / El. 1206.0 ft

ELEVATION: 1251.567 ft.

END OF DRILLING: Running Sands

(N) 324,962.26 (E) 1,584,135.64

AFTER DRILLING: N/A**Notes:** Layer USCS Classification Based On ASTM D2487
Layer Density Based On Field SPT N-Values

(Continued Next Page)

DDK ENGINEERING

(a small business joint venture)

28 North Main Street
Randolph, VT 05060**VISUAL CLASSIFICATION LOG****JB3-19-1**

PAGE 2 OF 2

PROJECT: Jewell Brook Watershed**PROJECT NUMBER:** 172719-17**LOCATION:** Ludlow, Windsor County, VT**CLIENT:** NRCS**DATE STARTED:** 10/24/2019 **DRILLING CONTRACTOR:** NEBC**DATE COMPLETED:** 10/25/2019 **DRILLER:** Matt Soucy**LOGGED BY:** AA**DRILLING METHOD:** 4.25" ID HSA, 2" OD SBS (8")**CHECKED BY:** QDW**CORING METHOD:** N/A**LOCATION:** Site 3 Main**GROUND WATER LEVELS:**

Embankment

TIME OF DRILLING: 45.6 ft / El. 1206.0 ft

ELEVATION: 1251.567 ft.

END OF DRILLING: Running Sands

(N) 324,962.26 (E) 1,584,135.64

AFTER DRILLING: N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	FIELD DESCRIPTION	LAB USCS	RECOVERY, ft (%)	SPT BLOW COUNT (N / ft)	EST q_u (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
						RQD, ft (% RQD)		20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
35	SpT-18		Silty Sand, (SM) , Fine To Medium, Dense To Very Dense, Light Brown And Grayish Brown, Dry To Moist, [Glacial Till], (0-10% Gravel)		(90)	(42)					
	SpT-19			SM	1.8 (90)	18-28-27-24 (55)					
	SpT-20				1.7 (85)	13-14-19-23 (33)					
40	SpT-21		Sandy Silt, (ML) , Non Plastic, Very Loose To Compact, Light Brown And Olive Brown, Wet, [Glacial Till], (0-10% Gravel)		1.8 (90)	13-18-15-14 (33)					
	SpT-22			ML	2.0 (100)	7-11-9-9 (20)					
	SpT-23				1.7 (85)	2-3-3-4 (6)					
45	SpT-24		49.5'-52.0': With Gravel		1.5 (75)	2-3-1-0 (4)					
	SpT-25			ML	0.7 (35)	0-0-1-10 (1)					
	SpT-26				0.6 (30)	6-8-9-6 (17)					
50	SpT-27		58.0		0.4 (20)	7-8-11-13 (19)					
	SpT-28			ML	1.1 (55)	0-1-2-1 (3)					
	SpT-29				1.3 (65)	0-3-3-4 (6)					
55			Bottom of Boring at 58.0 feet. Augers Began Locking Up At 56.5' 150 Gal. Grout Used								
60											
65											
70											

Notes: Layer USCS Classification Based On ASTM D2487
Layer Density Based On Field SPT N-Values

NRCS - DAPP BORING LOG 172719-17 - SITE 3.GPJ NOLAN RUN DATABASE TEMP.GDT 7/9/20

DDK ENGINEERING

(a small business joint venture)

28 North Main Street
Randolph, VT 05060**VISUAL CLASSIFICATION LOG****JB3-19-2**

PAGE 1 OF 2

PROJECT: Jewell Brook Watershed**PROJECT NUMBER:** 172719-17**LOCATION:** Ludlow, Windsor County, VT**CLIENT:** NRCS**DATE STARTED:** 10/28/2019**DRILLING CONTRACTOR:** NEBC**DATE COMPLETED:** 10/29/2019**DRILLER:** Matt Soucy**LOGGED BY:** AA**DRILLING METHOD:** 4.25" ID HSA, 2" OD SBS (8")**CHECKED BY:** QDW**CORING METHOD:** NX (Cuttings Rem. w/Water)**LOCATION:** Site 3 Main**GROUND WATER LEVELS:**

Embankment

TIME OF DRILLING: 43.4 ft / El. 1208.4 ft

ELEVATION: 1251.848 ft.

END OF DRILLING: 41.3 ft / El. 1210.5 ft

(N) 325,173.65 (E) 1,584,003.16

AFTER DRILLING: N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	FIELD DESCRIPTION	LAB USCS	RECOVERY, ft (%)	SPT BLOW COUNT (N / ft)	EST q_u (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
						RQD, ft (% RQD)		20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
0											
	SpT-1		0.3' Topsoil, Brown, Moist		1.7 (85)	2-4-5-6 (9)					
	SpT-2		2.8' Silty Sand, (SM), With Gravel, Fine To Coarse, Compact, Brown, Dry To Moist, [Embankment Fill], (20-30% Gravel)		1.5 (75)	9-13-14-16 (27)					
5	SpT-3		4.6' Silty Sand, (SM), Fine, Compact, Light Brown, Dry To Moist, [Embankment Fill], (0-10% Gravel)		1.8 (90)	10-11-10-10 (21)					
	SpT-4		Silty Sand, (SM), With Gravel, Fine To Medium, Compact To Dense, Brown And Grayish Brown, Dry To Moist, [Embankment Fill], (10-25% Gravel) 5.5'-5.8': Silt, Gray, Moist	SM	2.0 (100)	16-18-26-22 (44)					
10	SpT-5				1.6 (80)	9-13-9-10 (22)					
	SpT-6		10.3'-10.7': Cobble		1.5 (75)	4-13-17-17 (30)					
	SpT-7		SpT-7: Crushed Cobble/Gravel throughout		1.5 (75)	48-32-35-28 (67)					
15	SpT-8				0.7 (35)	8-7-7-10 (14)					
	SpT-9		16.1'-16.4': Cobble		1.2 (60)	12-12-15-21 (27)					
20	SpT-10		19.0'-19.1': Wood Fibers		1.6 (80)	11-8-11-12 (19)					
	SpT-11		19.3'-19.6': Cobble		1.3 (65)	5-13-16-31 (29)					
	SpT-12		21.0'-21.3': Cobble		1.2 (60)	19-18-16-32 (34)					
25	SpT-13				1.8 (90)	7-9-13-14 (22)					
	SpT-14			SM	1.3 (65)	14-16-25-29 (41)					
30	SpT-15				2.0 (100)	12-18-23-22 (41)					
	SpT-16		SpT-16: Trace Organics		1.6 (80)	14-16-15-20 (31)					
	SpT-17		30.4'-30.7': Cobble		1.4 (100)	21-23-50/0.4'					
35	SpT-18				1.8 (90)	10-9-11-19 (20)					
	SpT-19		35.7' Silty Sand, (SM), Fine, Compact To Dense, Light Brown, Moist, [Glacial Till], (0-10% Gravel)		1.6 (80)	16-22-21-23 (43)					
40	SpT-20		39.4'-39.7': Cobble	SM	2.0 (100)	12-16-28-23 (44)					

Notes: Layer USCS Classification Based On ASTM D2487
Layer Density Based On Field SPT N-Values

(Continued Next Page)

NRCS - DAPP BORING LOG 172719-17 - SITE 3.GPJ NOLAN RUN DATABASE TEMP.GDT 7/9/20

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28 North Main Street
Randolph, VT 05060

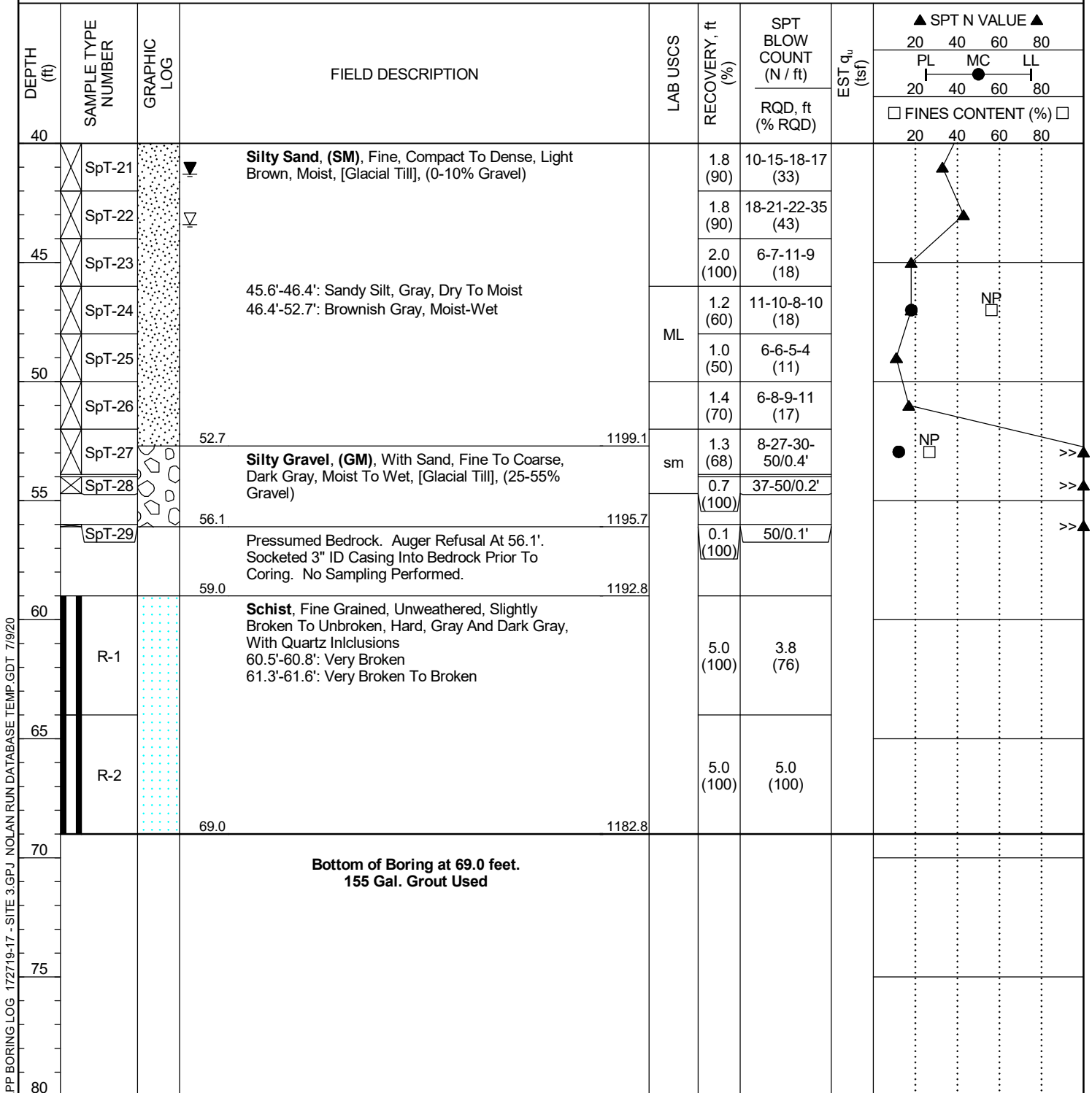
VISUAL CLASSIFICATION LOG

JB3-19-2

PAGE 2 OF 2

PROJECT: Jewell Brook Watershed
PROJECT NUMBER: 172719-17
LOCATION: Ludlow, Windsor County, VT
CLIENT: NRCS

DATE STARTED: 10/28/2019 **DRILLING CONTRACTOR:** NEBC
DATE COMPLETED: 10/29/2019 **DRILLER:** Matt Soucy
LOGGED BY: AA **DRILLING METHOD:** 4.25" ID HSA, 2" OD SBS (8")
CHECKED BY: QDW **CORING METHOD:** NX (Cuttings Rem. w/Water)
LOCATION: Site 3 Main **GROUND WATER LEVELS:**
Embankment ∇ **TIME OF DRILLING:** 43.4 ft / El. 1208.4 ft
ELEVATION: 1251.848 ft. ∇ **END OF DRILLING:** 41.3 ft / El. 1210.5 ft
(N) 325,173.65 **(E)** 1,584,003.16 **AFTER DRILLING:** N/A



NRCS - DAPP BORING LOG 172719-17 - SITE 3.GPJ NOLAN RUN DATABASE TEMP.GDT 7/9/20

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28 North Main Street

Randolph, VT 05060

VISUAL CLASSIFICATION LOG**JB3-19-3**

PAGE 1 OF 1

PROJECT: Jewell Brook Watershed**PROJECT NUMBER:** 172719-17**LOCATION:** Ludlow, Windsor County, VT**CLIENT:** NRCS**DATE STARTED:** 10/30/2019 **DRILLING CONTRACTOR:** NEBC**DATE COMPLETED:** 10/30/2019 **DRILLER:** Matt Soucy**LOGGED BY:** AA**DRILLING METHOD:** 4.25" ID HSA, 2" OD SBS (8")**CHECKED BY:** QDW**CORING METHOD:** NX (Cuttings Rem. w/Water)**LOCATION:** Site 3**GROUND WATER LEVELS:**

Downstream Toe

TIME OF DRILLING: Dry

ELEVATION: 1190.81 ft.

END OF DRILLING: 0.0 ft / El. 1190.8 ft

(N) 325,147.69 (E) 1,584,245.76 **AFTER DRILLING:** N/A

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	FIELD DESCRIPTION	LAB USCS	RECOVERY, ft (%)	SPT BLOW COUNT (N / ft) RQD, ft (% RQD)	EST q_u (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
0								□ FINES CONTENT (%) □			
								20	40	60	80
0			0.3' Topsoil , Brown, Moist								
	SpT-1		1.5' Silty Sand (SM) , With Gravel, Fine To Coarse, Compact, Brown, Moist, (20-30% Gravel)		0.8 (50)	2-5-7-50/0.1'					>>▲
			Presumed Bedrock. Auger Refusal At 4.5'. Socketed 3" ID Casing Into Bedrock Prior To Coring. No Sampling Performed.								
5	SpT-2		SpT-2: Powdered Rock		0.1 (100)	50/0.1'					>>▲
			6.0'								
			7.5' Schist , Fine Grained, Slightly Weathered, Very Broken To Broken, Hard, Gray And Dark Gray, With Quartz Inclusions		4.9 (98)	3.3 (66)					
10	R-1		Schist , Fine Grained, Slightly Weathered To Unweathered, Broken To Unbroken, Hard, Gray And Dark Gray, With Quartz Inclusions 8.5'-8.7': Very Broken								
			11.8'-11.9': Very Broken								
15	R-2				5.0 (100)	4.2 (84)					
			16.0'								
			Auger Refusal at 4.5 feet. Bottom of Boring at 16.0 feet. 20 Gal. Grout Used								
20											
25											
30											
35											

Notes: Layer USCS Classification Based On ASTM D2487
Layer Density Based On Field SPT N-Values

NRCS - DAPP BORING LOG 172719-17 - SITE 3.GPJ NOLAN RUN DATABASE TEMP.GDT 7/19/20

DDK ENGINEERING

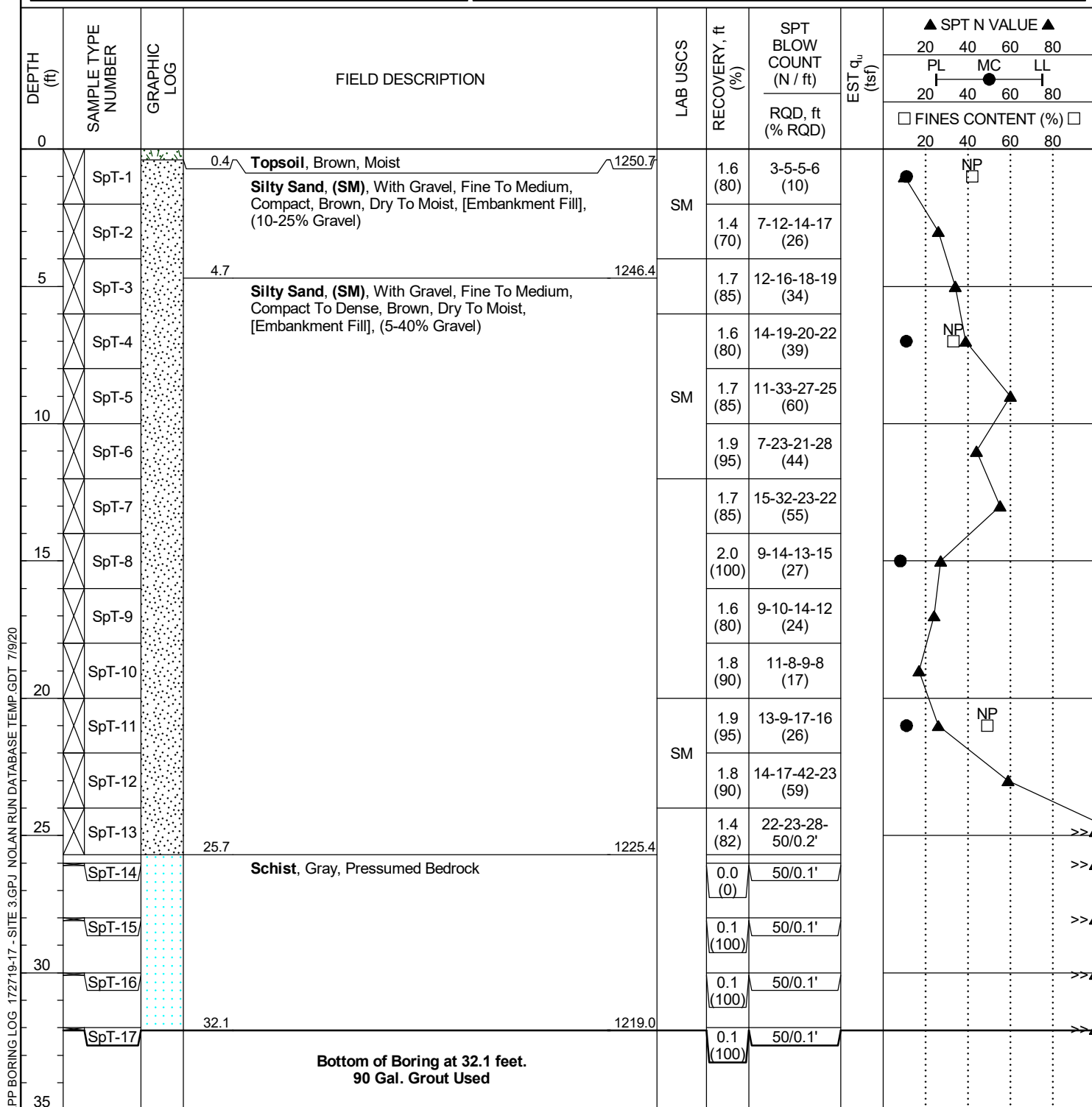
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28 North Main Street
Randolph, VT 05060**VISUAL CLASSIFICATION LOG****JB3-19-4**

PAGE 1 OF 1

PROJECT: Jewell Brook Watershed**PROJECT NUMBER:** 172719-17**LOCATION:** Ludlow, Windsor County, VT**CLIENT:** NRCS**DATE STARTED:** 10/23/2019 **DRILLING CONTRACTOR:** NEBC**DATE COMPLETED:** 10/23/2019 **DRILLER:** Matt Soucy**LOGGED BY:** AA**DRILLING METHOD:** 4.25" ID HSA, 2" OD SBS (8")**CHECKED BY:** QDW**CORING METHOD:** N/A**LOCATION:** Site 3 Saddle**GROUND WATER LEVELS:**

Dam Embankment

TIME OF DRILLING: N/A**ELEVATION:** 1251.093 ft.**END OF DRILLING:** Dry**(N)** 324,606.57 **(E)** 1,584,069.25**AFTER DRILLING:** N/A**Notes:** Layer USCS Classification Based On ASTM D2487
Layer Density Based On Field SPT N-Values

NRCS - DAPP BORING LOG 172719-17 - SITE 3.GPJ NOLAN RUN DATABASE TEMP.GDT 7/9/20

**28 North Main Street
Randolph, VT 05060**

PAGE 1 OF 1

(N) 325,412.94 (E) 1,584,116.95 25hrs AFTER DRILLING: 15.4 ft / El. 1217.1 ft

CLIENT: NRCS

[illegible]

**Notes: Layer USCS Classification Based On ASTM D2487
Layer Density Based On Field SPT N-Values**

IRCS - DAPP BORING LOG 172719-17 - SITE 3.GPJ NOLAN RUN DATABASE TEMP.GDT 7/9/20

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28 North Main Street
Randolph, VT 05060**VISUAL CLASSIFICATION LOG****JB3-19-202**

PAGE 1 OF 1

PROJECT: Jewell Brook Watershed**PROJECT NUMBER:** 172719-17**LOCATION:** Ludlow, Windsor County, VT**CLIENT:** NRCS**DATE STARTED:** 10/21/2019**DRILLING CONTRACTOR:** NEBC**DATE COMPLETED:** 10/21/2019**DRILLER:** Matt Soucy**LOGGED BY:** AA**DRILLING METHOD:** 4.25" ID HSA, 2" OD SBS (8")**CHECKED BY:** QDW**CORING METHOD:** N/A**LOCATION:** Site 3 Spillway**GROUND WATER LEVELS:****TIME OF DRILLING:** N/A**ELEVATION:** 1241.837 ft.**END OF DRILLING:** Dry**(N)** 325,575.61 **(E)** 1,583,961.53 **50hrs AFTER DRILLING:** 15.1 ft / El. 1226.7 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	FIELD DESCRIPTION	LAB USCS	RECOVERY, ft (%)	SPT BLOW COUNT (N / ft)	EST q_u (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
						RQD, ft (% RQD)		20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
0			0.3' Topsoil , Brown, Moist								
	SpT-1		Silty Sand, (SM) , With Gravel, Fine To Coarse, Compact To Dense, Brown With Gray, Dry To Moist, [Glacial Till], (20-30% Gravel)		1.3 (65)	1-3-10-13 (13)					
	SpT-2			sm	1.4 (70)	8-18-24-30 (42)					
5	SpT-3				1.6 (80)	12-17-18-13 (35)					
			6.0' Sandy Silt, (ML) , Non Plastic, Compact, Grayish Brown, Moist, [Glacial Till], (0-10% Gravel)		2.0 (100)	10-12-14-13 (26)					
	SpT-4		Moist To Wet Below 10.6'	ML	1.6 (80)	8-12-13-11 (25)					
10	SpT-5				1.4 (70)	5-5-5-4 (10)					
	SpT-6			ML	1.5 (75)	2-7-7-8 (14)					
	SpT-7				1.3 (65)	5-9-7-8 (16)					
15	SpT-8				2.0 (100)	3-7-9-13 (16)					
	SpT-9		SpT-10: Dense	ML	2.0 (100)	11-15-18-27 (33)					
20	SpT-10										
			20.0' Bottom of Boring at 20.0 feet. 40 Gal. Grout Used								
25											
30											
35											

Notes: Layer USCS Classification Based On ASTM D2487
Layer Density Based On Field SPT N-Values

NRCS - DAPP BORING LOG 172719-17 - SITE 3.GPJ NOLAN RUN DATABASE TEMP.GDT 7/19/20

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28 North Main Street
Randolph, VT 05060**VISUAL CLASSIFICATION LOG****JB3-19-203**

PAGE 1 OF 1

PROJECT: Jewell Brook Watershed**PROJECT NUMBER:** 172719-17**LOCATION:** Ludlow, Windsor County, VT**CLIENT:** NRCS**DATE STARTED:** 10/22/2019 **DRILLING CONTRACTOR:** NEBC**DATE COMPLETED:** 10/22/2019 **DRILLER:** Matt Soucy**LOGGED BY:** AA**DRILLING METHOD:** 4.25" ID HSA, 2" OD SBS (8")**CHECKED BY:** QDW**CORING METHOD:** N/A**LOCATION:** Site 3 Spillway**GROUND WATER LEVELS:****TIME OF DRILLING:** N/A**ELEVATION:** 1241.643 ft.▼ **END OF DRILLING:** Dry(N) 325,526.82 (E) 1,583,815.25 ▼ **32hrs AFTER DRILLING:** Dry

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	FIELD DESCRIPTION	LAB USCS	RECOVERY, ft (%)	SPT BLOW COUNT (N / ft)	EST q _u (tsf)	▲ SPT N VALUE ▲			
						RQD, ft (% RQD)		20	40	60	80
								PL	MC	LL	
								□ FINES CONTENT (%) □			
20				40	60	80					

0			0.4' Topsoil , Brown, Moist								
	SpT-1		Silty Gravel, (GM) , With Sand, Fine To Coarse, Brown And Gray, Dry To Moist, [Glacial Till], (25-50% Gravel)	SM	1.2 (60)	1-3-20-16 (23)					
	SpT-2				0.7 (50)	11-12-50/0.4'					>>▲
5	SpT-3					0.9 (82)	9-36-50/0.1'				
			5.4		1236.2						
			Auger Refusal at 5.4 feet. Bottom of Boring at 5.4 feet. 15 Gal. Grout Used								
10											
15											
20											
25											
30											
35											

Notes: Layer USCS Classification Based On ASTM D2487
Layer Density Based On Field SPT N-Values

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28 North Main Street

Randolph, VT 05060

VISUAL CLASSIFICATION LOG**JB3-19-203A**

PAGE 1 OF 1

PROJECT: Jewell Brook Watershed**PROJECT NUMBER:** 172719-17**LOCATION:** Ludlow, Windsor County, VT**CLIENT:** NRCS**DATE STARTED:** 10/30/2019 **DRILLING CONTRACTOR:** NEBC**DATE COMPLETED:** 10/30/2019 **DRILLER:** Matt Soucy**LOGGED BY:** AA**DRILLING METHOD:** 4" Casing (4.5")**CHECKED BY:** QDW**CORING METHOD:** N/A**LOCATION:** Site 3 Spillway**GROUND WATER LEVELS:****TIME OF DRILLING:** N/A**ELEVATION:** 1242.015 ft.**END OF DRILLING:** 6.1 ft / El. 1235.9 ft**(N)** 325,524.44 **(E)** 1,583,821.72 **11hrs AFTER DRILLING:** 8.7 ft / El. 1233.3 ft

NRCS - DAPP BORING LOG 172719-17 - SITE 3.GPJ NOLAN RUN DATABASE TEMP.GDT 7/9/20

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	FIELD DESCRIPTION	LAB USCS	RECOVERY, ft (%)	SPT BLOW COUNT (N / ft) RQD, ft (% RQD)	EST q_u (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
0								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
			Advanced casing to 4.0 ft. No sampling performed.								
5	SpT-1		4.0 Silty Gravel, (GM) , With Sand, Fine To Coarse, Brown And Gray, Dry To Moist, [Glacial Till], (40-50% Gravel)		1.1 (79)	8-30-50/0.4'					
	SpT-2		6.3 Sandy Silt, (ML) , With Gravel, Non Plastic, Compact, Light Brown And Grayish Brown, Moist To Wet, [Glacial Till], (5-30% Gravel)	ML	0.8 (67)	18-41-50/0.2'					
10	SpT-3		7.2'-8.2': Cobbles/Boulder		1.6 (80)	14-24-19-18 (43)					
	SpT-4		10.0'-11.0': Cobbles/Boulder		0.1 (100)	50/0.1'					
15	SpT-5			ML	1.0 (50)	8-8-7-8 (15)					
	SpT-6				1.0 (50)	11-11-13-16 (24)					
	SpT-7		16.9'-18.5': Sand With Gravel, Brown		0.9 (45)	23-26-32-35 (58)					
20	SpT-8		19.8	ML	1.5 (83)	17-24-36-50/0.3'					
			Bottom of Boring at 19.8 feet. 15 Gal. Grout Used								
25											
30											
35											

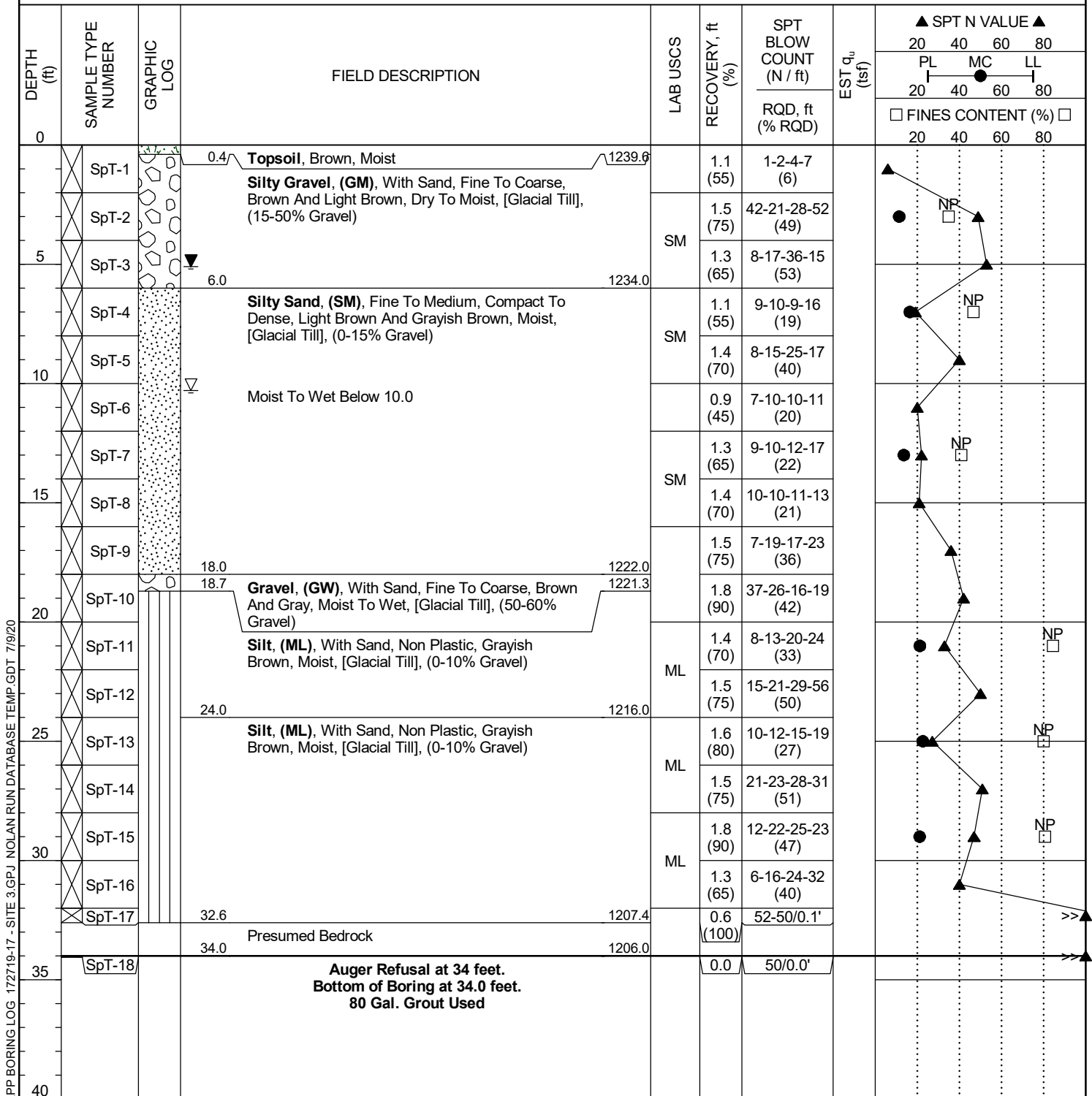
Notes: Layer USCS Classification Based On ASTM D2487
Layer Density Based On Field SPT N-Values

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28 North Main Street
Randolph, VT 05060**VISUAL CLASSIFICATION LOG****JB3-19-204**

PAGE 1 OF 1

PROJECT: Jewell Brook Watershed**PROJECT NUMBER:** 172719-17**LOCATION:** Ludlow, Windsor County, VT**CLIENT:** NRCS**DATE STARTED:** 10/22/2019**DRILLING CONTRACTOR:** NEBC**DATE COMPLETED:** 10/22/2019**DRILLER:** Matt Soucy**LOGGED BY:** AA**DRILLING METHOD:** 4.25" ID HSA, 2" OD SBS (8")**CHECKED BY:** QDW**CORING METHOD:** N/A**LOCATION:** Site 3 Spillway**GROUND WATER LEVELS:**▽ **TIME OF DRILLING:** 10.3 ft / El. 1229.7 ft**ELEVATION:** 1239.953 ft.▽ **END OF DRILLING:** 5.1 ft / El. 1234.9 ft(N) 325,629.24 (E) 1,583,775.98 ▽ **39hrs AFTER DRILLING:** Caved In**Notes:** Layer USCS Classification Based On ASTM D2487
Layer Density Based On Field SPT N-Values

NRCS - DAPP BORING LOG 172719-17 - SITE 3.GPJ NOLAN RUN DATABASE TEMP.GDT 7/9/20

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28 North Main Street
Randolph, VT 05060**VISUAL CLASSIFICATION LOG****JB3-19-204A**

PAGE 1 OF 2

PROJECT: Jewell Brook Watershed
PROJECT NUMBER: 172719-17
LOCATION: Ludlow, Windsor County, VT
CLIENT: NRCS**DATE STARTED:** 10/31/2019 **DRILLING CONTRACTOR:** NEBC
DATE COMPLETED: 10/31/2019 **DRILLER:** Matt Soucy
LOGGED BY: AA **DRILLING METHOD:** 4" Casing (4.5")
CHECKED BY: QDW **CORING METHOD:** NX (Cuttings Rem. w/Water)
LOCATION: Site 3 Spillway **GROUND WATER LEVELS:**
TIME OF DRILLING: N/A
ELEVATION: 1240.25 ft. **END OF DRILLING:** 6.2 ft / El. 1234.1 ft
(N) 325,626.25 **(E)** 1,583,788.20 **1hrs AFTER DRILLING:** 6.4 ft / El. 1233.9 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	FIELD DESCRIPTION	LAB USCS	RECOVERY, ft (%)	SPT BLOW COUNT (N / ft)	EST q_u (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								□ FINES CONTENT (%) □			
								20	40	60	80
0			Set 4" casing to 34.0' prior to coring.								
5											
10											
15											
20											
25											
30											
35			34.0			1206.3					

Notes: Layer USCS Classification Based On ASTM D2487
Layer Density Based On Field SPT N-Values

(Continued Next Page)

DDK ENGINEERING

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28 North Main Street
Randolph, VT 05060**VISUAL CLASSIFICATION LOG****JB3-19-204A**

PAGE 2 OF 2

PROJECT: Jewell Brook Watershed
PROJECT NUMBER: 172719-17
LOCATION: Ludlow, Windsor County, VT
CLIENT: NRCS**DATE STARTED:** 10/31/2019 **DRILLING CONTRACTOR:** NEBC
DATE COMPLETED: 10/31/2019 **DRILLER:** Matt Soucy
LOGGED BY: AA **DRILLING METHOD:** 4" Casing (4.5")
CHECKED BY: QDW **CORING METHOD:** NX (Cuttings Rem. w/Water)
LOCATION: Site 3 Spillway **GROUND WATER LEVELS:**
TIME OF DRILLING: N/A
ELEVATION: 1240.25 ft. **END OF DRILLING:** 6.2 ft / El. 1234.1 ft
(N) 325,626.25 **(E)** 1,583,788.20 **1hrs AFTER DRILLING:** 6.4 ft / El. 1233.9 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	FIELD DESCRIPTION	LAB USCS	RECOVERY, ft (%)	SPT BLOW COUNT (N / ft) RQD, ft (% RQD)	EST q_u (tsf)	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
35								20	40	60	80
	R-1		Schist , Slightly Weathered To Unweathered, Very Broken To Unbroken, Hard, Gray And Dark Gray, With Quartz Inclusions 34.0'-35.2': Very Broken To Broken 35.2'-39.0': Slightly Broken To Unbroken 39.0'-44.0': Very Broken To Slightly Broken 38.3'-44.0': Diagonal Fractures Every 0.1' To 0.3'		5.0 (100)	2.7 (54)					
40	R-2				5.0 (100)	0.0 (0)					
45			44.0	1196.3							
			Bottom of Boring at 44.0 feet. 35 Gal. Grout Used								
50											
55											
60											
65											
70											

Notes: Layer USCS Classification Based On ASTM D2487
Layer Density Based On Field SPT N-Values

NRCS - DAPP BORING LOG 172719-17 - SITE 3.GPJ NOLAN RUN DATABASE TEMP.GDT 7/9/20

APPENDIX B
ROCK CORE PHOTOGRAPHS



Test Boring JB3-19-2
Box: 1 of 1
Depth: 59.0' to 69.0'
Condition: Dry
Date: October 29, 2019



Test Boring JB3-19-2
Box: 1 of 1
Depth: 59.0' to 69.0'
Condition: Wet
Date: October 29, 2019



Test Boring JB3-19-3
Box: 1 of 1
Depth: 6.0' to 16.0'
Condition: Dry
Date: October 30, 2019



Test Boring JB3-19-3
Box: 1 of 1
Depth: 6.0' to 16.0'
Condition: Wet
Date: October 30, 2019



Test Boring JB3-19-204A
Box: 1 of 1
Depth: 34.0' to 44.0'
Condition: Dry
Date: October 31, 2019



Test Boring JB3-19-204A
Box: 1 of 1
Depth: 34.0' to 44.0'
Condition: Wet
Date: October 31, 2019

APPENDIX C
LABORATORY TEST RESULTS

MOISTURE CONTENT

ASTM D 2216-10

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001

Lab ID:	-090	-091	-092	-093	-094
Boring No.:	JB3-19-1	JB3-19-1	JB3-19-1	JB3-19-1	JB3-19-1
Depth (ft):	2.0-6.0	8.0-12.0	18.0-22.0	28.0-30.0	36.0-40.0
Sample No.:	SpT-2/3	SpT-5/6	SpT-10/11	SpT-15	SpT-19/20
Tare Number	8	2	35	20	46
Wt. of Tare & Wet Sample (g)	34.27	55.34	22.81	57.83	27.38
Wt. of Tare & Dry Sample (g)	32.65	52.60	21.36	53.16	25.22
Weight of Tare (g)	8.31	8.30	8.43	8.45	8.47
Weight of Water (g)	1.62	2.74	1.45	4.67	2.16
Weight of Dry Sample (g)	24.34	44.30	12.93	44.71	16.75
Water Content (%)	6.7	6.2	11.2	10.4	12.9

Lab ID	-095	-096	-097	-098	-099
Boring No.	JB3-19-1	JB3-19-1	JB3-19-1	JB3-19-2	JB3-19-2
Depth (ft)	42.0-44.0	46.0-48.0	54.0-58.0	2.0-4.0	6.0-10.0
Sample No.	SpT-22	SpT-24	SpT-28/29	SpT-2	SpT-4/5
Tare Number	14	19	36	12	38
Wt. of Tare & Wet Sample (g)	111.90	28.13	33.74	32.43	31.24
Wt. of Tare & Dry Sample (g)	93.25	24.49	28.83	29.78	29.41
Weight of Tare (g)	8.48	8.29	8.47	8.47	8.36
Weight of Water (g)	18.65	3.64	4.91	2.65	1.83
Weight of Dry Sample (g)	84.77	16.20	20.36	21.31	21.05
Water Content (%)	22.0	22.5	24.1	12.4	8.7

Notes :

Tested By SG Date 1/17/20 Checked By JLK Date 1/20/20

MOISTURE CONTENT

ASTM D 2216-10

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001

Lab ID:	-100	-101	-102	-103	-104
Boring No.:	JB3-19-2	JB3-19-2	JB3-19-2	JB3-19-2	JB3-19-2
Depth (ft):	20.0-24.0	24.0-30.0	36.0-40.0	46.0-50.0	52.0-54.7
Sample No.:	SpT-11/12	SpT-13/14/15	SpT-19/20	SpT-24/25	SpT-27/28
Tare Number	17	16	39	26	30
Wt. of Tare & Wet Sample (g)	60.22	35.67	26.49	26.26	47.21
Wt. of Tare & Dry Sample (g)	54.09	32.58	24.52	23.53	43.04
Weight of Tare (g)	8.48	8.32	8.48	8.47	8.49
Weight of Water (g)	6.13	3.09	1.97	2.73	4.17
Weight of Dry Sample (g)	45.61	24.26	16.04	15.06	34.55
Water Content (%)	13.4	12.7	12.3	18.1	12.1

Lab ID	-106	-107	-108	-109	-110
Boring No.	JB3-19-4	JB3-19-4	JB3-19-4	JB3-19-4	JB3-19-201
Depth (ft)	0.0-4.0	6.0-12.0	14.0-16.0	20.0-24.0	2.0-6.0
Sample No.	SpT-1/2	SpT-4/5/6	SpT-8	SpT-11/12	SpT-2/3
Tare Number	9	49	31	4	43
Wt. of Tare & Wet Sample (g)	24.93	30.35	82.57	37.03	27.29
Wt. of Tare & Dry Sample (g)	23.28	28.19	77.03	34.19	23.21
Weight of Tare (g)	8.25	8.38	8.35	8.36	8.51
Weight of Water (g)	1.65	2.16	5.54	2.84	4.08
Weight of Dry Sample (g)	15.03	19.81	68.68	25.83	14.70
Water Content (%)	11.0	10.9	8.1	11.0	27.8

Notes :

Tested By SG Date 1/17/20 Checked By JLK Date 1/20/20

MOISTURE CONTENT

ASTM D 2216-10

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001

Lab ID:	-111	-112	-113	-114	-115
Boring No.:	JB3-19-201	JB3-19-201	JB3-19-201	JB3-19-202	JB3-19-202
Depth (ft):	6.0-8.0	10.0-14.0	16.0-20.0	2.0-6.0	6.0-10.0
Sample No.:	SpT-4	SpT-6/7	SpT-9/10	SpT-2/3	SpT-4/5
Tare Number	37	50	13	47	22
Wt. of Tare & Wet Sample (g)	21.27	24.64	30.30	22.54	32.99
Wt. of Tare & Dry Sample (g)	17.95	21.88	26.78	21.60	28.32
Weight of Tare (g)	8.34	8.46	8.29	8.42	8.31
Weight of Water (g)	3.32	2.76	3.52	0.94	4.67
Weight of Dry Sample (g)	9.61	13.42	18.49	13.18	20.01
Water Content (%)	34.5	20.6	19.0	7.1	23.3

Lab ID	-116	-117	-118	-119	-120
Boring No.	JB3-19-202	JB3-19-202	JB3-19-203	JB3-19-203A	JB3-19-203A
Depth (ft)	10.0-14.0	16.0-20.0	0.0-3.4	6.0-10.0	12.0-16.0
Sample No.	SpT-6/7	SpT-9/10	SpT-1/2	SpT-2/3	SpT-5/6
Tare Number	14	18	32	5	30
Wt. of Tare & Wet Sample (g)	34.14	30.98	26.35	27.20	36.25
Wt. of Tare & Dry Sample (g)	29.37	27.07	24.04	24.56	31.90
Weight of Tare (g)	8.46	8.46	8.44	8.31	8.48
Weight of Water (g)	4.77	3.91	2.31	2.64	4.35
Weight of Dry Sample (g)	20.91	18.61	15.60	16.25	23.42
Water Content (%)	22.8	21.0	14.8	16.2	18.6

Notes :

Tested By SG Date 1/24/20 Checked By JLK Date 1/27/20

MOISTURE CONTENT

ASTM D 2216-10

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001

Lab ID:	-121	-122	-123	-124	-125
Boring No.:	JB3-19-203A	JB3-19-204	JB3-19-204	JB3-19-204	JB3-19-204
Depth (ft):	18.0-19.8	2.0-6.0	6.0-10.0	12.0-16.0	20.0-24.0
Sample No.:	SpT-8	SpT-2/3	SpT-4/5	SpT-7/8	SpT-11/12
Tare Number	3	31	43	26	12
Wt. of Tare & Wet Sample (g)	23.62	63.84	30.59	42.00	37.98
Wt. of Tare & Dry Sample (g)	21.13	58.17	27.48	37.98	32.81
Weight of Tare (g)	8.43	8.35	8.48	8.46	8.46
Weight of Water (g)	2.49	5.67	3.11	4.02	5.17
Weight of Dry Sample (g)	12.70	49.82	19.00	29.52	24.35
Water Content (%)	19.6	11.4	16.4	13.6	21.2

Lab ID	-126	-127
Boring No.	JB3-19-204	JB3-19-204
Depth (ft)	24.0-28.0	28.0-32.0
Sample No.	SpT-13/14	SpT-15/16
Tare Number	45	28
Wt. of Tare & Wet Sample (g)	36.45	29.45
Wt. of Tare & Dry Sample (g)	31.29	25.77
Weight of Tare (g)	8.46	8.34
Weight of Water (g)	5.16	3.68
Weight of Dry Sample (g)	22.83	17.43
Water Content (%)	22.6	21.1

Notes :

Tested By SG Date 1/24/20 Checked By JLK Date 1/27/20

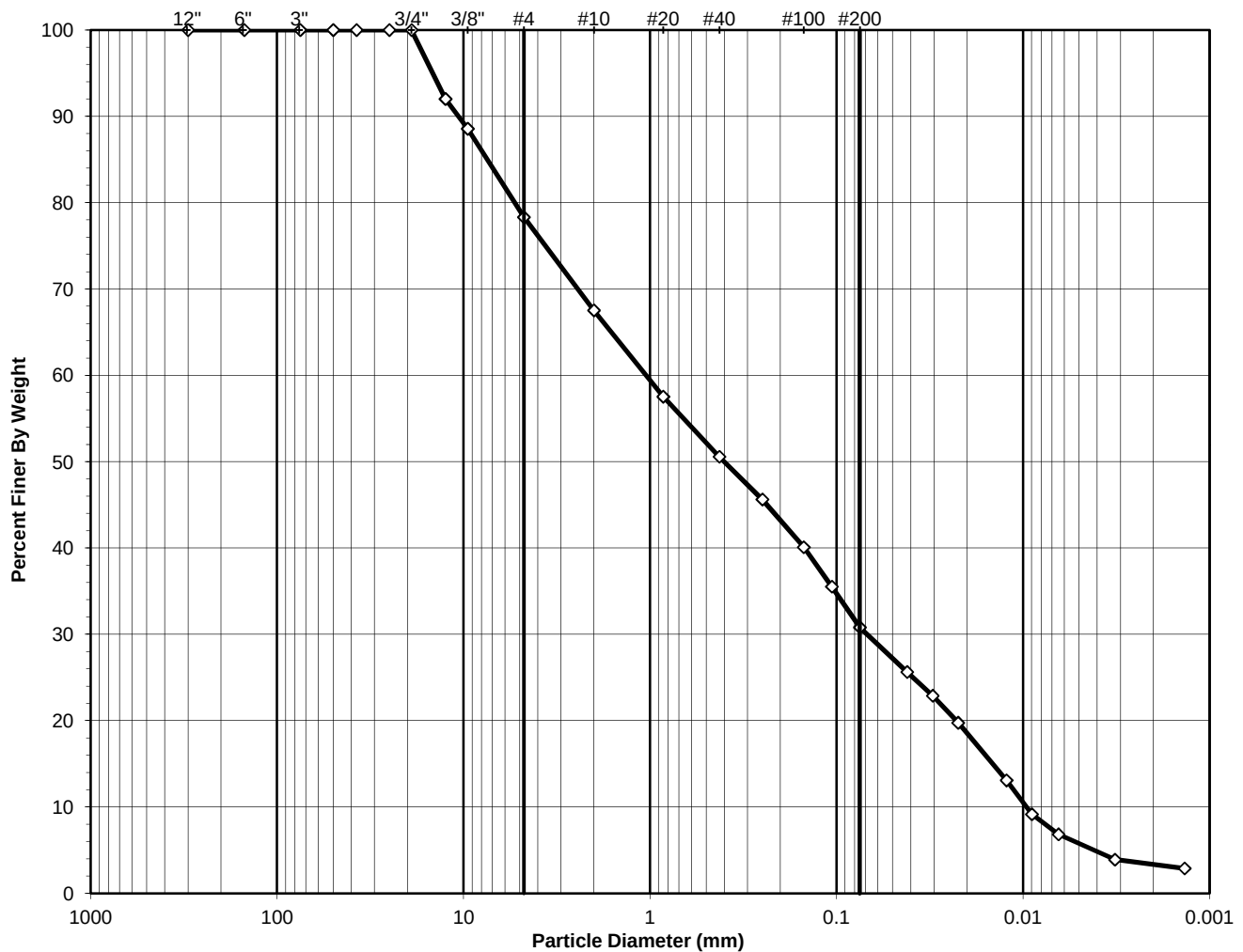
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-090

Boring No.: JB3-19-1
 Depth (ft): 2.0-6.0
 Sample No.: SpT-2/3
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
SM, TESTED

D50 = 0.40

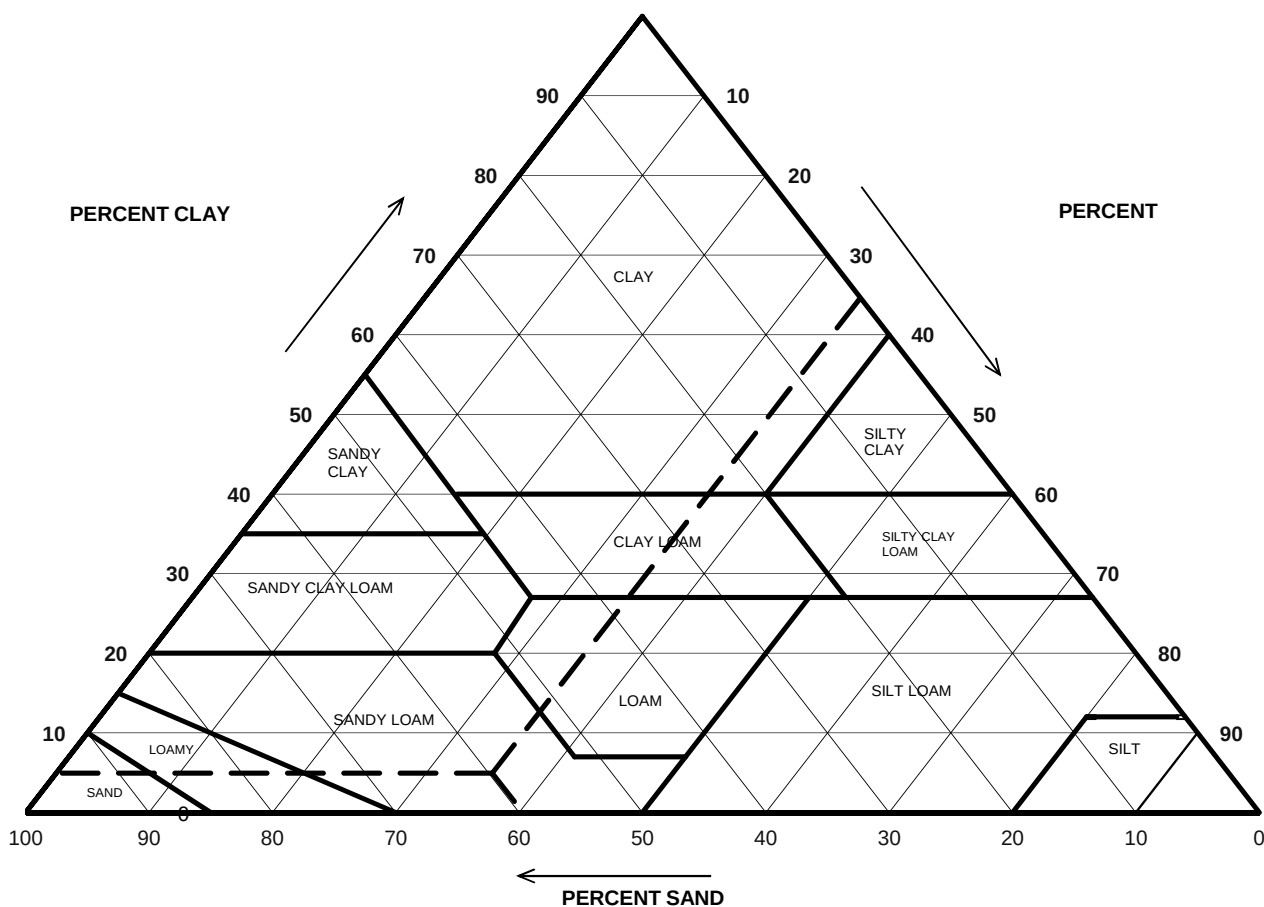
USCS Classification:
SILTY SAND WITH GRAVEL
(NON-PLASTIC FINES)

Tested By HL Date 1/23/20 Checked By KC Date 1/27/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-090

Boring No.: JB3-19-1
 Depth (ft): 2.0-6.0
 Sample No.: SpT-2/3
 Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	32.47	
2	67.53	Sand	40.31	59.69
0.05	27.22	Silt	23.88	35.36
0.002	3.34	Clay	3.34	4.95

USDA Classification: SANDY LOAM

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-090

Boring No.: JB3-19-1
Depth (ft): 2.0-6.0
Sample No.: SpT-2/3
Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1445	Tare No.:	NA	Tare No.:	1445	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	503.65	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	503.65	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	473.31	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	473.31	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	146.09	Weight of Tare (g):	NA	Weight of Tare (g):	146.09	Weight of Tare (g):	NA
Weight of Water (g):	30.34	Weight of Water (g):	NA	Weight of Water (g):	30.34	Weight of Water (g):	NA
Weight of Dry Soil (g):	327.22	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	327.22	Weight of Dry Soil (g):	NA
Moisture Content (%):	9.3	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	327.22	Total Dry Weight of Sample (g):	327.22	Dry Weight of Sample (g):	327.22	Total Dry Weight of Sample (g):	327.22
Tare No. (Sub-Specimen)	1445	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1445	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	503.65	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	503.65	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	146.09	Dry Weight of - 3/4" Sample (g):	327.22	Weight of Tare (g):	146.09	Dry Weight of - 3/4" Sample (g):	327.22
Sub-Specimen Wet Weight (g):	357.56	Dry Weight -3/4" +3/8" Sample (g):	37.42	Sub-Specimen Wet Weight (g):	357.56	Dry Weight -3/4" +3/8" Sample (g):	37.42
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	289.80	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	289.80
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	26.13	(**)	7.99	92.01	92
3/8"	9.5	11.29	3.45	11.44	88.56	89
#4	4.75	33.52	10.24	21.68	78.32	78
#10	2	35.31	10.79	32.47	67.53	68
#20	0.85	32.71	(**)	42.47	57.53	58
#40	0.425	22.76	6.96	49.42	50.58	51
#60	0.25	16.20	4.95	54.37	45.63	46
#100	0.15	18.09	5.53	59.90	40.10	40
#140	0.106	14.94	4.57	64.47	35.53	36
#200	0.075	15.46	4.72	69.19	30.81	31
Pan	-	100.81	30.81	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
(**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By HL Date 1/23/20 Checked By KC Date 1/27/20

HYDROMETER ANALYSIS

ASTM D7928-17

Client:	D'Appolonia	Boring No.:	JB3-19-1
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	2.0-6.0
Project No.:	2020-002-001	Sample No.:	SpT-2/3
Lab ID:	2020-002-001-090	Soil Color:	Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	38.5	22.2	5.82	10.0	0.0419	83.2	25.6
2	35.0	22.2	5.82	10.6	0.0305	74.3	22.9
4	31.0	22.2	5.82	11.3	0.0223	64.1	19.8
15	22.5	22.2	5.82	12.9	0.0123	42.5	13.1
30	17.5	22.2	5.82	13.8	0.0090	29.8	9.2
60	14.5	22.3	5.78	14.3	0.0065	22.2	6.8
250	10.5	23.0	5.52	15.0	0.0032	12.7	3.9
1440	9.5	22.2	5.82	15.2	0.0014	9.4	2.9

Soil Specimen Data

Tare No.:	957	Percent Finer than # 200:	30.81
Wt. of Tare & Dry Material (g):	143.35		
Weight of Tare (g):	99.53	Specific Gravity:	2.70 Assumed
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	38.82		

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	G- 1819
Cylinder	G- 771
Thermometer	G- 1505
Balance	G- 657
#200 Sieve	G- 1944
Foam Inhibitor Used	No

Tested By	TO	Date	1/23/20	Checked By	KC	Date	1/27/20
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page 4 of 4

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-090

Boring No.: JB3-19-1
Depth (ft): 2.0-6.0
Sample No.: SpT-2/3
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	8
Wt. of Tare & Wet Sample (g)	34.27
Wt. of Tare & Dry Sample (g)	32.65
Weight of Tare (g)	8.31
Weight of Water (g)	1.62
Weight of Dry Sample (g)	24.34

Water Content (%) **6.7**

NON - PLASTIC MATERIAL

Tested By *FS* *Date* *1/21/20* *Checked By* *JLK* *Date* *1/21/20*

SPECIFIC GRAVITY

ASTM D 854-14

Client:	D'Appolonia	Boring No.:	JB3-19-1
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	8.0-12.0
Project No.:	2020-002-001	Sample No.:	SpT-5/6
Lab ID:	2020-002-001-091	Visual Description:	Brown Silty Clay

(Minus No.4 sieve material, oven dried)

Replicate Number	1	2
Pycnometer ID:	G 1917	G 1991
Weight of Pycnometer & Soil & Water (g):	747.23	748.4
Temperature (°C):	25.1	25.4
Weight of Pycnometer & Water (g):	683.97	684.48
Tare Number:	672	2343
Weight of Tare & Dry Soil (g):	196.53	192.06
Weight of Tare (g):	95.02	91.96
Weight of Dry Soil (g):	101.51	100.10
Specific Gravity of Soil @ Measured Temperature:	2.654	2.767
Specific Gravity of Water @ Measured Temperature:	0.99703	0.99695
Conversion Factor for Measured Temperature:	0.99882	0.99874
Specific Gravity @ 20° Celsius:	2.657	2.770

Average Specific Gravity @ 20° Celsius

2.71

Tested By TO Date 1/28/20 Checked By BRB Date 1/29/20

DCN: CT-S5 Date: 3/26/18 Revision: 21

S:\Excel\Excel QA\Spreadsheets\Specific Gravity.xls

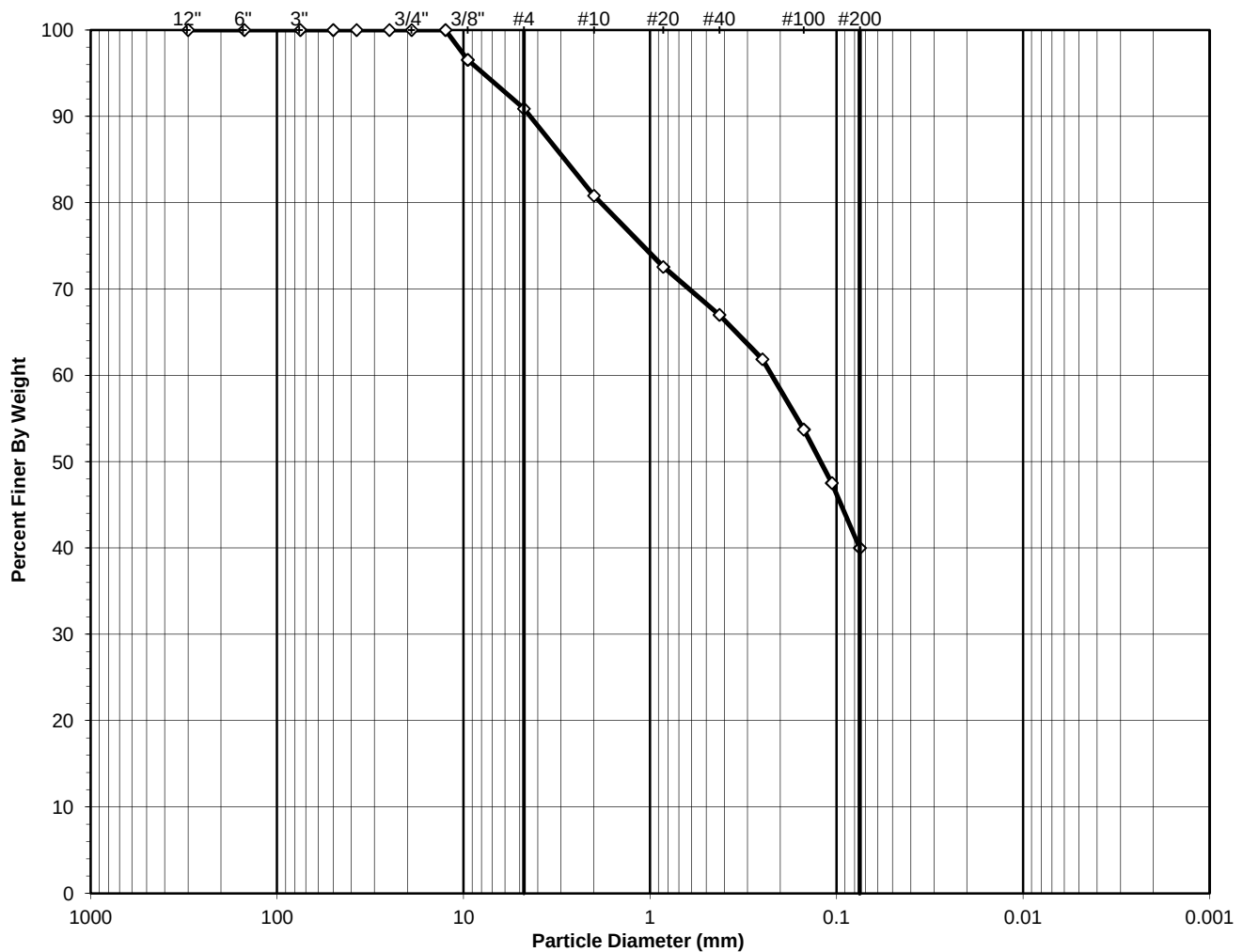
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-092

Boring No.: JB3-19-1
 Depth (ft): 18.0-22.0
 Sample No.: SpT-10/11
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
SM, TESTED

D50 = 0.12

USCS Classification:
SILTY SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-092

Boring No.: JB3-19-1
 Depth (ft): 18.0-22.0
 Sample No.: SpT-10/11
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1513	Tare No.:	NA	Tare No.:	1513	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	351.48	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	351.48	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	331.98	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	331.98	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	148.22	Weight of Tare (g):	NA	Weight of Tare (g):	148.22	Weight of Tare (g):	NA
Weight of Water (g):	19.50	Weight of Water (g):	NA	Weight of Water (g):	19.50	Weight of Water (g):	NA
Weight of Dry Soil (g):	183.76	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	183.76	Weight of Dry Soil (g):	NA
Moisture Content (%):	10.6	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	183.76	Total Dry Weight of Sample (g):	183.76	Dry Weight of Sample (g):	183.76	Total Dry Weight of Sample (g):	183.76
Tare No. (Sub-Specimen)	1513	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1513	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	351.48	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	351.48	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	148.22	Dry Weight of - 3/4" Sample (g):	183.76	Weight of Tare (g):	148.22	Dry Weight of - 3/4" Sample (g):	183.76
Sub-Specimen Wet Weight (g):	203.26	Dry Weight -3/4" +3/8" Sample (g):	6.35	Sub-Specimen Wet Weight (g):	203.26	Dry Weight -3/4" +3/8" Sample (g):	6.35
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	177.41	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	177.41
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**)	0.00	100.00	100
3/8"	9.5	6.35	3.46	3.46	96.54	97
#4	4.75	10.39	5.65	9.11	90.89	91
#10	2	18.51	10.07	19.18	80.82	81
#20	0.85	15.17	(**)	27.44	72.56	73
#40	0.425	10.21	5.56	32.99	67.01	67
#60	0.25	9.44	5.14	38.13	61.87	62
#100	0.15	14.96	8.14	46.27	53.73	54
#140	0.106	11.39	6.20	52.47	47.53	48
#200	0.075	13.83	7.53	60.00	40.00	40
Pan	-	73.51	40.00	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-092

Boring No.: JB3-19-1
Depth (ft): 18.0-22.0
Sample No.: SpT-10/11
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	35
Wt. of Tare & Wet Sample (g)	22.81
Wt. of Tare & Dry Sample (g)	21.36
Weight of Tare (g)	8.43
Weight of Water (g)	1.45
Weight of Dry Sample (g)	12.93

Water Content (%)	11.2
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NON - PLASTIC MATERIAL

Tested By	FS	Date	1/22/20	Checked By	JLK	Date	1/22/20
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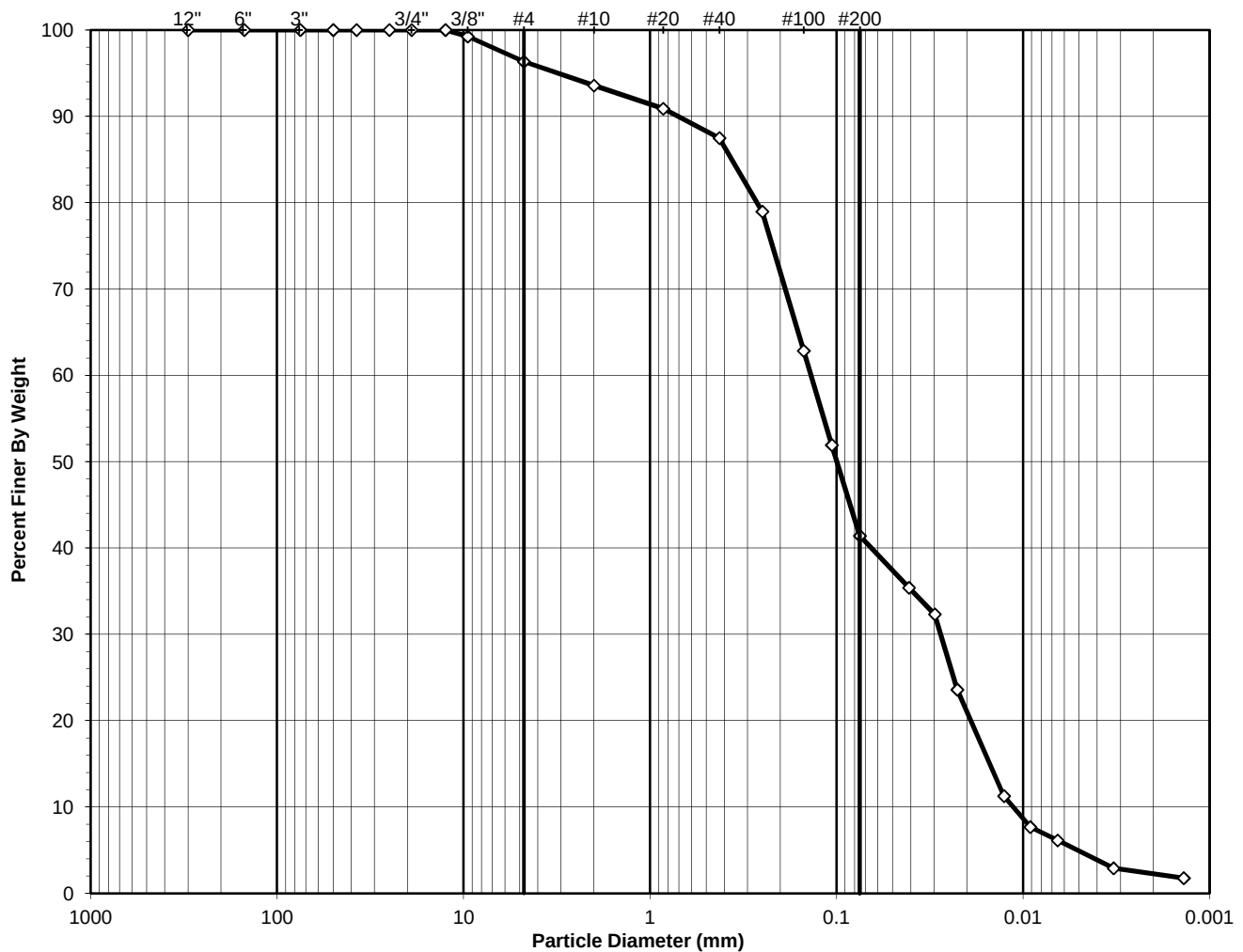
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-094

Boring No.: JB3-19-1
 Depth (ft): 36.0-40.0
 Sample No.: SpT-19/20
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
SM, TESTED

D50 = 0.10

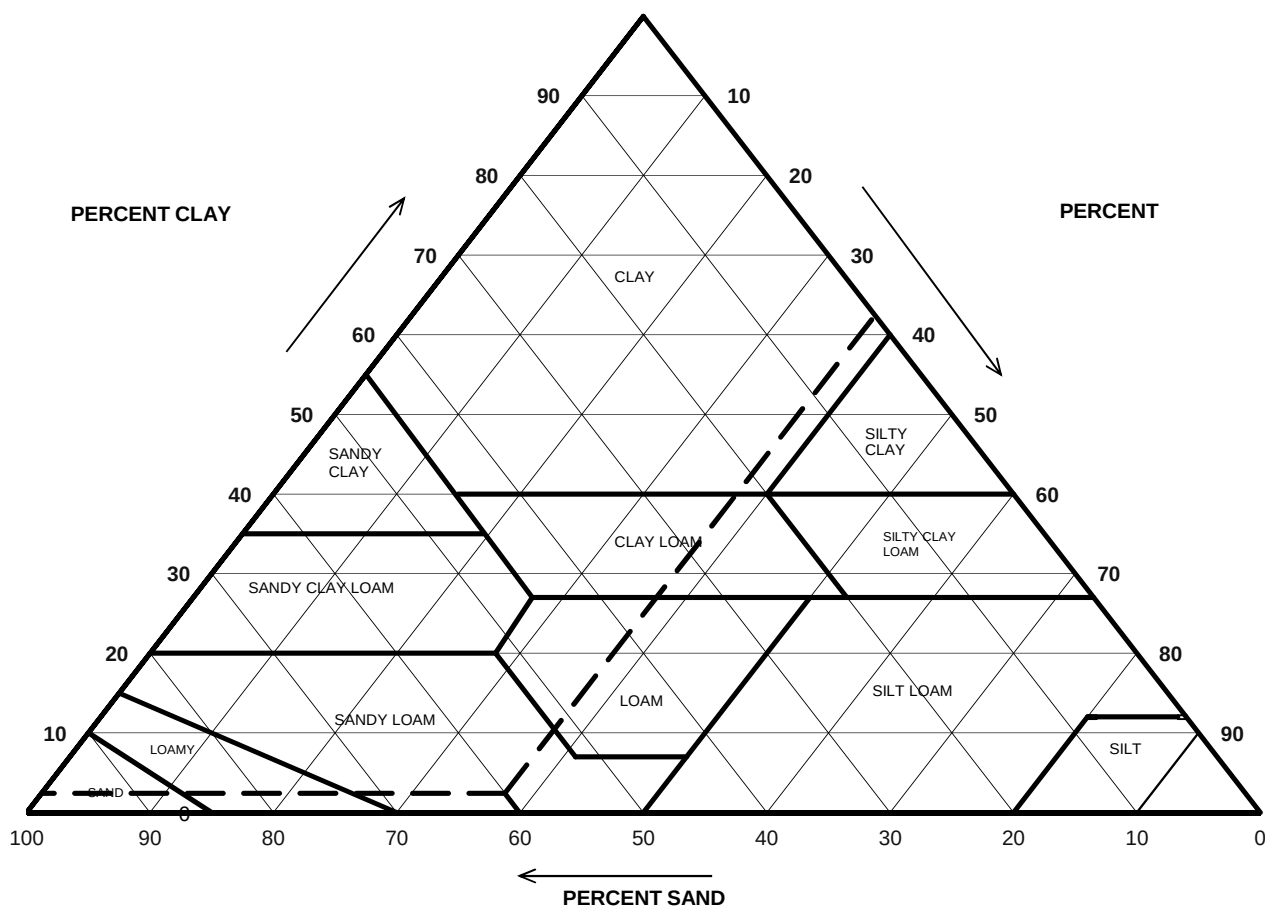
USCS Classification:
SILTY SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/21/20 Checked By KC Date 1/27/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-094

Boring No.: JB3-19-1
Depth (ft): 36.0-40.0
Sample No.: SpT-19/20
Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	6.43	
2	93.57	Sand	56.18	60.04
0.05	37.39	Silt	35.13	37.54
0.002	2.26	Clay	2.26	2.41

USDA Classification: **SANDY LOAM**

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-094

Boring No.: JB3-19-1
 Depth (ft): 36.0-40.0
 Sample No.: SpT-19/20
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1426	Tare No.:	NA	Tare No.:	1426	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	453.80	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	453.80	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	419.51	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	419.51	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	144.50	Weight of Tare (g):	NA	Weight of Tare (g):	144.50	Weight of Tare (g):	NA
Weight of Water (g):	34.29	Weight of Water (g):	NA	Weight of Water (g):	34.29	Weight of Water (g):	NA
Weight of Dry Soil (g):	275.01	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	275.01	Weight of Dry Soil (g):	NA
Moisture Content (%):	12.5	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	275.01	Total Dry Weight of Sample (g):	275.01	Dry Weight of Sample (g):	275.01	Total Dry Weight of Sample (g):	275.01
Tare No. (Sub-Specimen)	1426	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1426	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	453.80	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	453.80	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	144.50	Dry Weight of - 3/4" Sample (g):	275.01	Weight of Tare (g):	144.50	Dry Weight of - 3/4" Sample (g):	275.01
Sub-Specimen Wet Weight (g):	309.30	Dry Weight -3/4" +3/8" Sample (g):	2.08	Sub-Specimen Wet Weight (g):	309.30	Dry Weight -3/4" +3/8" Sample (g):	2.08
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	272.93	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	272.93
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*) 0.00	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**) 0.00	0.00	100.00	100
3/8"	9.5	2.08	0.76	0.76	99.24	99
#4	4.75	8.00	2.91	3.67	96.33	96
#10	2	7.61	2.77	6.43	93.57	94
#20	0.85	7.38	(**) 2.68	9.12	90.88	91
#40	0.425	9.35	3.40	12.52	87.48	87
#60	0.25	23.43	8.52	21.04	78.96	79
#100	0.15	44.35	16.13	37.16	62.84	63
#140	0.106	30.02	10.92	48.08	51.92	52
#200	0.075	28.92	10.52	58.59	41.41	41
Pan	-	113.87	41.41	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/21/20 Checked By KC Date 1/27/20

HYDROMETER ANALYSIS

ASTM D7928-17

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-094

Boring No.: JB3-19-1
 Depth (ft): 36.0-40.0
 Sample No.: SpT-19/20
 Soil Color: Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	40.0	23.0	5.52	9.7	0.0409	85.5	35.4
2	37.0	23.0	5.52	10.3	0.0297	78.1	32.3
4	28.5	23.0	5.52	11.8	0.0225	57.0	23.6
15	16.5	23.0	5.52	14.0	0.0127	27.2	11.3
30	13.0	23.0	5.52	14.6	0.0091	18.5	7.7
60	11.5	23.0	5.52	14.9	0.0065	14.8	6.1
250	8.5	22.6	5.67	15.4	0.0033	7.0	2.9
1440	7.5	22.3	5.78	15.6	0.0014	4.3	1.8

Soil Specimen Data

Tare No.:	301	Percent Finer than # 200:	41.41
Wt. of Tare & Dry Material (g):	148.89		
Weight of Tare (g):	104.01	Specific Gravity:	2.70 Assumed
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	39.88		

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	G- 1819
Cylinder	G- 366
Thermometer	G- 1505
Balance	G- 657
#200 Sieve	G- 1944
Foam Inhibitor Used	No

Tested By	FS	Date	1/22/20	Checked By	KC	Date	1/27/20
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page 4 of 4

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-094

Boring No.: JB3-19-1
Depth (ft): 36.0-40.0
Sample No.: SpT-19/20
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	46
Wt. of Tare & Wet Sample (g)	27.38
Wt. of Tare & Dry Sample (g)	25.22
Weight of Tare (g)	8.47
Weight of Water (g)	2.16
Weight of Dry Sample (g)	16.75

Water Content (%) **12.9**

NON - PLASTIC MATERIAL

Tested By *FS* *Date* *1/22/20* *Checked By* *JLK* *Date* *1/22/20*

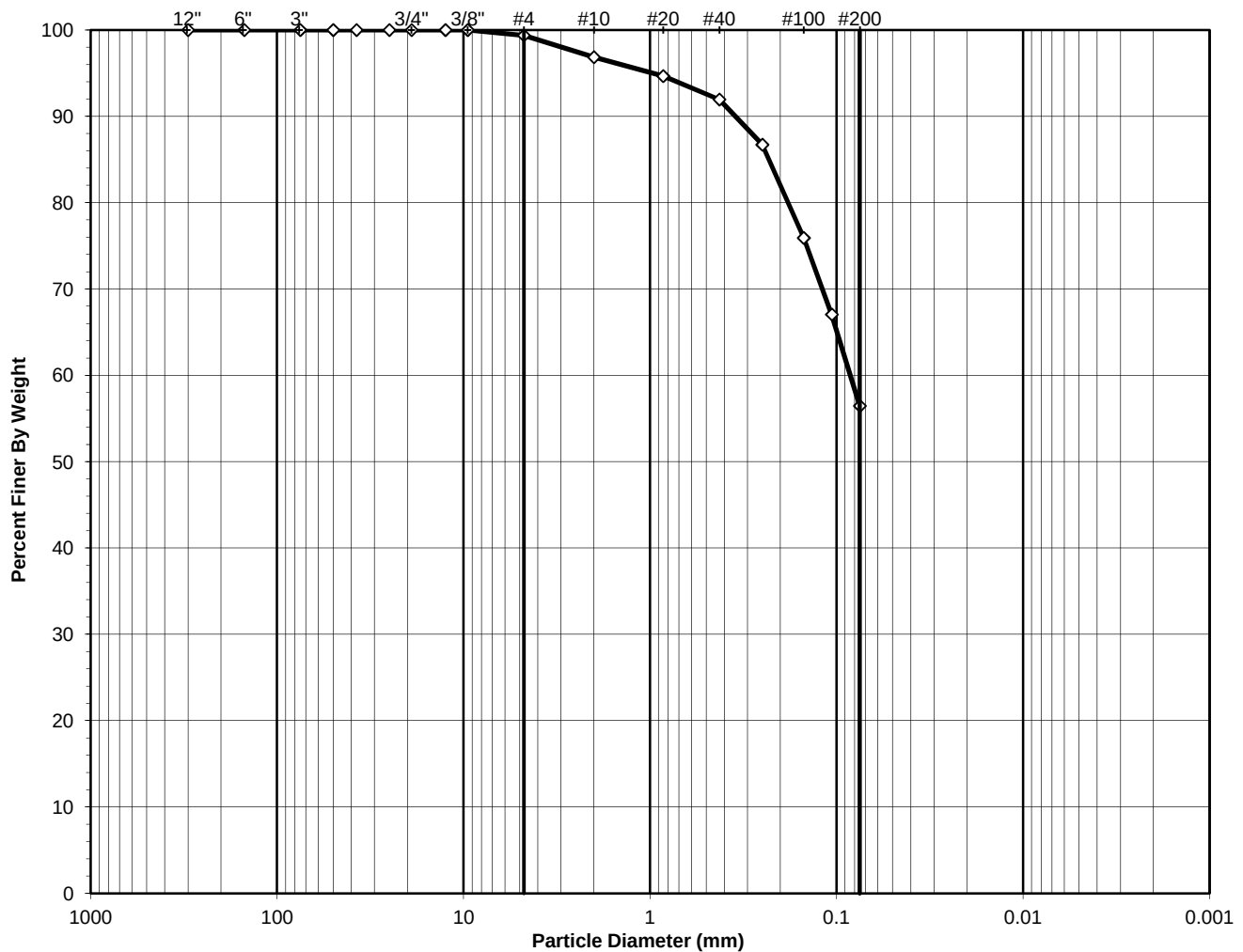
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-096

Boring No.: JB3-19-1
 Depth (ft): 46.0-48.0
 Sample No.: SpT-24
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
ML, TESTED

D50 = 0.05

USCS Classification:
SANDY SILT
(NON-PLASTIC FINES)

Tested By HL Date 1/23/20 Checked By KC Date 1/23/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-096

Boring No.: JB3-19-1
 Depth (ft): 46.0-48.0
 Sample No.: SpT-24
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	2025	Tare No.:	NA	Tare No.:	2025	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	367.56	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	367.56	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	328.11	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	328.11	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	146.78	Weight of Tare (g):	NA	Weight of Tare (g):	146.78	Weight of Tare (g):	NA
Weight of Water (g):	39.45	Weight of Water (g):	NA	Weight of Water (g):	39.45	Weight of Water (g):	NA
Weight of Dry Soil (g):	181.33	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	181.33	Weight of Dry Soil (g):	NA
Moisture Content (%):	21.8	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	181.33	Total Dry Weight of Sample (g):	181.33	Dry Weight of Sample (g):	181.33	Total Dry Weight of Sample (g):	181.33
Tare No. (Sub-Specimen)	2025	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	2025	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	367.56	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	367.56	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	146.78	Dry Weight of - 3/4" Sample (g):	181.33	Weight of Tare (g):	146.78	Dry Weight of - 3/4" Sample (g):	181.33
Sub-Specimen Wet Weight (g):	220.78	Dry Weight -3/4" +3/8" Sample (g):	0.00	Sub-Specimen Wet Weight (g):	220.78	Dry Weight -3/4" +3/8" Sample (g):	0.00
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	181.33	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	181.33
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100.0
6"	150	0.00	0.00	0.00	100.00	100.0
3"	75	0.00	0.00	0.00	100.00	100.0
2"	50	0.00	(*) 0.00	0.00	100.00	100.0
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.0
1"	25	0.00	0.00	0.00	100.00	100.0
3/4"	19	0.00	0.00	0.00	100.00	100.0
1/2"	12.5	0.00	(**) 0.00	0.00	100.00	100.0
3/8"	9.5	0.00	0.00	0.00	100.00	100.0
#4	4.75	1.13	0.62	0.62	99.38	99.4
#10	2	4.57	2.52	3.14	96.86	96.9
#20	0.85	3.98	(**) 2.19	5.34	94.66	94.7
#40	0.425	4.91	2.71	8.05	91.95	92.0
#60	0.25	9.49	5.23	13.28	86.72	86.7
#100	0.15	19.58	10.80	24.08	75.92	75.9
#140	0.106	16.08	8.87	32.95	67.05	67.1
#200	0.075	19.21	10.59	43.54	56.46	56.5
Pan	-	102.38	56.46	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By HL Date 1/23/20 Checked By KC Date 1/23/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-096

Boring No.: JB3-19-1
Depth (ft): 46.0-48.0
Sample No.: SpT-24
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	19
Wt. of Tare & Wet Sample (g)	28.13
Wt. of Tare & Dry Sample (g)	24.49
Weight of Tare (g)	8.29
Weight of Water (g)	3.64
Weight of Dry Sample (g)	16.20

Water Content (%)	22.5
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NON - PLASTIC MATERIAL

Tested By	FS	Date	1/21/20	Checked By	JLK	Date	1/21/20
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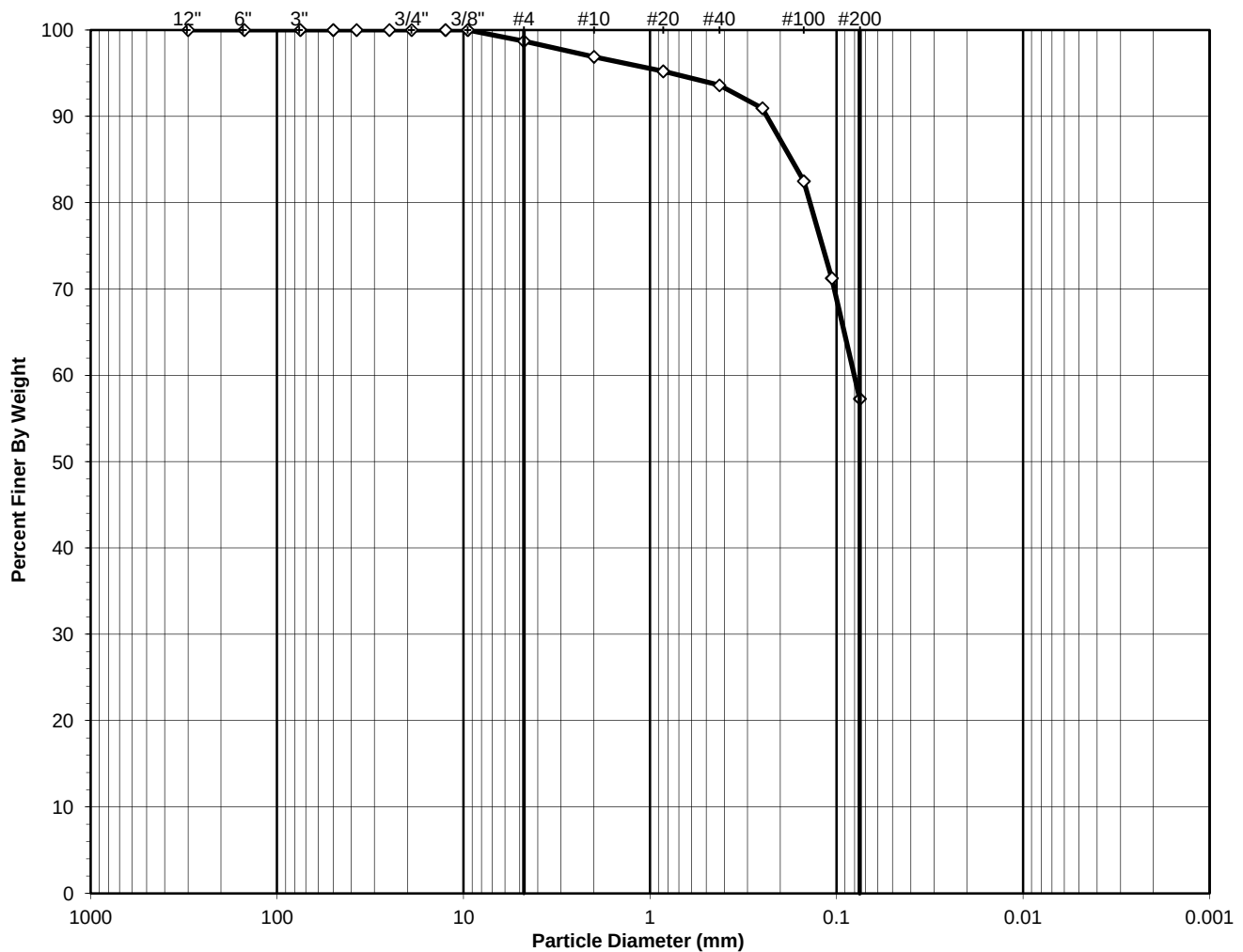
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-097

Boring No.: JB3-19-1
 Depth (ft): 54.0-58.0
 Sample No.: SpT-28/29
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
ML, TESTED

D50 = 0.05

USCS Classification:
SANDY SILT
(NON-PLASTIC FINES)

Tested By HL Date 1/23/20 Checked By KC Date 1/23/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-097

Boring No.: JB3-19-1
 Depth (ft): 54.0-58.0
 Sample No.: SpT-28/29
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1454	Tare No.:	NA	Tare No.:	1454	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	380.48	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	380.48	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	336.69	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	336.69	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	138.04	Weight of Tare (g):	NA	Weight of Tare (g):	138.04	Weight of Tare (g):	NA
Weight of Water (g):	43.79	Weight of Water (g):	NA	Weight of Water (g):	43.79	Weight of Water (g):	NA
Weight of Dry Soil (g):	198.65	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	198.65	Weight of Dry Soil (g):	NA
Moisture Content (%):	22.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	198.65	Total Dry Weight of Sample (g):	198.65	Dry Weight of Sample (g):	198.65	Total Dry Weight of Sample (g):	198.65
Tare No. (Sub-Specimen)	1454	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1454	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	380.48	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	380.48	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	138.04	Dry Weight of - 3/4" Sample (g):	198.65	Weight of Tare (g):	138.04	Dry Weight of - 3/4" Sample (g):	198.65
Sub-Specimen Wet Weight (g):	242.44	Dry Weight -3/4" +3/8" Sample (g):	0.00	Sub-Specimen Wet Weight (g):	242.44	Dry Weight -3/4" +3/8" Sample (g):	0.00
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	198.65	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	198.65
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*) 0.00	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**) 0.00	0.00	100.00	100
3/8"	9.5	0.00	0.00	0.00	100.00	100
#4	4.75	2.56	1.29	1.29	98.71	99
#10	2	3.60	1.81	3.10	96.90	97
#20	0.85	3.34	(**) 1.68	4.78	95.22	95
#40	0.425	3.21	1.62	6.40	93.60	94
#60	0.25	5.28	2.66	9.06	90.94	91
#100	0.15	16.79	8.45	17.51	82.49	82
#140	0.106	22.33	11.24	28.75	71.25	71
#200	0.075	27.75	13.97	42.72	57.28	57
Pan	-	113.79	57.28	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By HL Date 1/23/20 Checked By KC Date 1/23/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-097

Boring No.: JB3-19-1
Depth (ft): 54.0-58.0
Sample No.: SpT-28/29
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	36
Wt. of Tare & Wet Sample (g)	33.74
Wt. of Tare & Dry Sample (g)	28.83
Weight of Tare (g)	8.47
Weight of Water (g)	4.91
Weight of Dry Sample (g)	20.36

Water Content (%)	24.1
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NON - PLASTIC MATERIAL

Tested By	FS	Date	1/21/20	Checked By	JLK	Date	1/21/20
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SPECIFIC GRAVITY

ASTM D 854-14

Client:	D'Appolonia	Boring No.:	JB3-19-1
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	54.0-58.0
Project No.:	2020-002-001	Sample No.:	SpT-28/29
Lab ID:	2020-002-001-097	Visual Description:	Brown Silty Clay

(Minus No.4 sieve material, oven dried)

Replicate Number	1	2
Pycnometer ID:	G 1917	G 1991
Weight of Pycnometer & Soil & Water (g):	746.82	748.59
Temperature (°C):	24.4	24.5
Weight of Pycnometer & Water (g):	684.06	684.59
Tare Number:	690	889
Weight of Tare & Dry Soil (g):	194.69	199.55
Weight of Tare (g):	93.86	99.09
Weight of Dry Soil (g):	100.83	100.46
Specific Gravity of Soil @ Measured Temperature:	2.649	2.755
Specific Gravity of Water @ Measured Temperature:	0.99720	0.99718
Conversion Factor for Measured Temperature:	0.99900	0.99897
Specific Gravity @ 20° Celsius:	2.652	2.758

Average Specific Gravity @ 20° Celsius	2.70
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Tested By TO Date 1/28/20 Checked By BRB Date 1/29/20

DCN: CT-S5 Date: 3/26/18 Revision: 21

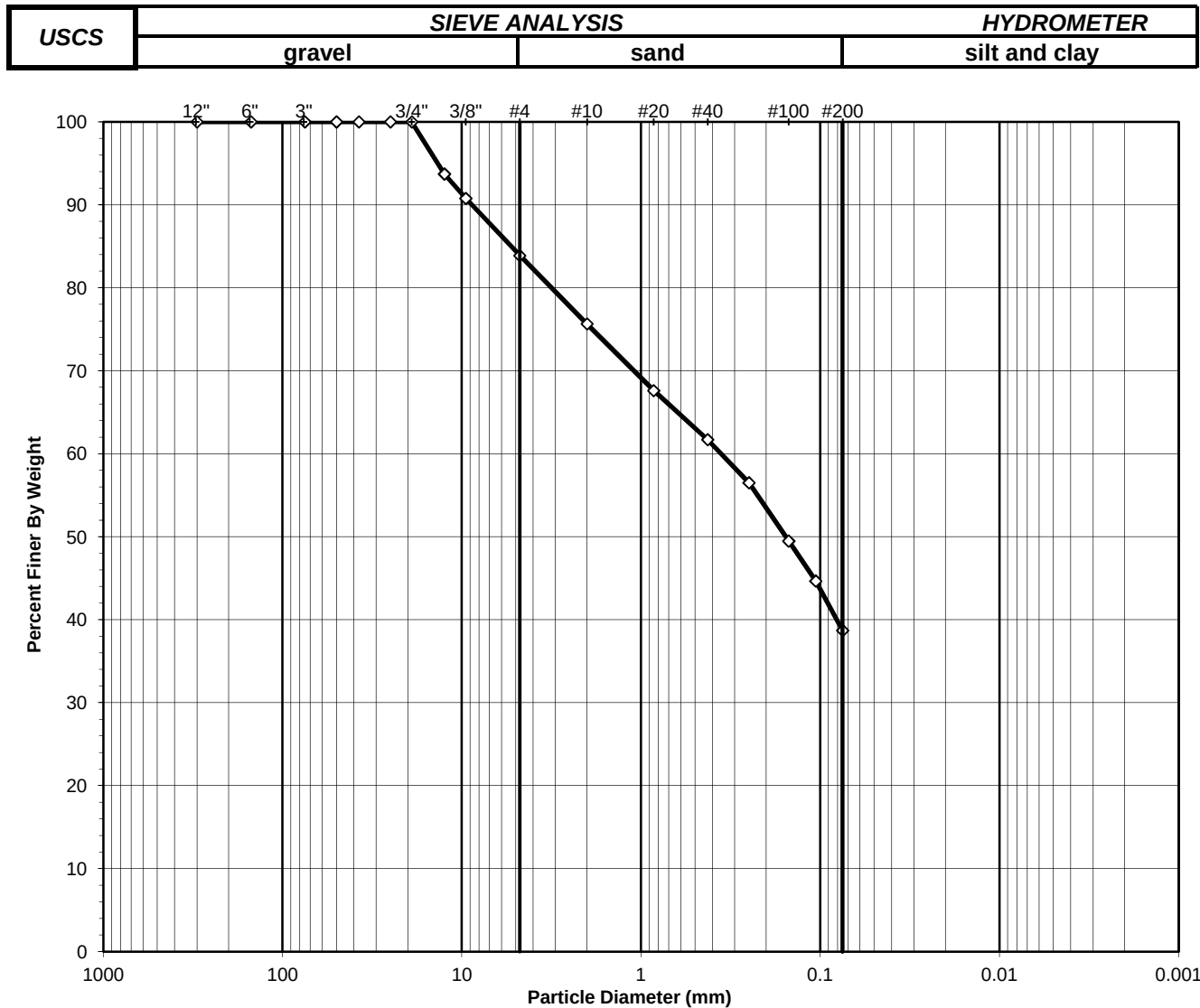
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SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-099

Boring No.: JB3-19-2
 Depth (ft): 6.0-10.0
 Sample No.: SpT-4/5
 Soil Color: Brown



USCS Symbol:
SM, TESTED

D50 = 0.16

USCS Classification:
SILTY SAND WITH GRAVEL
(NON-PLASTIC FINES)

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-099

Boring No.: JB3-19-2
 Depth (ft): 6.0-10.0
 Sample No.: SpT-4/5
 Soil Color: Brown

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	1476	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	396.86	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	376.28	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	146.53	Weight of Tare (g):	NA
Weight of Water (g):	20.58	Weight of Water (g):	NA
Weight of Dry Soil (g):	229.75	Weight of Dry Soil (g):	NA
Moisture Content (%):	9.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	229.75	Total Dry Weight of Sample (g):	229.75
Tare No. (Sub-Specimen)	1476	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	396.86	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	146.53	Dry Weight of - 3/4" Sample (g):	229.75
Sub-Specimen Wet Weight (g):	250.33	Dry Weight -3/4" +3/8" Sample (g):	21.18
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	208.57
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*) 0.00	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	14.44	(**) 6.29	6.29	93.71	94
3/8"	9.5	6.74	2.93	9.22	90.78	91
#4	4.75	15.83	6.89	16.11	83.89	84
#10	2	18.92	8.24	24.34	75.66	76
#20	0.85	18.47	(**) 8.04	32.38	67.62	68
#40	0.425	13.58	5.91	38.29	61.71	62
#60	0.25	11.94	5.20	43.49	56.51	57
#100	0.15	16.14	7.03	50.52	49.48	49
#140	0.106	11.07	4.82	55.33	44.67	45
#200	0.075	13.68	5.95	61.29	38.71	39
Pan	-	88.94	38.71	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-099

Boring No.: JB3-19-2
Depth (ft): 6.0-10.0
Sample No.: SpT-4/5
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	38
Wt. of Tare & Wet Sample (g)	31.24
Wt. of Tare & Dry Sample (g)	29.41
Weight of Tare (g)	8.36
Weight of Water (g)	1.83
Weight of Dry Sample (g)	21.05

Water Content (%) **8.7**

NON - PLASTIC MATERIAL

Tested By *FS* *Date* *1/22/20* *Checked By* *JLK* *Date* *1/22/20*

SPECIFIC GRAVITY

ASTM D 854-14

Client:	D'Appolonia	Boring No.:	JB3-19-2
Client Reference:	NRCS- Jewell Brook 172719-17	Depth (ft):	20.0-24.0
Project No.:	2020-002-001	Sample No.:	SpT-11/12
Lab ID:	2020-002-001-100	Visual Description:	Brown Silty Clay

(Minus No.4 sieve material, oven dried)

Replicate Number	1	2
Pycnometer ID:	G 1917	G 1991
Weight of Pycnometer & Soil & Water (g):	746.32	748.61
Temperature (°C):	26.5	26.9
Weight of Pycnometer & Water (g):	683.78	684.28
Tare Number:	972	1681
Weight of Tare & Dry Soil (g):	200.06	198.19
Weight of Tare (g):	99.2	97.4
Weight of Dry Soil (g):	100.86	100.79
Specific Gravity of Soil @ Measured Temperature:	2.632	2.764
Specific Gravity of Water @ Measured Temperature:	0.99666	0.99655
Conversion Factor for Measured Temperature:	0.99845	0.99834
Specific Gravity @ 20° Celsius:	2.636	2.769

Average Specific Gravity @ 20° Celsius	2.70
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Tested By TO Date 1/24/20 Checked By JLK Date 1/27/20

DCN: CT-S5 Date: 3/26/18 Revision: 21

S:\Excel\Excel QA\Spreadsheets\Specific Gravity.xls

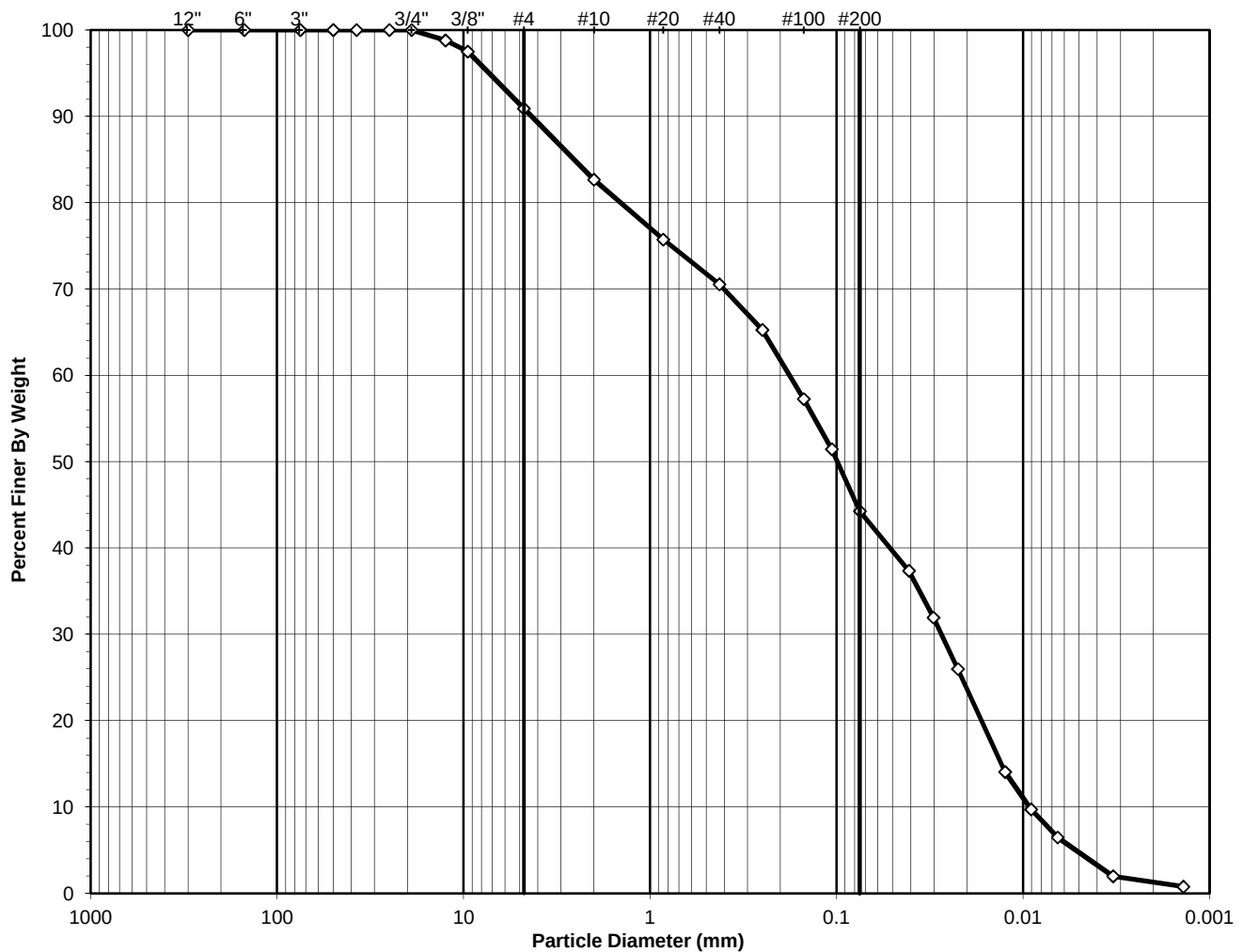
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-101

Boring No.: JB3-19-2
 Depth (ft): 24.0-30.0
 Sample No.: SpT-13/14/15
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
SM, TESTED

D50 = 0.10

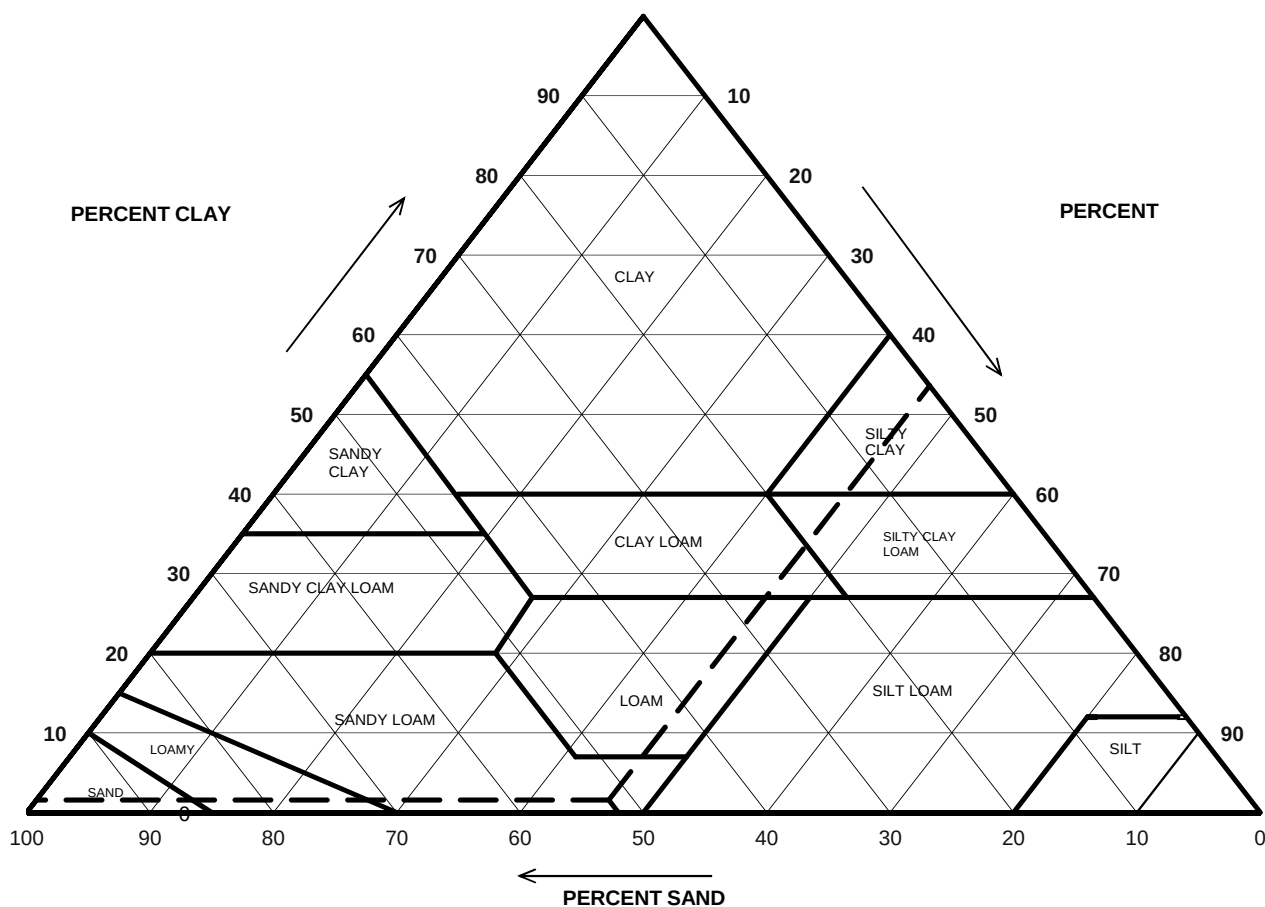
USCS Classification:
SILTY SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/21/20 Checked By KC Date 1/27/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-101

Boring No.: JB3-19-2
 Depth (ft): 24.0-30.0
 Sample No.: SpT-13/14/15
 Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	17.33	
2	82.67	Sand	43.02	52.04
0.05	39.65	Silt	38.36	46.40
0.002	1.29	Clay	1.29	1.56

USDA Classification: **SANDY LOAM**

WASH SIEVE ANALYSIS

ASTM D6913-17



Client:	D'Appolonia	Boring No.:	JB3-19-2
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	24.0-30.0
Project No.:	2020-002-001	Sample No.:	SpT-13/14/15
Lab ID:	2020-002-001-101	Soil Color:	Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1515	Tare No.:	NA	Tare No.:	1515	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	499.53	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	499.53	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	458.85	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	458.85	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.33	Weight of Tare (g):	NA	Weight of Tare (g):	145.33	Weight of Tare (g):	NA
Weight of Water (g):	40.68	Weight of Water (g):	NA	Weight of Water (g):	40.68	Weight of Water (g):	NA
Weight of Dry Soil (g):	313.52	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	313.52	Weight of Dry Soil (g):	NA
Moisture Content (%):	13.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	313.52	Total Dry Weight of Sample (g):	313.52	Dry Weight of Sample (g):	313.52	Total Dry Weight of Sample (g):	313.52
Tare No. (Sub-Specimen)	1515	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1515	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	499.53	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	499.53	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	145.33	Dry Weight of - 3/4" Sample (g):	313.52	Weight of Tare (g):	145.33	Dry Weight of - 3/4" Sample (g):	313.52
Sub-Specimen Wet Weight (g):	354.20	Dry Weight -3/4" +3/8" Sample (g):	7.83	Sub-Specimen Wet Weight (g):	354.20	Dry Weight -3/4" +3/8" Sample (g):	7.83
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	305.69	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	305.69
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	3.78	(**)	1.21	98.79	99
3/8"	9.5	4.05	1.29	2.50	97.50	98
#4	4.75	20.71	6.61	9.10	90.90	91
#10	2	25.80	8.23	17.33	82.67	83
#20	0.85	21.74	(**)	24.27	75.73	76
#40	0.425	16.25	5.18	29.45	70.55	71
#60	0.25	16.58	5.29	34.74	65.26	65
#100	0.15	25.10	8.01	42.74	57.26	57
#140	0.106	18.22	5.81	48.56	51.44	51
#200	0.075	22.51	7.18	55.73	44.27	44
Pan	-	138.78	44.27	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By	DS	Date	1/21/20	Checked By	KC	Date	1/27/20
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HYDROMETER ANALYSIS

ASTM D7928-17

Client:	D'Appolonia	Boring No.:	JB3-19-2
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	24.0-30.0
Project No.:	2020-002-001	Sample No.:	SpT-13/14/15
Lab ID:	2020-002-001-101	Soil Color:	Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	40.0	23.0	5.52	9.7	0.0409	84.4	37.4
2	35.0	23.0	5.52	10.6	0.0302	72.2	31.9
4	29.5	23.0	5.52	11.6	0.0224	58.7	26.0
15	18.5	23.0	5.52	13.6	0.0125	31.8	14.1
30	14.5	23.0	5.52	14.3	0.0091	22.0	9.7
60	11.5	23.0	5.52	14.9	0.0065	14.6	6.5
250	7.5	22.6	5.67	15.6	0.0033	4.5	2.0
1440	6.5	22.3	5.78	15.8	0.0014	1.8	0.8

Soil Specimen Data

Tare No.:	506	Percent Finer than # 200:	44.27
Wt. of Tare & Dry Material (g):	142.46		
Weight of Tare (g):	97.07	Specific Gravity:	2.70 Assumed
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	40.39		

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	G- 1819
Cylinder	G- 198
Thermometer	G- 1505
Balance	G- 657
#200 Sieve	G- 1944
Foam Inhibitor Used	No

Tested By	FS	Date	1/22/20	Checked By	KC	Date	1/27/20
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ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-101

Boring No.: JB3-19-2
Depth (ft): 24.0-30.0
Sample No.: SpT-13/14/15
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	16
Wt. of Tare & Wet Sample (g)	35.67
Wt. of Tare & Dry Sample (g)	32.58
Weight of Tare (g)	8.32
Weight of Water (g)	3.09
Weight of Dry Sample (g)	24.26

Water Content (%)	12.7
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NON - PLASTIC MATERIAL

Tested By	FS	Date	1/22/20	Checked By	JLK	Date	1/22/20
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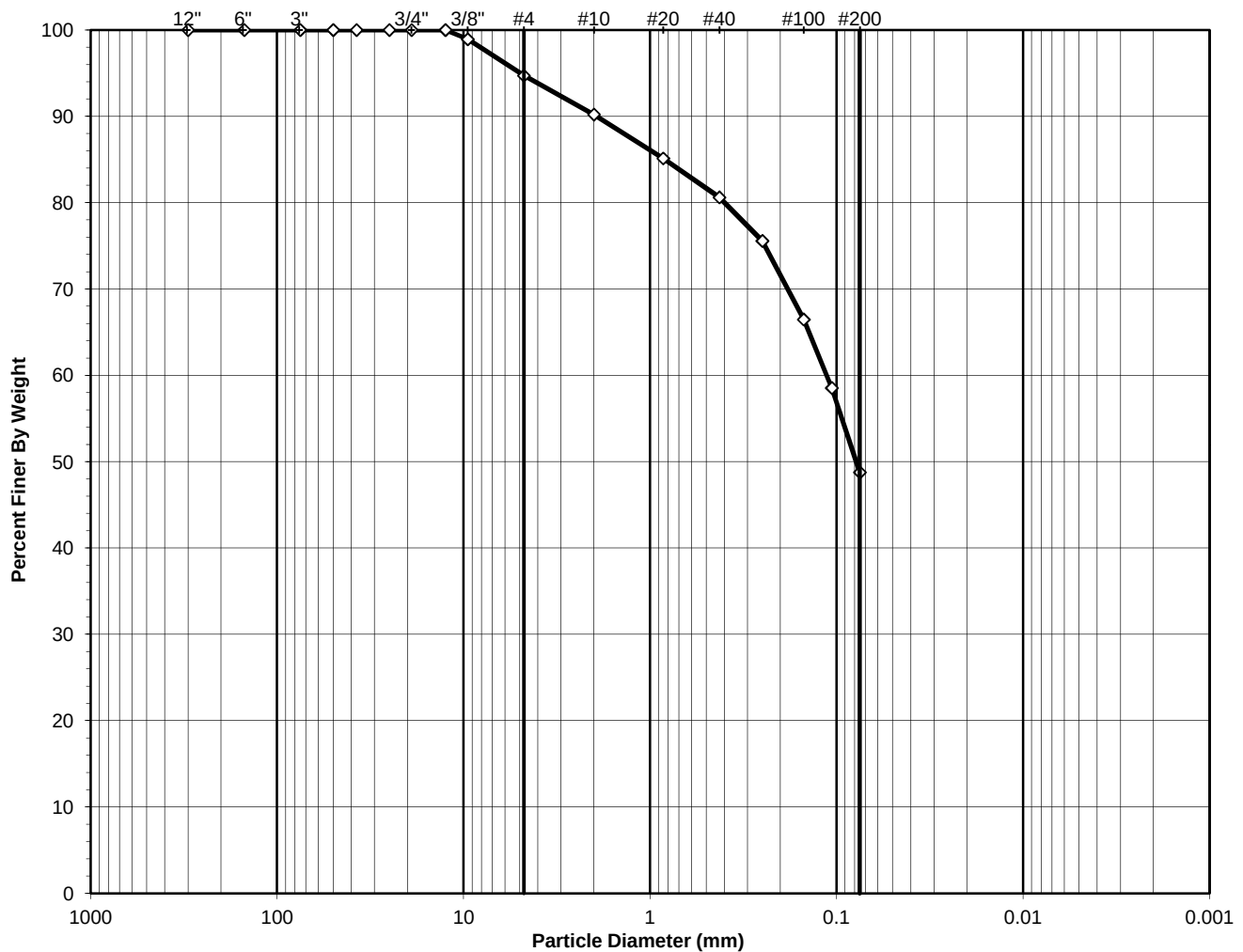
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-102

Boring No.: JB3-19-2
 Depth (ft): 36.0-40.0
 Sample No.: SpT-19/20
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
SM, TESTED

D50 = 0.08

USCS Classification:
SILTY SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-102

Boring No.: JB3-19-2
 Depth (ft): 36.0-40.0
 Sample No.: SpT-19/20
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1467	Tare No.:	NA	Tare No.:	1467	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	360.11	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	360.11	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	337.17	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	337.17	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	146.24	Weight of Tare (g):	NA	Weight of Tare (g):	146.24	Weight of Tare (g):	NA
Weight of Water (g):	22.94	Weight of Water (g):	NA	Weight of Water (g):	22.94	Weight of Water (g):	NA
Weight of Dry Soil (g):	190.93	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	190.93	Weight of Dry Soil (g):	NA
Moisture Content (%):	12.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	190.93	Total Dry Weight of Sample (g):	190.93	Dry Weight of Sample (g):	190.93	Total Dry Weight of Sample (g):	190.93
Tare No. (Sub-Specimen)	1467	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1467	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	360.11	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	360.11	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	146.24	Dry Weight of - 3/4" Sample (g):	190.93	Weight of Tare (g):	146.24	Dry Weight of - 3/4" Sample (g):	190.93
Sub-Specimen Wet Weight (g):	213.87	Dry Weight -3/4" +3/8" Sample (g):	2.04	Sub-Specimen Wet Weight (g):	213.87	Dry Weight -3/4" +3/8" Sample (g):	2.04
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	188.89	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	188.89
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**)	0.00	100.00	100
3/8"	9.5	2.04	1.07	1.07	98.93	99
#4	4.75	8.05	4.22	5.28	94.72	95
#10	2	8.60	4.50	9.79	90.21	90
#20	0.85	9.70	(**)	14.87	85.13	85
#40	0.425	8.62	4.51	19.38	80.62	81
#60	0.25	9.63	5.04	24.43	75.57	76
#100	0.15	17.37	9.10	33.53	66.47	66
#140	0.106	15.15	7.93	41.46	58.54	59
#200	0.075	18.67	9.78	51.24	48.76	49
Pan	-	93.10	48.76	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-102

Boring No.: JB3-19-2
Depth (ft): 36.0-40.0
Sample No.: SpT-19/20
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	39
Wt. of Tare & Wet Sample (g)	26.49
Wt. of Tare & Dry Sample (g)	24.52
Weight of Tare (g)	8.48
Weight of Water (g)	1.97
Weight of Dry Sample (g)	16.04

Water Content (%)	12.3
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NON - PLASTIC MATERIAL

Tested By	FS	Date	1/22/20	Checked By	JLK	Date	1/22/20
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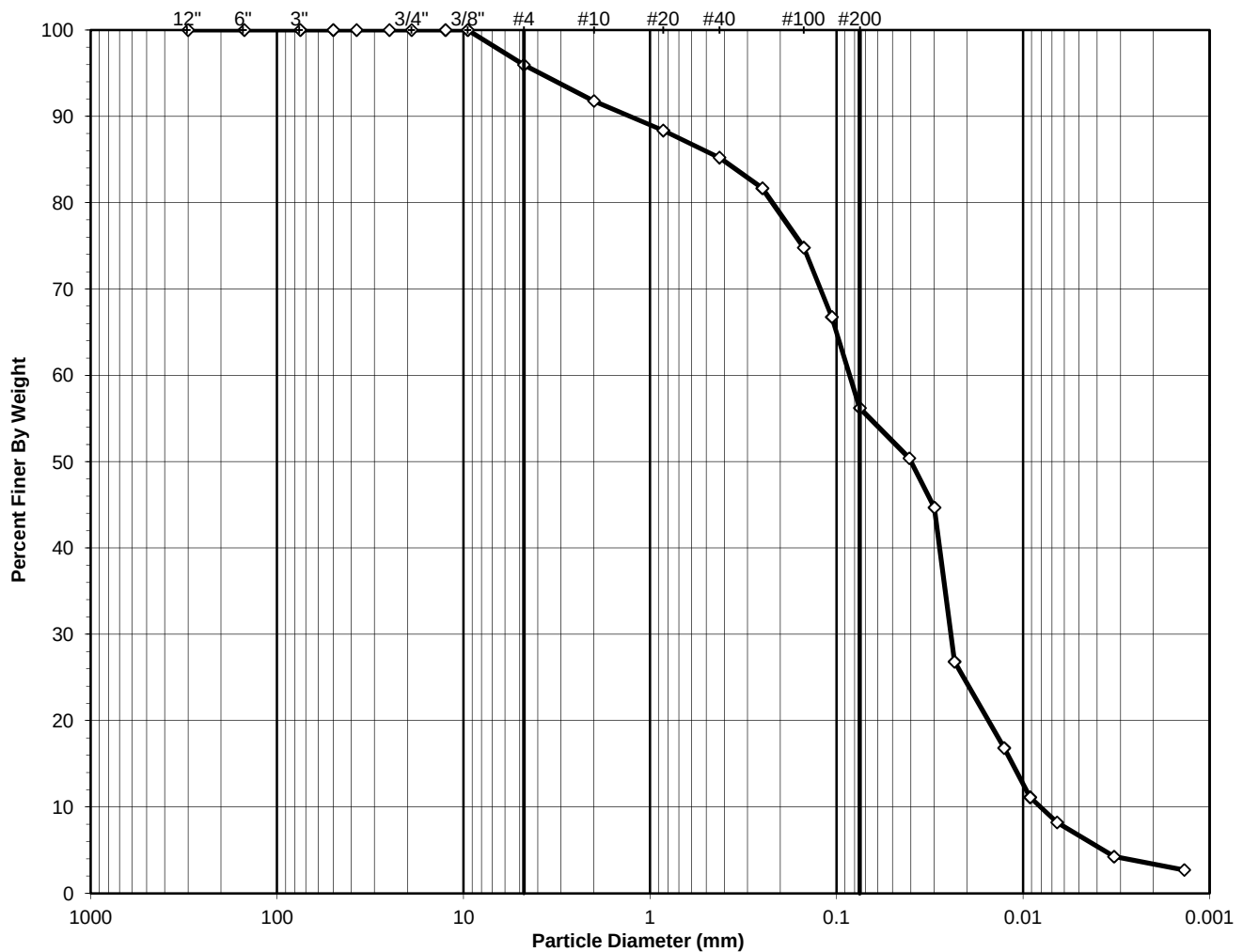
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-103

Boring No.: JB3-19-2
 Depth (ft): 46.0-50.0
 Sample No.: SpT-24/25
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
ML, TESTED

D50 = 0.04

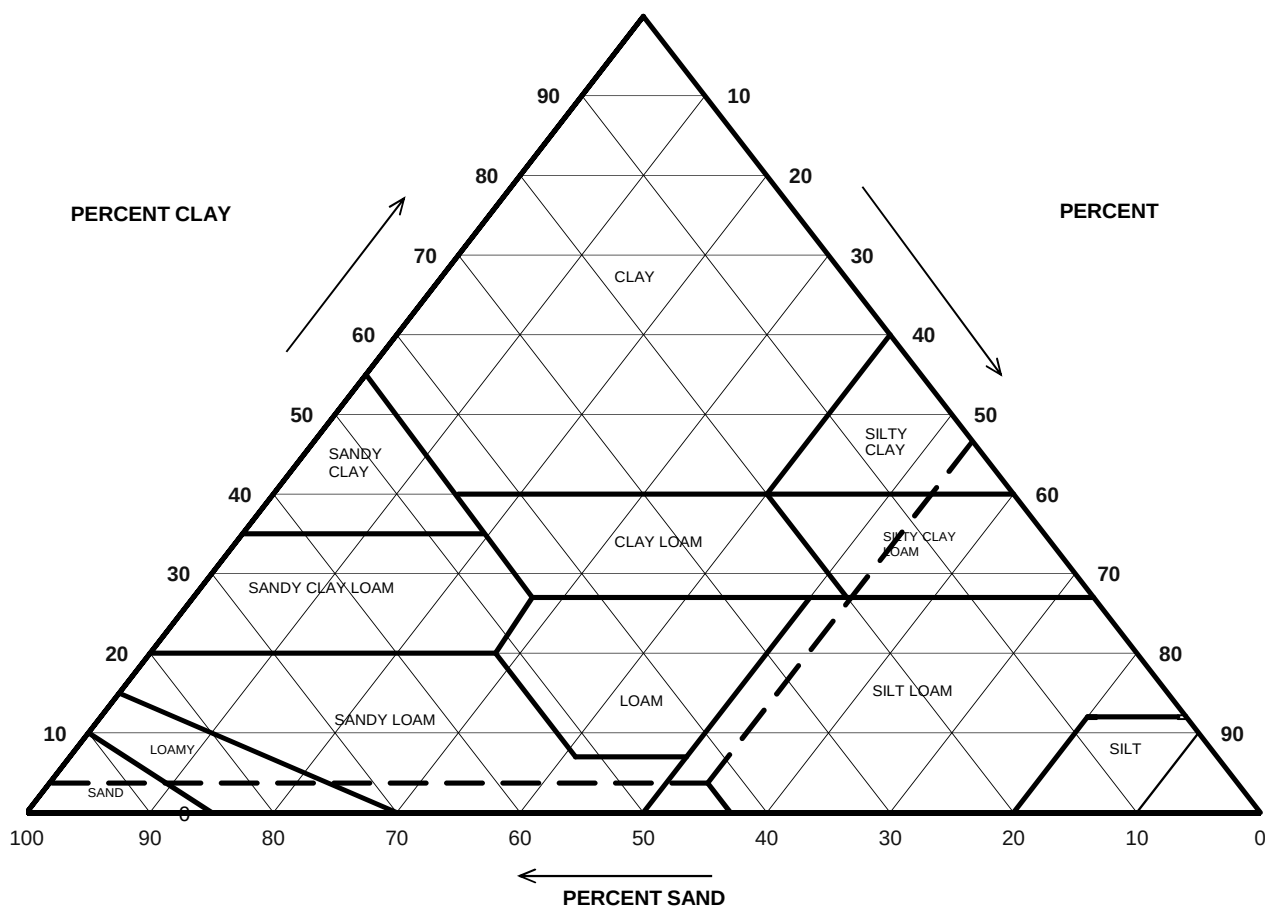
USCS Classification:
SANDY SILT
(NON-PLASTIC FINES)

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-103

Boring No.: JB3-19-2
Depth (ft): 46.0-50.0
Sample No.: SpT-24/25
Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	8.22	
2	91.78	Sand	39.43	42.96
0.05	52.35	Silt	48.96	53.34
0.002	3.39	Clay	3.39	3.70

USDA Classification: **SILT LOAM**

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-103

Boring No.: JB3-19-2
 Depth (ft): 46.0-50.0
 Sample No.: SpT-24/25
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1557	Tare No.:	NA	Tare No.:	1557	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	347.90	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	347.90	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	315.84	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	315.84	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	147.75	Weight of Tare (g):	NA	Weight of Tare (g):	147.75	Weight of Tare (g):	NA
Weight of Water (g):	32.06	Weight of Water (g):	NA	Weight of Water (g):	32.06	Weight of Water (g):	NA
Weight of Dry Soil (g):	168.09	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	168.09	Weight of Dry Soil (g):	NA
Moisture Content (%):	19.1	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	168.09	Total Dry Weight of Sample (g):	168.09	Dry Weight of Sample (g):	168.09	Total Dry Weight of Sample (g):	168.09
Tare No. (Sub-Specimen)	1557	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1557	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	347.90	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	347.90	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	147.75	Dry Weight of - 3/4" Sample (g):	168.09	Weight of Tare (g):	147.75	Dry Weight of - 3/4" Sample (g):	168.09
Sub-Specimen Wet Weight (g):	200.15	Dry Weight -3/4" +3/8" Sample (g):	0.00	Sub-Specimen Wet Weight (g):	200.15	Dry Weight -3/4" +3/8" Sample (g):	0.00
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	168.09	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	168.09
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**)	0.00	100.00	100
3/8"	9.5	0.00	0.00	0.00	100.00	100
#4	4.75	6.80	4.05	4.05	95.95	96
#10	2	7.01	4.17	8.22	91.78	92
#20	0.85	5.75	(**)	11.64	88.36	88
#40	0.425	5.27	3.14	14.77	85.23	85
#60	0.25	5.98	3.56	18.33	81.67	82
#100	0.15	11.55	6.87	25.20	74.80	75
#140	0.106	13.51	8.04	33.24	66.76	67
#200	0.075	17.73	10.55	43.79	56.21	56
Pan	-	94.49	56.21	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20

HYDROMETER ANALYSIS

ASTM D7928-17

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-103

Boring No.: JB3-19-2
 Depth (ft): 46.0-50.0
 Sample No.: SpT-24/25
 Soil Color: Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	41.0	22.5	5.71	9.5	0.0407	89.7	50.4
2	37.0	22.5	5.71	10.3	0.0299	79.5	44.7
4	24.5	22.5	5.71	12.5	0.0233	47.7	26.8
15	17.5	22.5	5.71	13.8	0.0126	30.0	16.8
30	13.5	22.5	5.71	14.5	0.0092	19.8	11.1
60	11.5	22.4	5.75	14.9	0.0066	14.6	8.2
250	8.5	23.0	5.52	15.4	0.0033	7.6	4.3
1440	7.5	22.8	5.60	15.6	0.0014	4.8	2.7

Soil Specimen Data

Tare No.:	703	Percent Finer than # 200:	56.21
Wt. of Tare & Dry Material (g):	139.24		
Weight of Tare (g):	95.32	Specific Gravity:	2.70 Measured
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	38.92		

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	G- 1819
Cylinder	G- 202
Thermometer	G- 1505
Balance	G- 657
#200 Sieve	G- 1944
Foam Inhibitor Used	No

Tested By	TO	Date	1/21/20	Checked By	KC	Date	1/23/20
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page 4 of 4

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-103

Boring No.: JB3-19-2
Depth (ft): 46.0-50.0
Sample No.: SpT-24/25
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	26
Wt. of Tare & Wet Sample (g)	26.26
Wt. of Tare & Dry Sample (g)	23.53
Weight of Tare (g)	8.47
Weight of Water (g)	2.73
Weight of Dry Sample (g)	15.06

Water Content (%) 18.1

NON - PLASTIC MATERIAL

Tested By FS *Date* 1/22/20 *Checked By* JLK *Date* 1/22/20

SPECIFIC GRAVITY

ASTM D 854-14

Client:	D'Appolonia	Boring No.:	JB3-19-2
Client Reference:	NRCS- Jewell Brook 172719-17	Depth (ft):	46.0-50.0
Project No.:	2020-002-001	Sample No.:	SpT-24/25
Lab ID:	2020-002-001-103	Visual Description:	Brown Silty Clay

(Minus No.4 sieve material, oven dried)

Replicate Number	1	2
Pycnometer ID:	G 1917	G 1991
Weight of Pycnometer & Soil & Water (g):	737.35	748.31
Temperature (°C):	26.8	27.0
Weight of Pycnometer & Water (g):	683.74	684.27
Tare Number:	503	1019
Weight of Tare & Dry Soil (g):	178.75	200.33
Weight of Tare (g):	92.2	100.03
Weight of Dry Soil (g):	86.55	100.30
Specific Gravity of Soil @ Measured Temperature:	2.627	2.766
Specific Gravity of Water @ Measured Temperature:	0.99658	0.99652
Conversion Factor for Measured Temperature:	0.99837	0.99831
Specific Gravity @ 20° Celsius:	2.632	2.771

Average Specific Gravity @ 20° Celsius	2.70
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Tested By TO Date 1/24/20 Checked By JLK Date 1/27/20

DCN: CT-S5 Date: 3/26/18 Revision: 21

S:\Excel\Excel QA\Spreadsheets\Specific Gravity.xls

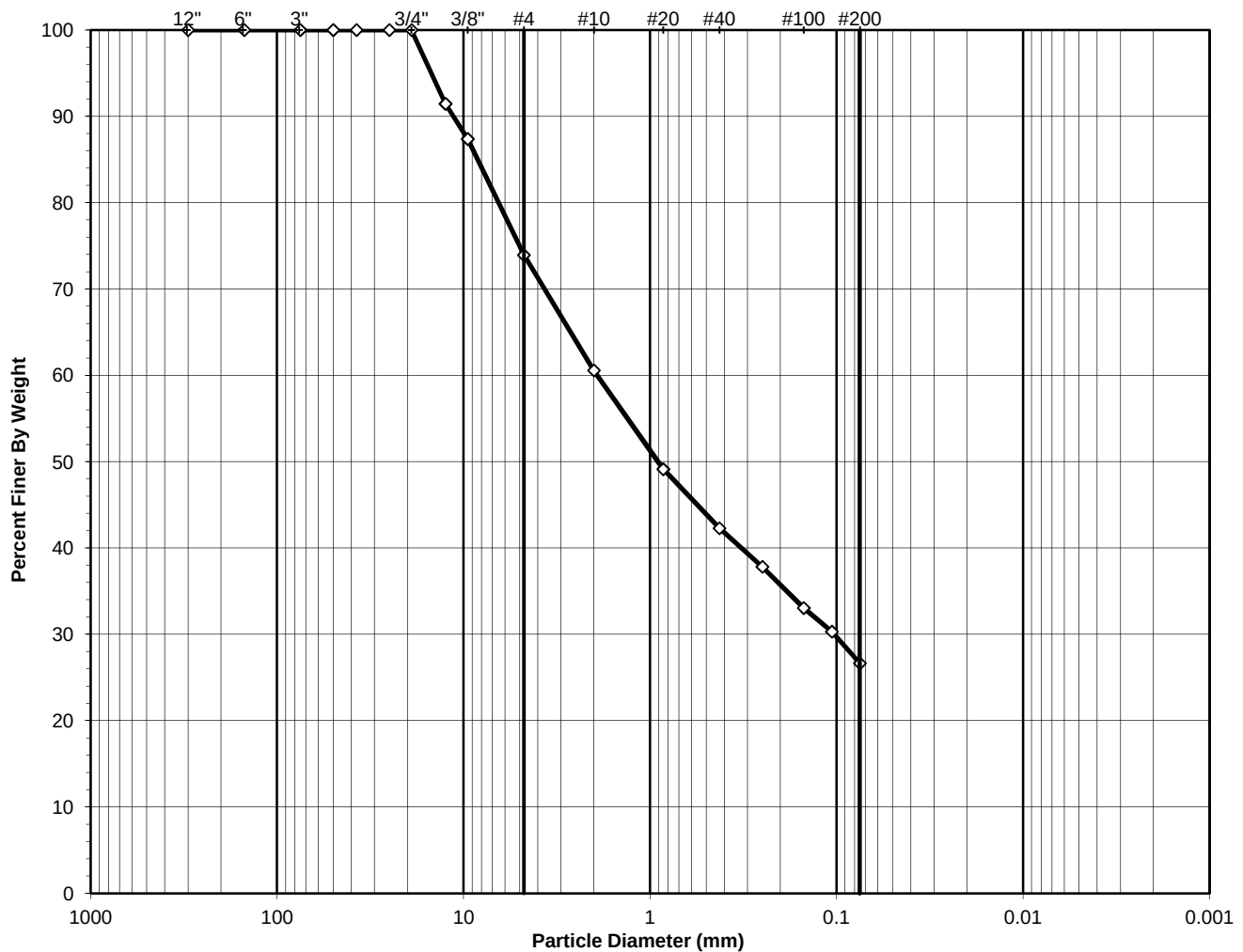
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-104

Boring No.: JB2-19-2
 Depth (ft): 52.0-54.7
 Sample No.: SpT-27/28
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
sm, ASSUMED

D50 = 0.91

USCS Classification:
SILTY SAND WITH GRAVEL

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-104

Boring No.: JB2-19-2
Depth (ft): 52.0-54.7
Sample No.: SpT-27/28
Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	2043	Tare No.:	NA	Tare No.:	2043	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	599.84	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	599.84	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	555.86	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	555.86	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	146.32	Weight of Tare (g):	NA	Weight of Tare (g):	146.32	Weight of Tare (g):	NA
Weight of Water (g):	43.98	Weight of Water (g):	NA	Weight of Water (g):	43.98	Weight of Water (g):	NA
Weight of Dry Soil (g):	409.54	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	409.54	Weight of Dry Soil (g):	NA
Moisture Content (%):	10.7	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	409.54	Total Dry Weight of Sample (g):	409.54	Dry Weight of Sample (g):	409.54	Total Dry Weight of Sample (g):	409.54
Tare No. (Sub-Specimen)	2043	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	2043	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	599.84	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	599.84	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	146.32	Dry Weight of - 3/4" Sample (g):	409.54	Weight of Tare (g):	146.32	Dry Weight of - 3/4" Sample (g):	409.54
Sub-Specimen Wet Weight (g):	453.52	Dry Weight -3/4" +3/8" Sample (g):	51.68	Sub-Specimen Wet Weight (g):	453.52	Dry Weight -3/4" +3/8" Sample (g):	51.68
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	357.86	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	357.86
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	35.00	(**)	8.55	91.45	91
3/8"	9.5	16.68	4.07	12.62	87.38	87
#4	4.75	55.06	13.44	26.06	73.94	74
#10	2	54.73	13.36	39.43	60.57	61
#20	0.85	46.86	(**)	50.87	49.13	49
#40	0.425	28.00	6.84	57.71	42.29	42
#60	0.25	18.28	4.46	62.17	37.83	38
#100	0.15	19.57	4.78	66.95	33.05	33
#140	0.106	11.20	2.73	69.68	30.32	30
#200	0.075	15.00	3.66	73.35	26.65	27
Pan	-	109.16	26.65	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
(**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20

UNCONFINED COMPRESSION STRENGTH of INTACT ROCK CORE SPECIMENS

ASTM D 7012-14 Method C

This method does not report strain rate or deformation.

Sample Prep and Conformance Verification: ASTM D 4543-08

Client: D'Appolonia
Client Project: NRCS-Jewel Brook 172719-17
Project No.: 2020-002-001
Lab ID No.: 2020-002-001-105

Boring No.: JB3-19-2
Depth (ft): 63.0-64.0
Sample ID: R-1
Moisture Condition: As Received-Unpreserved

Specimen Weight (g): 575.67

SPECIMEN LENGTH (in)

Reading 1: 4.00
Reading 2: 4.00
Reading 3: 4.00
Average: 4.00

SPECIMEN DIAMETER (in)

Reading 1: 1.99
Reading 2: 1.99
Average: **1.99**
Area (in²): 3.10
L/D: 2.01

MOISTURE CONTENT

Tare Number: 3380
Wt. of Tare & Wet Sample (g): 583.38
Wt. of Tare & Dry Sample (g): 583.19
Weight of Tare (g): 8.18
Weight of Wet Sample (g): 575.20
Sample Volume (cm³): 203.36
Moisture Content (%): 0.03
Unit Wet Weight (g/cm³): 2.831
Unit Wet Weight (pcf): 176.6
Unit Dry Weight (g/cm³): 2.830
Unit Dry Weight (pcf): 176.6

Total Load (lb): 22,550

Uniaxial Compressive Strength (psi): 7,270

Fracture Type: **Cone & Shear**

Rate of Loading (lb/sec): 137

Time to Break (min:sec): 2:44.91

Deviation From Straightness³:

AXIAL: Pass

TOP: Pass

BOTTOM: Pass

Physical Description:

Rock Core

Notes:

- 1) Moisture conditions at time of the test are: As Received-Unpreserved
- 2) Sample prep conforms to ASTM D4543-08 "best effort" if applicable
- 3) Deviation from straightness, Procedure A of ASTM D 4543-08
Pass/Fail criteria: gap < 0.02 = Pass, gap > 0.02 = Fail
- 4) Temperature is laboratory room temperature.
- 5) D4543 Prep and D7012 Testing Equipment Used:
- 6) Tool / Machine List:
G788 Compression Machine
G1661 Digital Calipers, G1380 Dial Gauge
G1616 Straight Edge, G1571 Feeler Gauge
G1633 V-Block, G1634 Rock Saw, G1635 Grinder



Tested By: JAC

Date: 1/7/20

Checked By: NJM

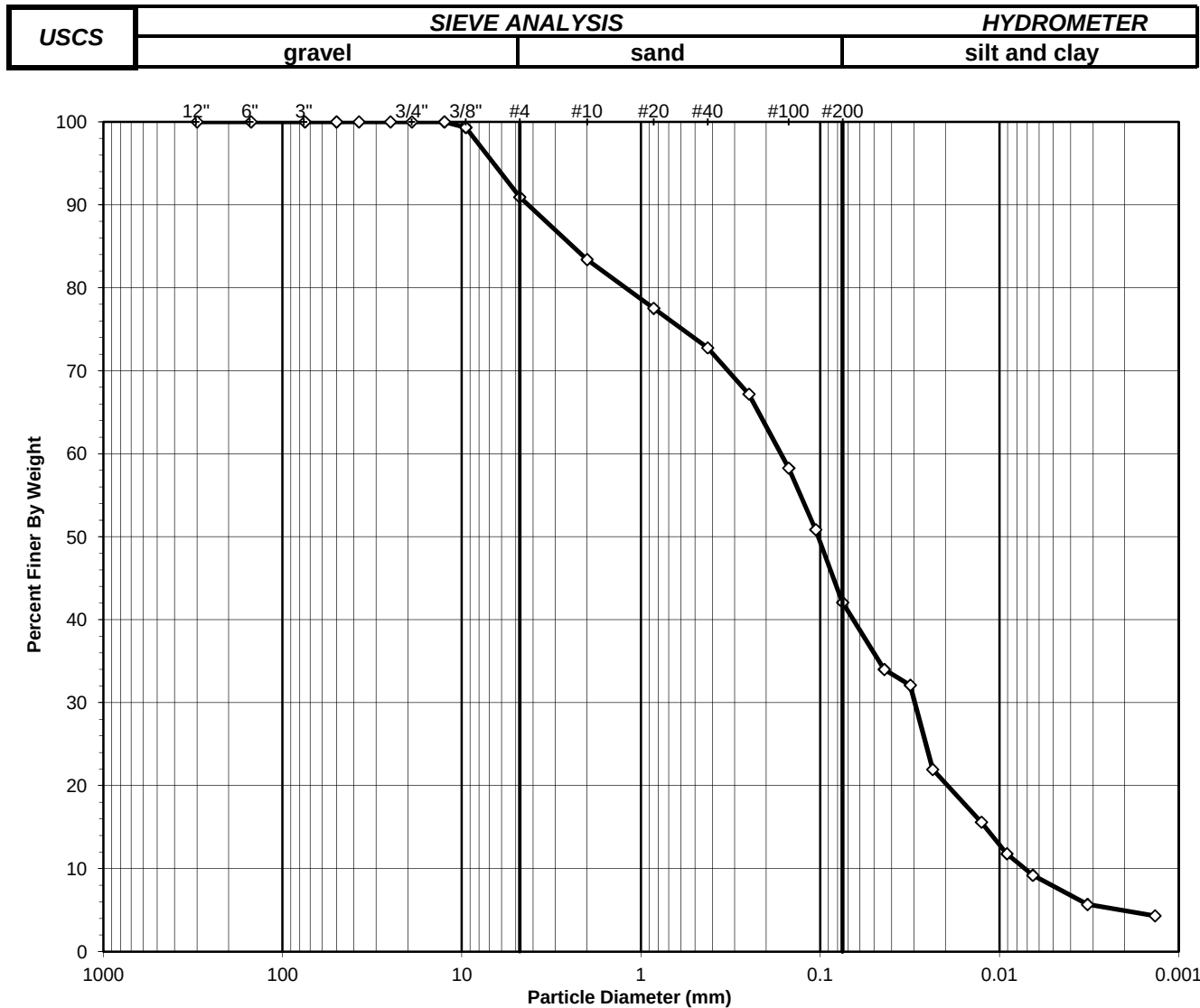
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SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-106

Boring No.: JB3-19-4
 Depth (ft): 0.0-4.0
 Sample No.: SpT-1/2
 Soil Color: Brown



USCS Symbol:
SM, TESTED

D50 = 0.10

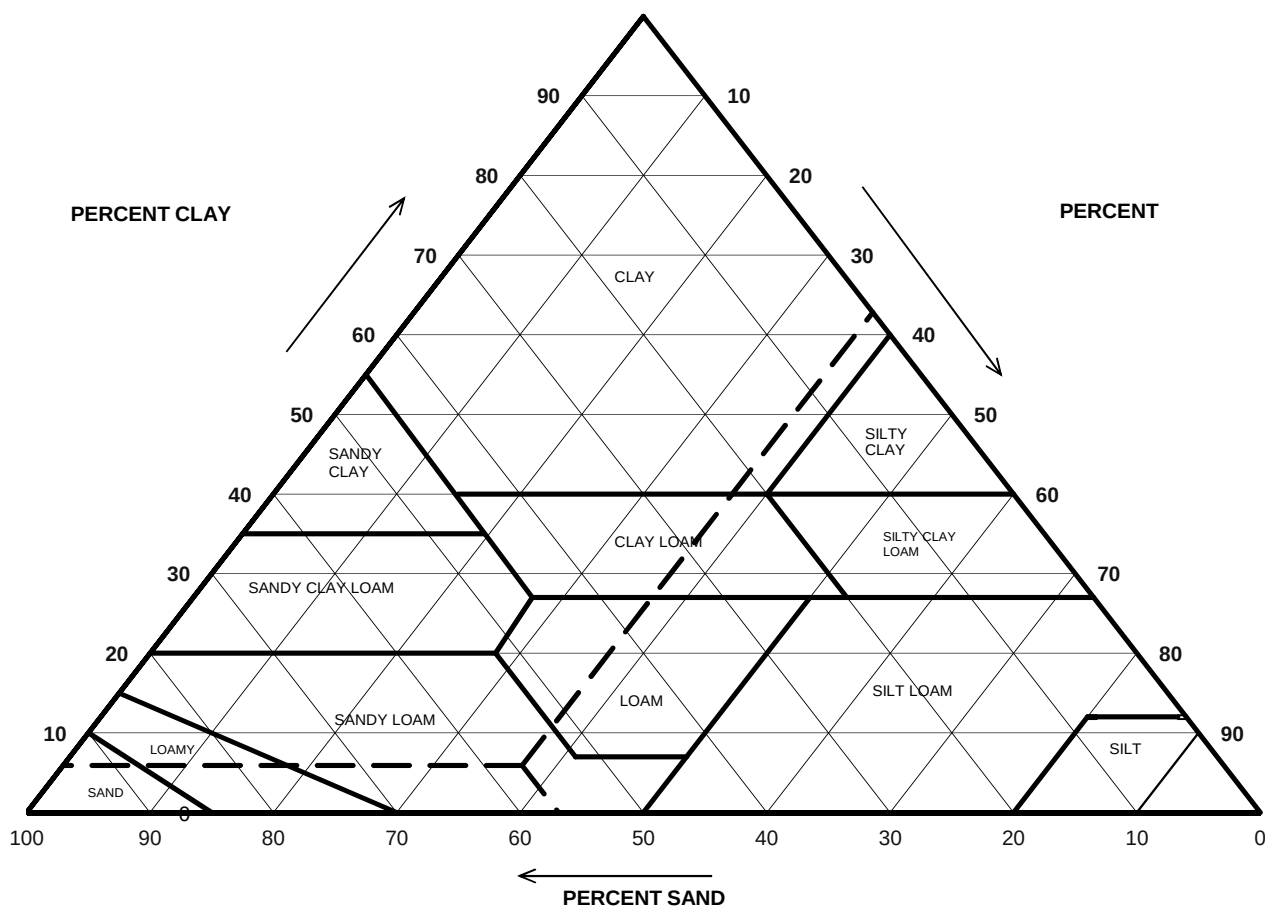
USCS Classification:
SILTY SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-106

Boring No.: JB3-19-4
Depth (ft): 0.0-4.0
Sample No.: SpT-1/2
Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	16.59	
2	83.41	Sand	47.45	56.88
0.05	35.96	Silt	31.03	37.20
0.002	4.93	Clay	4.93	5.91

USDA Classification: **SANDY LOAM**

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-106

Boring No.: JB3-19-4
 Depth (ft): 0.0-4.0
 Sample No.: SpT-1/2
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1554	Tare No.:	NA	Tare No.:	1554	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	379.34	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	379.34	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	356.43	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	356.43	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	143.68	Weight of Tare (g):	NA	Weight of Tare (g):	143.68	Weight of Tare (g):	NA
Weight of Water (g):	22.91	Weight of Water (g):	NA	Weight of Water (g):	22.91	Weight of Water (g):	NA
Weight of Dry Soil (g):	212.75	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	212.75	Weight of Dry Soil (g):	NA
Moisture Content (%):	10.8	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	212.75	Total Dry Weight of Sample (g):	212.75	Dry Weight of Sample (g):	212.75	Total Dry Weight of Sample (g):	212.75
Tare No. (Sub-Specimen)	1554	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1554	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	379.34	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	379.34	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	143.68	Dry Weight of - 3/4" Sample (g):	212.75	Weight of Tare (g):	143.68	Dry Weight of - 3/4" Sample (g):	212.75
Sub-Specimen Wet Weight (g):	235.66	Dry Weight -3/4" +3/8" Sample (g):	1.42	Sub-Specimen Wet Weight (g):	235.66	Dry Weight -3/4" +3/8" Sample (g):	1.42
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	211.33	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	211.33
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*) 0.00	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**) 0.00	0.00	100.00	100
3/8"	9.5	1.42	0.67	0.67	99.33	99
#4	4.75	17.88	8.40	9.07	90.93	91
#10	2	16.00	7.52	16.59	83.41	83
#20	0.85	12.51	(**) 5.88	22.47	77.53	78
#40	0.425	10.12	4.76	27.23	72.77	73
#60	0.25	11.87	5.58	32.81	67.19	67
#100	0.15	18.97	8.92	41.73	58.27	58
#140	0.106	15.78	7.42	49.14	50.86	51
#200	0.075	18.66	8.77	57.91	42.09	42
Pan	-	89.54	42.09	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20

HYDROMETER ANALYSIS

ASTM D7928-17

Client:	D'Appolonia	Boring No.:	JB3-19-4
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	0.0-4.0
Project No.:	2020-002-001	Sample No.:	SpT-1/2
Lab ID:	2020-002-001-106	Soil Color:	Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	32.5	22.5	5.71	11.1	0.0439	80.8	34.0
2	31.0	22.5	5.71	11.4	0.0315	76.3	32.1
4	23.0	22.5	5.71	12.8	0.0236	52.2	22.0
15	18.0	22.5	5.71	13.7	0.0126	37.1	15.6
30	15.0	22.5	5.71	14.3	0.0091	28.0	11.8
60	13.0	22.4	5.75	14.6	0.0065	21.9	9.2
250	10.0	23.0	5.52	15.2	0.0032	13.5	5.7
1440	9.0	22.8	5.60	15.3	0.0014	10.3	4.3

Soil Specimen Data

Tare No.:	957	Percent Finer than # 200:	42.09
Wt. of Tare & Dry Material (g):	137.42		
Weight of Tare (g):	99.64	Specific Gravity:	2.70 Assumed
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	32.78		

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	G- 1819
Cylinder	G- 364
Thermometer	G- 1505
Balance	G- 657
#200 Sieve	G- 1944
Foam Inhibitor Used	No

Tested By	TO	Date	1/21/20	Checked By	KC	Date	1/23/20
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page 4 of 4

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-106

Boring No.: JB3-19-4
Depth (ft): 0.0-4.0
Sample No.: SpT-1/2
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	9
Wt. of Tare & Wet Sample (g)	24.93
Wt. of Tare & Dry Sample (g)	23.28
Weight of Tare (g)	8.25
Weight of Water (g)	1.65
Weight of Dry Sample (g)	15.03

Water Content (%)	11.0
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NON - PLASTIC MATERIAL

<i>Tested By</i>	<i>FS</i>	<i>Date</i>	<i>1/22/20</i>	<i>Checked By</i>	<i>JLK</i>	<i>Date</i>	<i>1/22/20</i>
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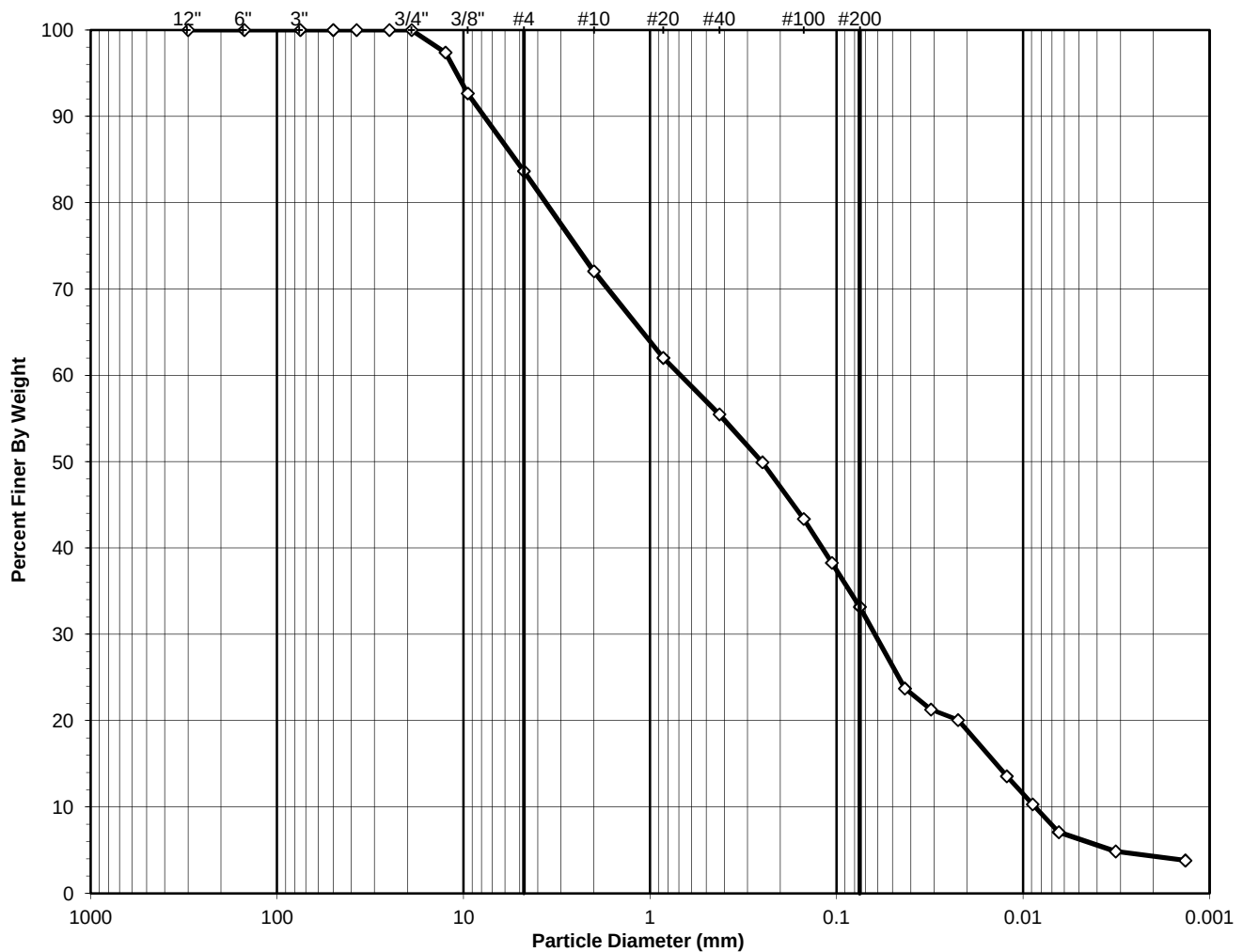
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-107

Boring No.: JB3-19-4
 Depth (ft): 6.0-12.0
 Sample No.: SpT-4/5/6
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
SM, TESTED

D50 = 0.25

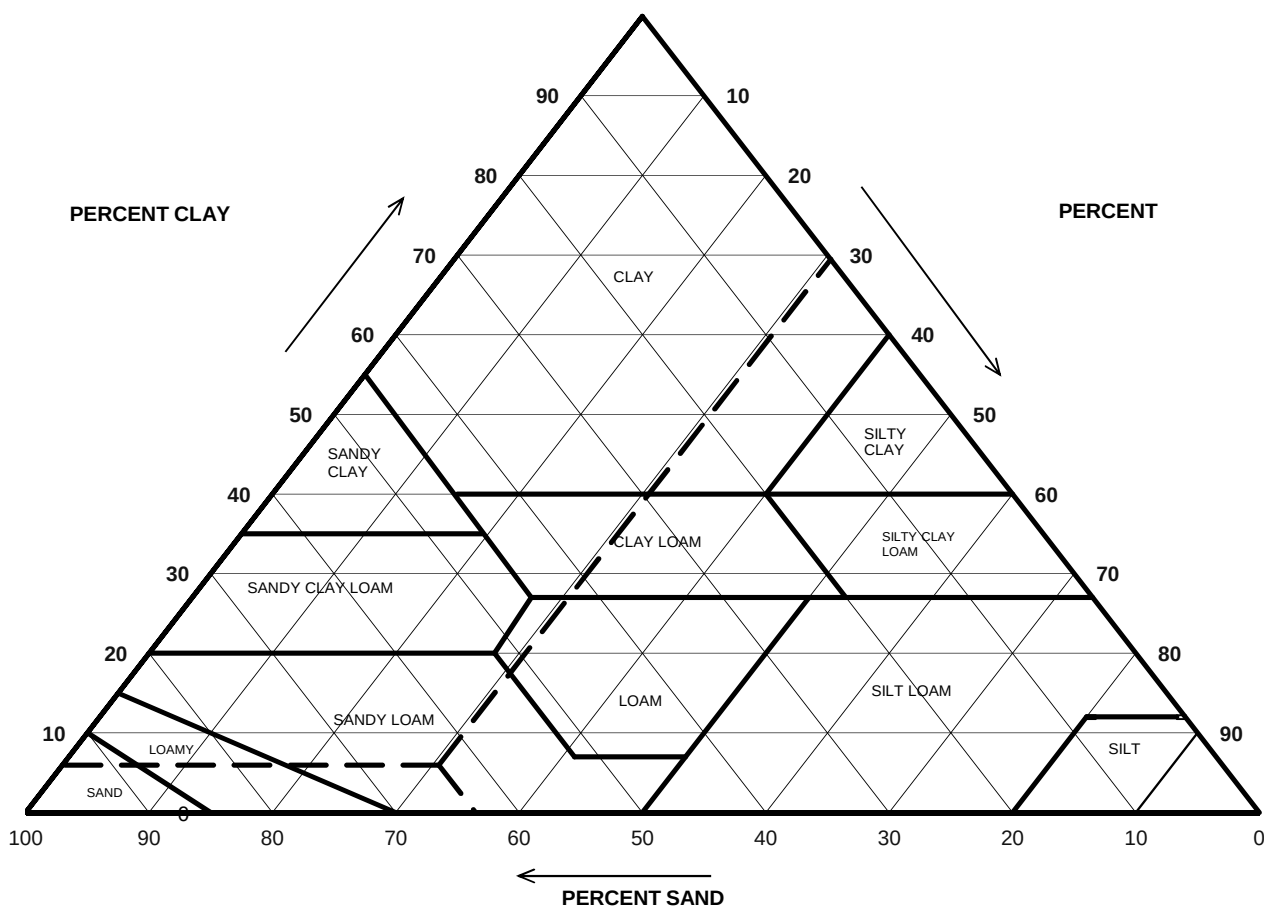
USCS Classification:
SILTY SAND WITH GRAVEL
(NON-PLASTIC FINES)

Tested By HL Date 1/23/20 Checked By KC Date 1/23/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-107

Boring No.: JB3-19-4
 Depth (ft): 6.0-12.0
 Sample No.: SpT-4/5/6
 Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	27.95	
2	72.05	Sand	45.77	63.52
0.05	26.28	Silt	21.99	30.53
0.002	4.29	Clay	4.29	5.95

USDA Classification: **SANDY LOAM**

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-107

Boring No.: JB3-19-4
Depth (ft): 6.0-12.0
Sample No.: SpT-4/5/6
Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1613	Tare No.:	NA	Tare No.:	1613	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	504.66	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	504.66	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	469.61	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	469.61	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	148.73	Weight of Tare (g):	NA	Weight of Tare (g):	148.73	Weight of Tare (g):	NA
Weight of Water (g):	35.05	Weight of Water (g):	NA	Weight of Water (g):	35.05	Weight of Water (g):	NA
Weight of Dry Soil (g):	320.88	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	320.88	Weight of Dry Soil (g):	NA
Moisture Content (%):	10.9	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	320.88	Total Dry Weight of Sample (g):	320.88	Dry Weight of Sample (g):	320.88	Total Dry Weight of Sample (g):	320.88
Tare No. (Sub-Specimen)	1613	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1613	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	504.66	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	504.66	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	148.73	Dry Weight of - 3/4" Sample (g):	320.88	Weight of Tare (g):	148.73	Dry Weight of - 3/4" Sample (g):	320.88
Sub-Specimen Wet Weight (g):	355.93	Dry Weight -3/4" +3/8" Sample (g):	23.57	Sub-Specimen Wet Weight (g):	355.93	Dry Weight -3/4" +3/8" Sample (g):	23.57
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	297.31	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	297.31
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	8.36	(**)	2.61	97.39	97
3/8"	9.5	15.21	4.74	7.35	92.65	93
#4	4.75	28.87	9.00	16.34	83.66	84
#10	2	37.24	11.61	27.95	72.05	72
#20	0.85	32.17	(**)	37.97	62.03	62
#40	0.425	21.00	6.54	44.52	55.48	55
#60	0.25	17.82	5.55	50.07	49.93	50
#100	0.15	21.05	6.56	56.63	43.37	43
#140	0.106	16.30	5.08	61.71	38.29	38
#200	0.075	16.38	5.10	66.82	33.18	33
Pan	-	106.48	33.18	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
(**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By HL Date 1/23/20 Checked By KC Date 1/23/20

HYDROMETER ANALYSIS

ASTM D7928-17

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-107

Boring No.: JB3-19-4
 Depth (ft): 6.0-12.0
 Sample No.: SpT-4/5/6
 Soil Color: Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	35.0	22.2	5.82	10.6	0.0430	71.5	23.7
2	32.0	22.2	5.82	11.2	0.0312	64.2	21.3
4	30.5	22.2	5.82	11.4	0.0223	60.5	20.1
15	22.5	22.2	5.82	12.9	0.0122	40.9	13.6
30	18.5	22.2	5.82	13.6	0.0089	31.1	10.3
60	14.5	22.3	5.78	14.3	0.0064	21.4	7.1
250	11.5	23.0	5.52	14.9	0.0032	14.7	4.9
1440	10.5	22.2	5.82	15.0	0.0013	11.5	3.8

Soil Specimen Data

Tare No.:	947	Percent Finer than # 200:	33.18
Wt. of Tare & Dry Material (g):	143.38		
Weight of Tare (g):	98.12	Specific Gravity:	2.71 Measured
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	40.26		

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	G- 1819
Cylinder	G- 353
Thermometer	G- 1505
Balance	G- 657
#200 Sieve	G- 1944
Foam Inhibitor Used	No

Tested By	TO	Date	1/23/20	Checked By	KC	Date	1/23/20
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page 4 of 4

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-107

Boring No.: JB3-19-4
Depth (ft): 6.0-12.0
Sample No.: SpT-4/5/6
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	49
Wt. of Tare & Wet Sample (g)	30.35
Wt. of Tare & Dry Sample (g)	28.19
Weight of Tare (g)	8.38
Weight of Water (g)	2.16
Weight of Dry Sample (g)	19.81

Water Content (%)	10.9
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NON - PLASTIC MATERIAL

Tested By	FS	Date	1/21/20	Checked By	JLK	Date	1/21/20
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SPECIFIC GRAVITY

ASTM D 854-14

Client:	D'Appolonia	Boring No.:	JB3-19-4
Client Reference:	NRCS- Jewell Brook 172719-17	Depth (ft):	6.0-12.0
Project No.:	2020-002-001	Sample No.:	SpT-4/5/6
Lab ID:	2020-002-001-107	Visual Description:	Brown Sandy Clay

(Minus No.4 sieve material, oven dried)

Replicate Number	1	2
Pycnometer ID:	G 1917	G 1991
Weight of Pycnometer & Soil & Water (g):	738.54	743.34
Temperature (°C):	26.0	26.2
Weight of Pycnometer & Water (g):	683.85	684.37
Tare Number:	929	926
Weight of Tare & Dry Soil (g):	187.27	185.95
Weight of Tare (g):	99.2	93.67
Weight of Dry Soil (g):	88.07	92.28
Specific Gravity of Soil @ Measured Temperature:	2.638	2.770
Specific Gravity of Water @ Measured Temperature:	0.99679	0.99674
Conversion Factor for Measured Temperature:	0.99858	0.99853
Specific Gravity @ 20° Celsius:	2.642	2.774

Average Specific Gravity @ 20° Celsius

2.71

Tested By TO Date 1/24/20 Checked By JLK Date 1/27/20

DCN: CT-S5 Date: 3/26/18 Revision: 21

S:\Excel\Excel QA\Spreadsheets\Specific Gravity.xls

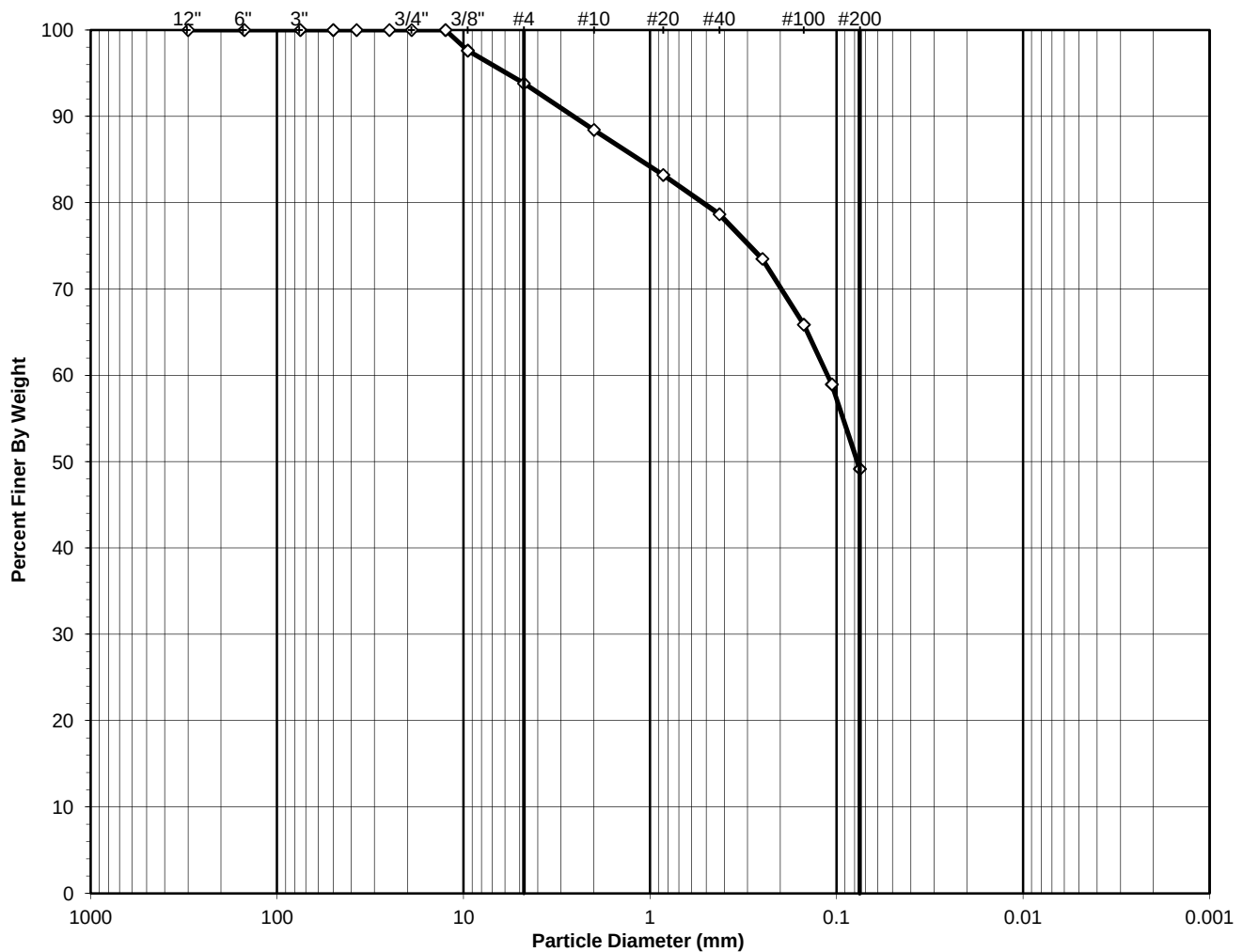
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-109

Boring No.: JB3-19-4
Depth (ft): 20.0-24.0
Sample No.: SpT-11/12
Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
SM, TESTED

D50 = 0.08

USCS Classification:
SILTY SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20
page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-109

Boring No.: JB3-19-4
 Depth (ft): 20.0-24.0
 Sample No.: SpT-11/12
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1548	Tare No.:	NA	Tare No.:	1548	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	436.41	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	436.41	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	406.53	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	406.53	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.12	Weight of Tare (g):	NA	Weight of Tare (g):	145.12	Weight of Tare (g):	NA
Weight of Water (g):	29.88	Weight of Water (g):	NA	Weight of Water (g):	29.88	Weight of Water (g):	NA
Weight of Dry Soil (g):	261.41	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	261.41	Weight of Dry Soil (g):	NA
Moisture Content (%):	11.4	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	261.41	Total Dry Weight of Sample (g):	261.41	Dry Weight of Sample (g):	261.41	Total Dry Weight of Sample (g):	261.41
Tare No. (Sub-Specimen)	1548	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1548	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	436.41	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	436.41	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	145.12	Dry Weight of - 3/4" Sample (g):	261.41	Weight of Tare (g):	145.12	Dry Weight of - 3/4" Sample (g):	261.41
Sub-Specimen Wet Weight (g):	291.29	Dry Weight -3/4" +3/8" Sample (g):	6.23	Sub-Specimen Wet Weight (g):	291.29	Dry Weight -3/4" +3/8" Sample (g):	6.23
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	255.18	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	255.18
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*) 0.00	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**) 0.00	0.00	100.00	100
3/8"	9.5	6.23	2.38	2.38	97.62	98
#4	4.75	9.94	3.80	6.19	93.81	94
#10	2	14.07	5.38	11.57	88.43	88
#20	0.85	13.65	(**) 5.22	16.79	83.21	83
#40	0.425	11.89	4.55	21.34	78.66	79
#60	0.25	13.50	5.16	26.50	73.50	73
#100	0.15	19.92	7.62	34.12	65.88	66
#140	0.106	18.08	6.92	41.04	58.96	59
#200	0.075	25.61	9.80	50.84	49.16	49
Pan	-	128.52	49.16	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/21/20 Checked By KC Date 1/23/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-109

Boring No.: JB3-19-4
Depth (ft): 20.0-24.0
Sample No.: SpT-11/12
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	4
Wt. of Tare & Wet Sample (g)	37.03
Wt. of Tare & Dry Sample (g)	34.19
Weight of Tare (g)	8.36
Weight of Water (g)	2.84
Weight of Dry Sample (g)	25.83

Water Content (%)	11.0
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NON - PLASTIC MATERIAL

Tested By	FS	Date	1/22/20	Checked By	JLK	Date	1/22/20
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SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-110

Boring No.: JB3-19-201
Depth (ft): 2.0-6.0
Sample No.: SpT-2/3
Soil Color: Brown



USCS Symbol:
SM, TESTED

D50 = 0.09

USCS Classification:
SILTY SAND
(NON-PLASTIC FINES)

Tested By	HL	Date	1/23/20	Checked By	KC	Date	1/23/20
<i>page 1 of 2</i>		DCN: CT-S73J, DATE 5/22/17, REV. 1e					

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-110

Boring No.: JB3-19-201
 Depth (ft): 2.0-6.0
 Sample No.: SpT-2/3
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1434	Tare No.:	NA	Tare No.:	1434	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	349.38	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	349.38	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	302.14	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	302.14	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.01	Weight of Tare (g):	NA	Weight of Tare (g):	145.01	Weight of Tare (g):	NA
Weight of Water (g):	47.24	Weight of Water (g):	NA	Weight of Water (g):	47.24	Weight of Water (g):	NA
Weight of Dry Soil (g):	157.13	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	157.13	Weight of Dry Soil (g):	NA
Moisture Content (%):	30.1	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	157.13	Total Dry Weight of Sample (g):	157.13	Dry Weight of Sample (g):	157.13	Total Dry Weight of Sample (g):	157.13
Tare No. (Sub-Specimen)	1434	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1434	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	349.38	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	349.38	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	145.01	Dry Weight of - 3/4" Sample (g):	157.13	Weight of Tare (g):	145.01	Dry Weight of - 3/4" Sample (g):	157.13
Sub-Specimen Wet Weight (g):	204.37	Dry Weight -3/4" +3/8" Sample (g):	0.00	Sub-Specimen Wet Weight (g):	204.37	Dry Weight -3/4" +3/8" Sample (g):	0.00
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	157.13	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	157.13
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**)	0.00	100.00	100
3/8"	9.5	0.00	0.00	0.00	100.00	100
#4	4.75	3.02	1.92	1.92	98.08	98
#10	2	4.24	2.70	4.62	95.38	95
#20	0.85	4.51	(**)	7.49	92.51	93
#40	0.425	5.97	3.80	11.29	88.71	89
#60	0.25	12.74	8.11	19.40	80.60	81
#100	0.15	20.14	12.82	32.22	67.78	68
#140	0.106	17.09	10.88	43.09	56.91	57
#200	0.075	17.77	11.31	54.40	45.60	46
Pan	-	71.65	45.60	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By HL Date 1/23/20 Checked By KC Date 1/23/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS- Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-110

Boring No.: JB3-19-201
Depth (ft): 2.0-6.0
Sample No.: SpT-2/3
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	43
Wt. of Tare & Wet Sample (g)	27.29
Wt. of Tare & Dry Sample (g)	23.21
Weight of Tare (g)	8.51
Weight of Water (g)	4.08
Weight of Dry Sample (g)	14.70

Water Content (%)	27.8
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NON - PLASTIC MATERIAL

Tested By	FS	Date	1/21/20	Checked By	JLK	Date	1/21/20
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SPECIFIC GRAVITY

ASTM D 854-14

Client:	D'Appolonia	Boring No.:	JB3-19-201
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	2.0-6.0
Project No.:	2020-002-001	Sample No.:	SpT-2/3
Lab ID:	2020-002-001-110	Visual Description:	Brown Silty Clay

(Minus No.4 sieve material, oven dried)

Replicate Number	1	2
Pycnometer ID:	G 1917	G 1991
Weight of Pycnometer & Soil & Water (g):	721.27	722.9
Temperature (°C):	23.8	23.9
Weight of Pycnometer & Water (g):	684.13	684.67
Tare Number:	1465	644
Weight of Tare & Dry Soil (g):	158.2	159.11
Weight of Tare (g):	96.2	97.99
Weight of Dry Soil (g):	62.00	61.12
Specific Gravity of Soil @ Measured Temperature:	2.494	2.670
Specific Gravity of Water @ Measured Temperature:	0.99735	0.99733
Conversion Factor for Measured Temperature:	0.99914	0.99912
Specific Gravity @ 20° Celsius:	2.496	2.673

Average Specific Gravity @ 20° Celsius	2.58
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Tested By TO Date 1/28/20 Checked By BRB Date 1/29/20

DCN: CT-S5 Date: 3/26/18 Revision: 21

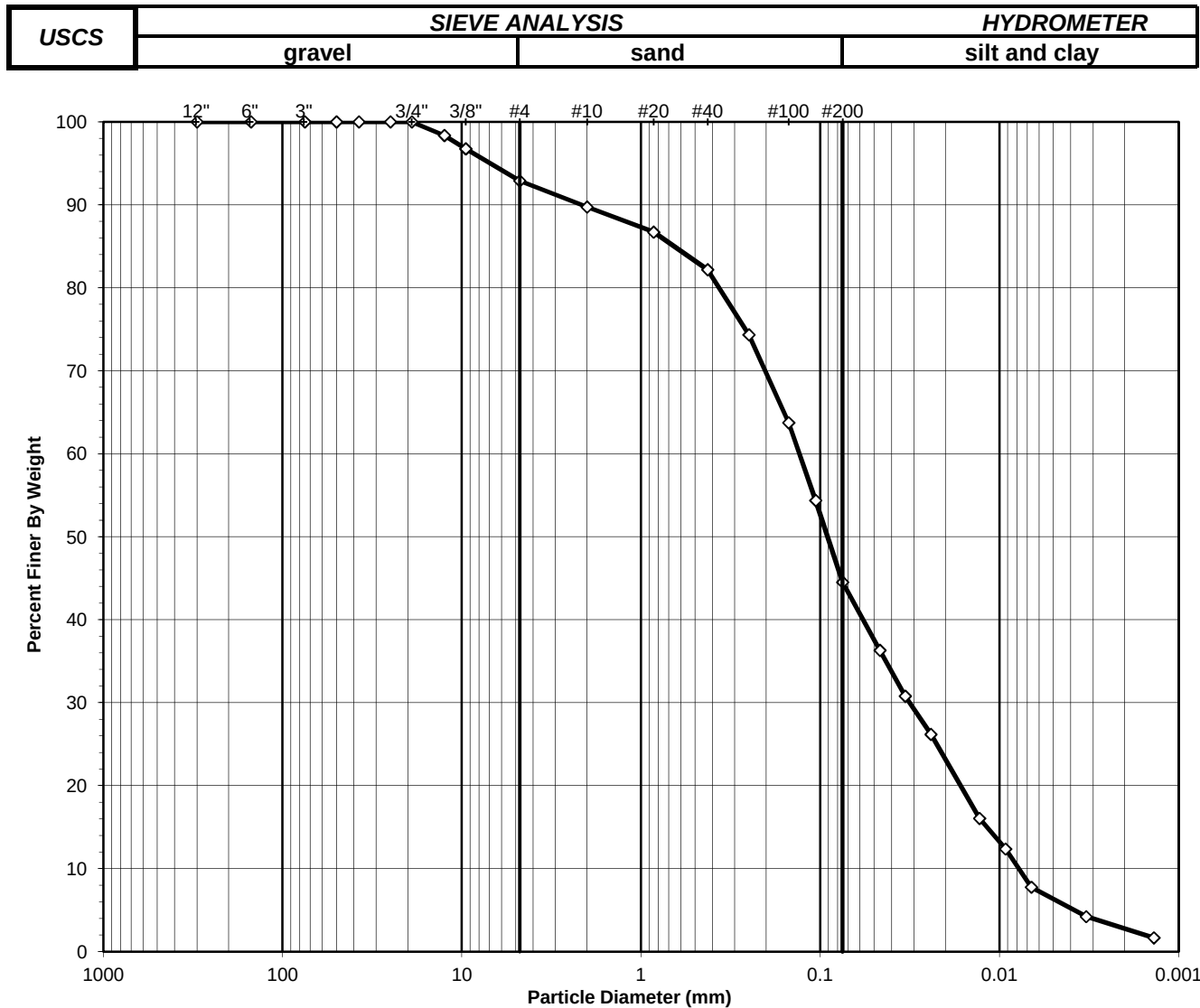
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SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-111

Boring No.: JB3-19-201
 Depth (ft): 6.0-8.0
 Sample No.: SpT-4
 Soil Color: Brown



USCS Symbol:
SM, TESTED

D50 = 0.09

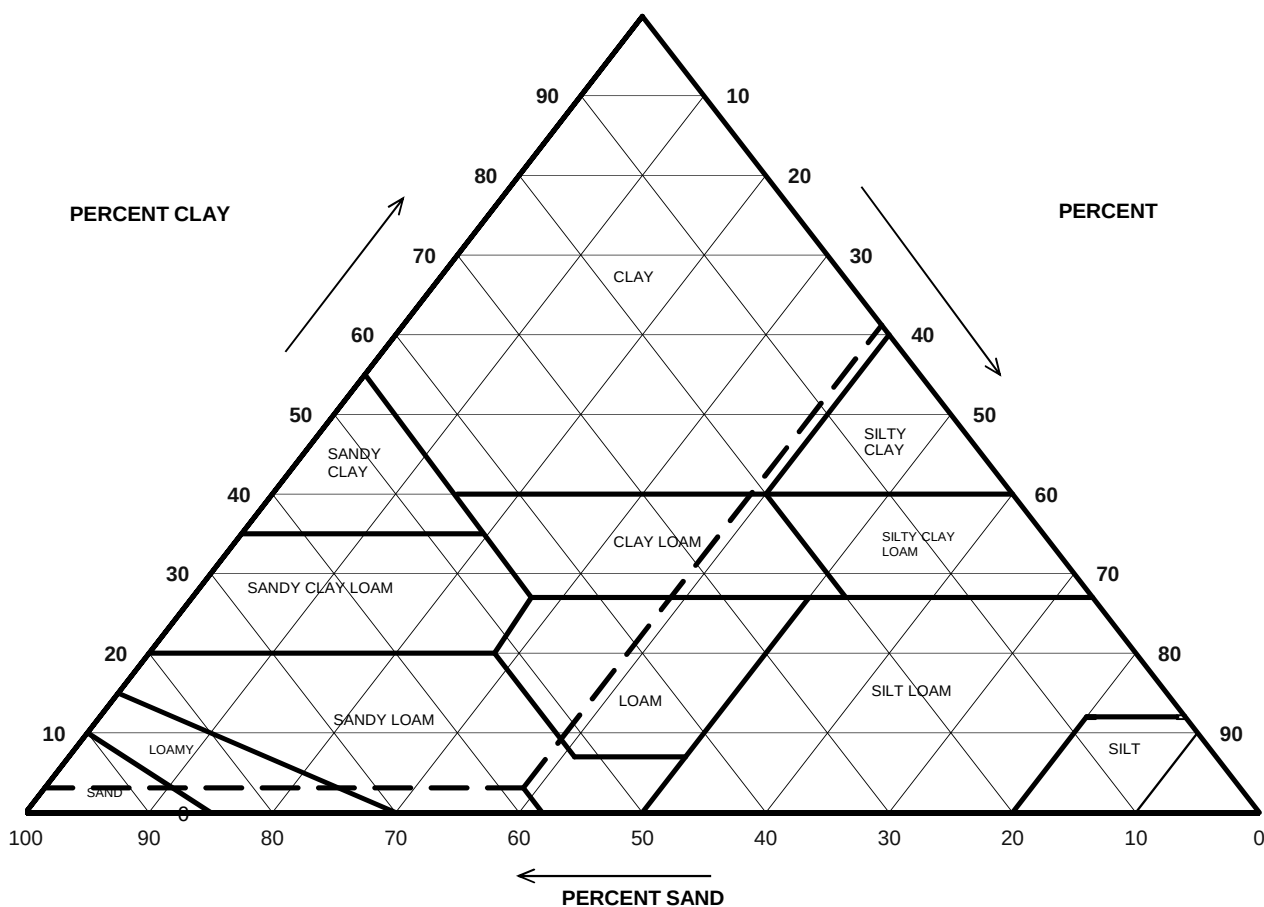
USCS Classification:
SILTY SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/30/20 Checked By JLK Date 2/3/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-111

Boring No.: JB3-19-201
Depth (ft): 6.0-8.0
Sample No.: SpT-4
Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	10.26	
2	89.74	Sand	52.16	58.13
0.05	37.58	Silt	34.81	38.80
0.002	2.76	Clay	2.76	3.08

USDA Classification: **SANDY LOAM**

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-111

Boring No.: JB3-19-201
 Depth (ft): 6.0-8.0
 Sample No.: SpT-4
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1428	Tare No.:	NA	Tare No.:	1428	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	377.03	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	377.03	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	312.65	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	312.65	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.14	Weight of Tare (g):	NA	Weight of Tare (g):	145.14	Weight of Tare (g):	NA
Weight of Water (g):	64.38	Weight of Water (g):	NA	Weight of Water (g):	64.38	Weight of Water (g):	NA
Weight of Dry Soil (g):	167.51	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	167.51	Weight of Dry Soil (g):	NA
Moisture Content (%):	38.4	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	167.51	Total Dry Weight of Sample (g):	167.51	Dry Weight of Sample (g):	167.51	Total Dry Weight of Sample (g):	167.51
Tare No. (Sub-Specimen)	1428	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1428	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	377.03	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	377.03	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	145.14	Dry Weight of - 3/4" Sample (g):	167.51	Weight of Tare (g):	145.14	Dry Weight of - 3/4" Sample (g):	167.51
Sub-Specimen Wet Weight (g):	231.89	Dry Weight -3/4" +3/8" Sample (g):	5.44	Sub-Specimen Wet Weight (g):	231.89	Dry Weight -3/4" +3/8" Sample (g):	5.44
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	162.07	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	162.07
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	2.74	(**)	1.64	98.36	98
3/8"	9.5	2.70	1.61	3.25	96.75	97
#4	4.75	6.47	3.86	7.11	92.89	93
#10	2	5.28	3.15	10.26	89.74	90
#20	0.85	5.07	(**)	13.29	86.71	87
#40	0.425	7.58	4.53	17.81	82.19	82
#60	0.25	13.14	7.84	25.66	74.34	74
#100	0.15	17.76	10.60	36.26	63.74	64
#140	0.106	15.70	9.37	45.63	54.37	54
#200	0.075	16.48	9.84	55.47	44.53	45
Pan	-	74.59	44.53	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/30/20 Checked By JLK Date 2/3/20

HYDROMETER ANALYSIS

ASTM D7928-17

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-111

Boring No.: JB3-19-201
 Depth (ft): 6.0-8.0
 Sample No.: SpT-4
 Soil Color: Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	25.5	22.3	5.78	12.3	0.0464	81.5	36.3
2	22.5	22.3	5.78	12.9	0.0335	69.1	30.8
4	20.0	22.3	5.78	13.3	0.0241	58.8	26.2
15	14.5	22.3	5.78	14.3	0.0129	36.1	16.1
30	12.5	22.3	5.78	14.7	0.0092	27.8	12.4
60	10.0	22.3	5.78	15.1	0.0066	17.4	7.8
250	8.0	22.5	5.71	15.5	0.0033	9.5	4.2
1440	6.5	22.8	5.60	15.8	0.0014	3.7	1.7

Soil Specimen Data

Tare No.:	1681	Percent Finer than # 200:	44.53
Wt. of Tare & Dry Material (g):	126.03		
Weight of Tare (g):	97.12	Specific Gravity:	2.70 Assumed
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	23.91		

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	G- 1819
Cylinder	G- 771
Thermometer	G- 1505
Balance	G- 657
#200 Sieve	G- 1944
Foam Inhibitor Used	No

Tested By	FS	Date	1/30/20	Checked By	JLK	Date	2/3/20
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page 4 of 4

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-111

Boring No.: JB3-19-201
Depth (ft): 6.0-8.0
Sample No.: SpT-4
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	37
Wt. of Tare & Wet Sample (g)	21.27
Wt. of Tare & Dry Sample (g)	17.95
Weight of Tare (g)	8.34
Weight of Water (g)	3.32
Weight of Dry Sample (g)	9.61

Water Content (%)	34.5
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NON - PLASTIC MATERIAL

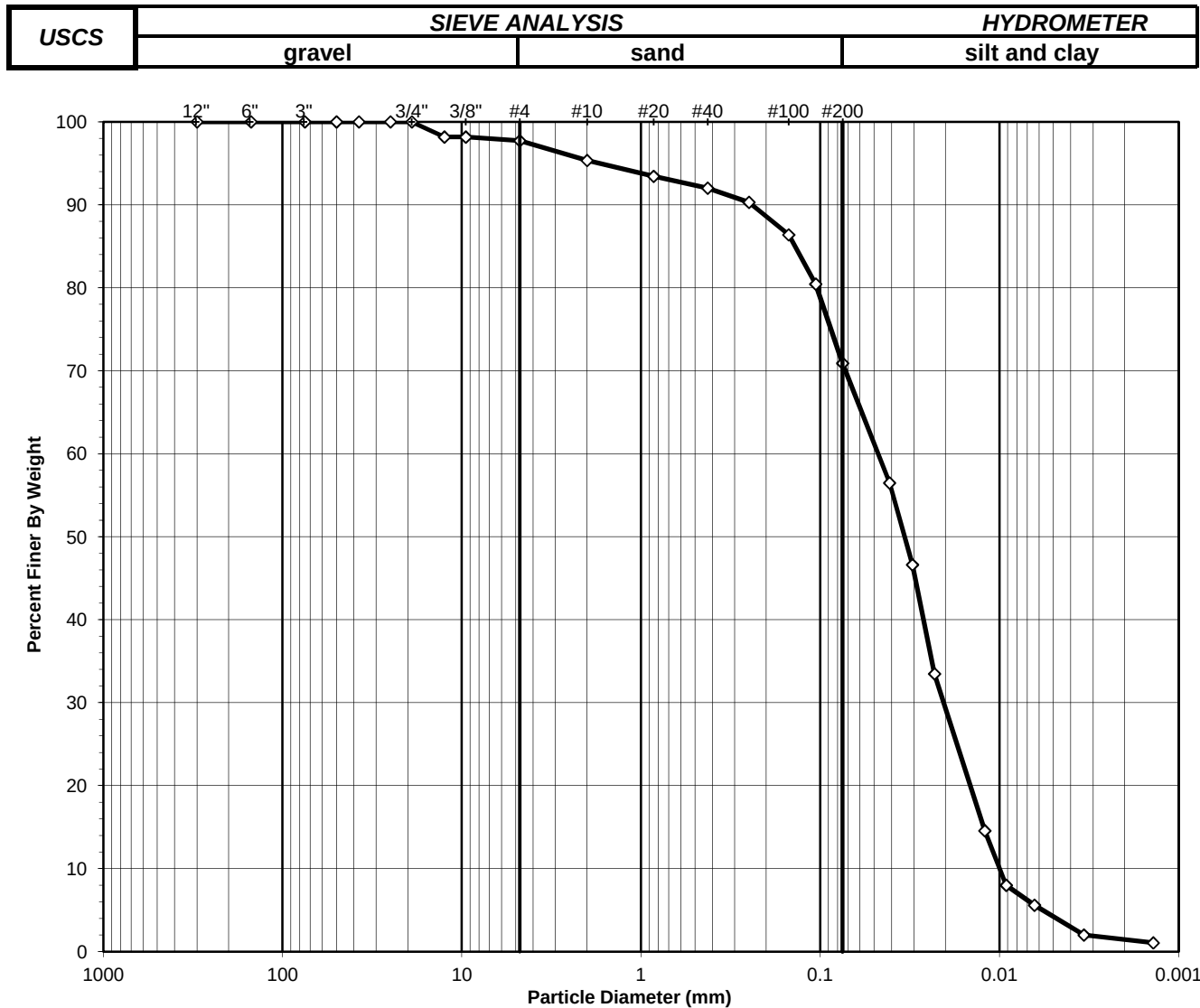
Tested By *MLF* Date *1/28/20* Checked By *JLK* Date *1/28/20*

SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-112

Boring No.: JB3-19-201
 Depth (ft): 10.0-14.0
 Sample No.: SpT-6/7
 Soil Color: Brown



USCS Symbol:
ML, TESTED

D50 = 0.03

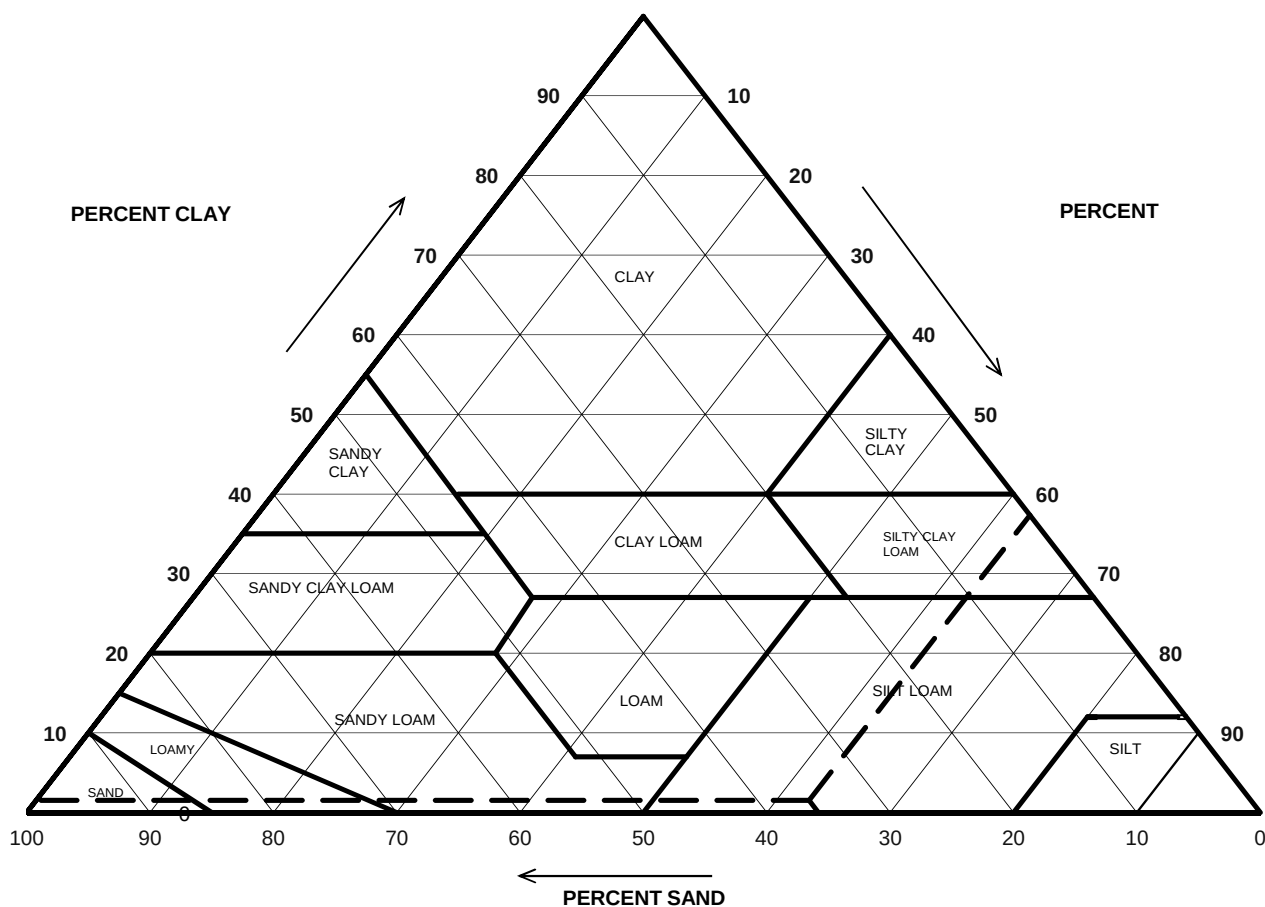
USCS Classification:
SILT WITH SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/28/20 Checked By JLK Date 1/30/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-112

Boring No.: JB3-19-201
Depth (ft): 10.0-14.0
Sample No.: SpT-6/7
Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	4.65	
2	95.35	Sand	34.15	35.82
0.05	61.20	Silt	59.75	62.67
0.002	1.45	Clay	1.45	1.52

USDA Classification: **SILT LOAM**

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-112

Boring No.: JB3-19-201
Depth (ft): 10.0-14.0
Sample No.: SpT-6/7
Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1415	Tare No.:	NA	Tare No.:	1415	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	467.37	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	467.37	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	411.94	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	411.94	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.25	Weight of Tare (g):	NA	Weight of Tare (g):	145.25	Weight of Tare (g):	NA
Weight of Water (g):	55.43	Weight of Water (g):	NA	Weight of Water (g):	55.43	Weight of Water (g):	NA
Weight of Dry Soil (g):	266.69	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	266.69	Weight of Dry Soil (g):	NA
Moisture Content (%):	20.8	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	266.69	Total Dry Weight of Sample (g):	266.69	Dry Weight of Sample (g):	266.69	Total Dry Weight of Sample (g):	266.69
Tare No. (Sub-Specimen)	1415	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1415	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	467.37	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	467.37	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	145.25	Dry Weight of - 3/4" Sample (g):	266.69	Weight of Tare (g):	145.25	Dry Weight of - 3/4" Sample (g):	266.69
Sub-Specimen Wet Weight (g):	322.12	Dry Weight -3/4" +3/8" Sample (g):	4.88	Sub-Specimen Wet Weight (g):	322.12	Dry Weight -3/4" +3/8" Sample (g):	4.88
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	261.81	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	261.81
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	4.88	(**)	1.83	98.17	98
3/8"	9.5	0.00	0.00	1.83	98.17	98
#4	4.75	1.19	0.45	2.28	97.72	98
#10	2	6.33	2.37	4.65	95.35	95
#20	0.85	5.10	(**)	6.56	93.44	93
#40	0.425	3.80	1.42	7.99	92.01	92
#60	0.25	4.55	1.71	9.69	90.31	90
#100	0.15	10.44	3.91	13.61	86.39	86
#140	0.106	15.85	5.94	19.55	80.45	80
#200	0.075	25.45	9.54	29.09	70.91	71
Pan	-	189.10	70.91	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
(**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/28/20 Checked By JLK Date 1/30/20

HYDROMETER ANALYSIS

ASTM D7928-17

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-112

Boring No.: JB3-19-201
 Depth (ft): 10.0-14.0
 Sample No.: SpT-6/7
 Soil Color: Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	40.0	22.7	5.63	9.7	0.0411	79.7	56.5
2	34.0	22.7	5.63	10.8	0.0306	65.8	46.6
4	26.0	22.7	5.63	12.3	0.0230	47.2	33.5
17	14.5	22.7	5.63	14.3	0.0121	20.6	14.6
31	10.5	22.7	5.63	15.0	0.0092	11.3	8.0
65	9.0	22.8	5.60	15.3	0.0064	7.9	5.6
240	7.0	22.3	5.78	15.7	0.0034	2.8	2.0
1440	6.5	22.1	5.86	15.8	0.0014	1.5	1.1

Soil Specimen Data

Tare No.: 301 Percent Finer than # 200: 70.91
 Wt. of Tare & Dry Material (g): 151.72
 Weight of Tare (g): 104.06 Specific Gravity: 2.70 Assumed
 Weight of Deflocculant (g): 5.0
 Weight of Dry Material (g): 42.66

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H G- 1819
 Cylinder G- 205
 Thermometer G- 1505
 Balance G- 657
 #200 Sieve G- 1944
 Foam Inhibitor Used No

Tested By TO Date 1/28/20 Checked By JLK Date 1/30/20
 page 4 of 4

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-112

Boring No.: JB3-19-201
Depth (ft): 10.0-14.0
Sample No.: SpT-6/7
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	50
Wt. of Tare & Wet Sample (g)	24.64
Wt. of Tare & Dry Sample (g)	21.88
Weight of Tare (g)	8.46
Weight of Water (g)	2.76
Weight of Dry Sample (g)	13.42

Water Content (%)	20.6
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NON - PLASTIC MATERIAL

<i>Tested By</i>	<i>FS</i>	<i>Date</i>	<i>1/29/20</i>	<i>Checked By</i>	<i>JLK</i>	<i>Date</i>	<i>1/29/20</i>
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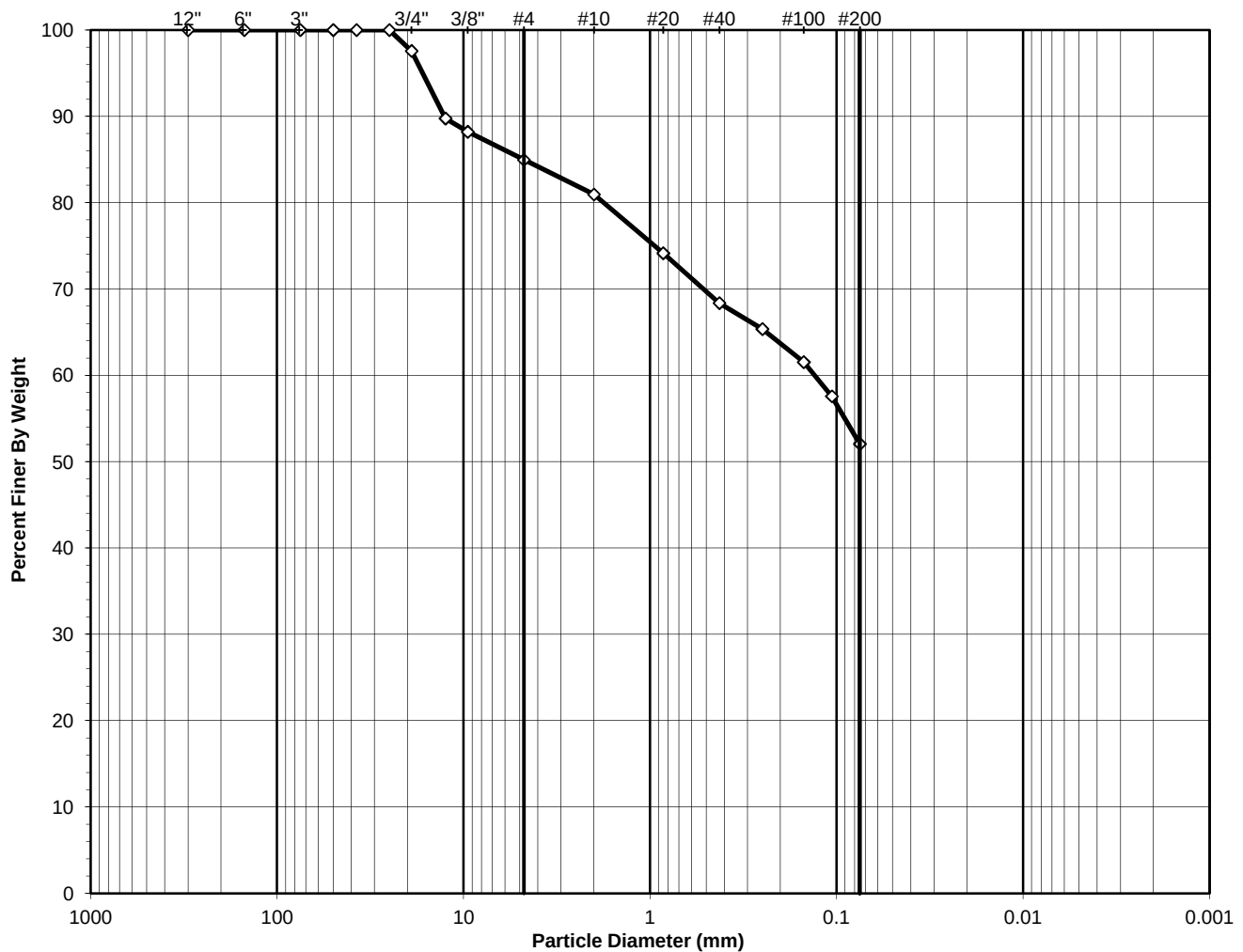
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-113

Boring No.: JB3-19-201
 Depth (ft): 16.0-20.0
 Sample No.: SpT-9-10
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
ML, TESTED

D50 = 0.07

USCS Classification:
SANDY SILT WITH GRAVEL
(NON-PLASTIC FINES)

Tested By DS Date 2/4/20 Checked By KC Date 2/5/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-113

Boring No.: JB3-19-201
 Depth (ft): 16.0-20.0
 Sample No.: SpT-9-10
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1543	Tare No.:	NA	Tare No.:	1543	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	468.91	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	468.91	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	468.91	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	468.91	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	144.33	Weight of Tare (g):	NA	Weight of Tare (g):	144.33	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA	Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	324.58	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	324.58	Weight of Dry Soil (g):	NA
Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	324.58	Total Dry Weight of Sample (g):	324.58	Dry Weight of Sample (g):	324.58	Total Dry Weight of Sample (g):	324.58
Tare No. (Sub-Specimen)	1543	Wet Weight of +3/4" Sample (g):	7.86	Tare No. (Sub-Specimen)	1543	Wet Weight of +3/4" Sample (g):	7.86
Wt. of Tare & Wet Sub-Specimen (g):	468.91	Dry Weight of + 3/4" Sample (g):	7.86	Wt. of Tare & Wet Sub-Specimen (g):	468.91	Dry Weight of + 3/4" Sample (g):	7.86
Weight of Tare (g):	144.33	Dry Weight of - 3/4" Sample (g):	316.72	Weight of Tare (g):	144.33	Dry Weight of - 3/4" Sample (g):	316.72
Sub-Specimen Wet Weight (g):	324.58	Dry Weight -3/4" +3/8" Sample (g):	30.42	Sub-Specimen Wet Weight (g):	324.58	Dry Weight -3/4" +3/8" Sample (g):	30.42
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	287.04	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	287.04
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	7.86	2.42	2.42	97.58	98
1/2"	12.5	25.38	7.82	10.24	89.76	90
3/8"	9.5	5.04	(**)	11.79	88.21	88
#4	4.75	10.53	3.24	15.04	84.96	85
#10	2	13.00	4.01	19.04	80.96	81
#20	0.85	22.10	(**)	25.85	74.15	74
#40	0.425	18.75	5.78	31.63	68.37	68
#60	0.25	9.76	3.01	34.64	65.36	65
#100	0.15	12.43	3.83	38.47	61.53	62
#140	0.106	12.84	3.96	42.42	57.58	58
#200	0.075	17.93	5.52	47.95	52.05	52
Pan	-	168.96	52.05	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 2/4/20 Checked By KC Date 2/5/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-113

Boring No.: JB3-19-201
Depth (ft): 16.0-20.0
Sample No.: SpT-9/10
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	13
Wt. of Tare & Wet Sample (g)	30.30
Wt. of Tare & Dry Sample (g)	26.78
Weight of Tare (g)	8.29
Weight of Water (g)	3.52
Weight of Dry Sample (g)	18.49

Water Content (%) **19.0**

NON - PLASTIC MATERIAL

Tested By *MLF* *Date* *1/30/20* *Checked By* *JLK* *Date* *1/30/20*

SPECIFIC GRAVITY

ASTM D 854-14

Client:	D'Appolonia	Boring No.:	JB3-19-201
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	16.0-20.0
Project No.:	2020-002-001	Sample No.:	SpT-9/10
Lab ID:	2020-002-001-113	Visual Description:	Brown Silty Clay

(Minus No.4 sieve material, oven dried)

Replicate Number	1	2
Pycnometer ID:	G 1917	G 1991
Weight of Pycnometer & Soil & Water (g):	746.37	749.39
Temperature (°C):	26.2	26.0
Weight of Pycnometer & Water (g):	683.82	684.40
Tare Number:	957	1019
Weight of Tare & Dry Soil (g):	199.7	201.51
Weight of Tare (g):	99.33	99.9
Weight of Dry Soil (g):	100.37	101.61
Specific Gravity of Soil @ Measured Temperature:	2.654	2.775
Specific Gravity of Water @ Measured Temperature:	0.99674	0.99679
Conversion Factor for Measured Temperature:	0.99853	0.99858
Specific Gravity @ 20° Celsius:	2.658	2.779

Average Specific Gravity @ 20° Celsius

2.72

Tested By TO Date 1/31/20 Checked By BRB Date 2/4/20

DCN: CT-S5 Date: 3/26/18 Revision: 21

S:\Excel\Excel QA\Spreadsheets\Specific Gravity.xls

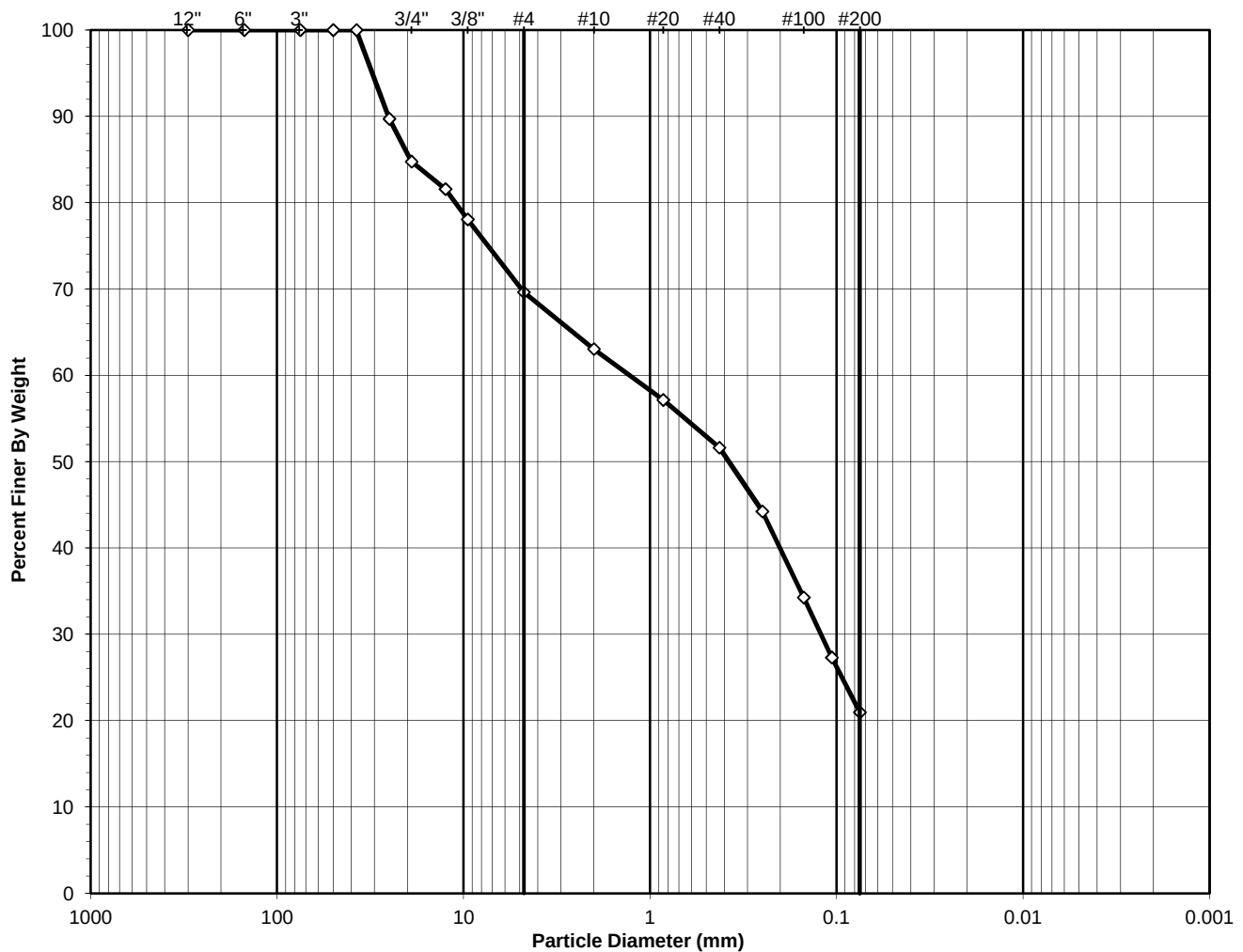
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-114

Boring No.: JB3-19-202
 Depth (ft): 2.0-6.0
 Sample No.: SpT-2/3
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
sm, ASSUMED

D50 = 0.38

USCS Classification:
SILTY SAND WITH GRAVEL
(INSUFFICIENT FINES TO RUN HYDROMETER)

Tested By DS Date 1/28/20 Checked By JLK Date 2/3/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-114

Boring No.: JB3-19-202
 Depth (ft): 2.0-6.0
 Sample No.: SpT-2/3
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1542	Tare No.:	NA	Tare No.:	1542	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	431.40	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	431.40	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	413.53	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	413.53	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	144.00	Weight of Tare (g):	NA	Weight of Tare (g):	144.00	Weight of Tare (g):	NA
Weight of Water (g):	17.87	Weight of Water (g):	NA	Weight of Water (g):	17.87	Weight of Water (g):	NA
Weight of Dry Soil (g):	269.53	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	269.53	Weight of Dry Soil (g):	NA
Moisture Content (%):	6.6	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	269.53	Total Dry Weight of Sample (g):	269.53	Dry Weight of Sample (g):	269.53	Total Dry Weight of Sample (g):	269.53
Tare No. (Sub-Specimen)	1542	Wet Weight of +3/4" Sample (g):	43.79	Tare No. (Sub-Specimen)	1542	Wet Weight of +3/4" Sample (g):	43.79
Wt. of Tare & Wet Sub-Specimen (g):	431.40	Dry Weight of + 3/4" Sample (g):	41.07	Wt. of Tare & Wet Sub-Specimen (g):	431.40	Dry Weight of + 3/4" Sample (g):	41.07
Weight of Tare (g):	144.00	Dry Weight of - 3/4" Sample (g):	228.46	Weight of Tare (g):	144.00	Dry Weight of - 3/4" Sample (g):	228.46
Sub-Specimen Wet Weight (g):	287.40	Dry Weight -3/4" +3/8" Sample (g):	18.06	Sub-Specimen Wet Weight (g):	287.40	Dry Weight -3/4" +3/8" Sample (g):	18.06
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	213.15	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	213.15
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*) 0.00	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	27.73	10.29	10.29	89.71	90
3/4"	19	13.34	4.95	15.24	84.76	85
1/2"	12.5	8.58	(**) 3.18	18.42	81.58	82
3/8"	9.5	9.48	3.52	21.94	78.06	78
#4	4.75	22.72	8.43	30.37	69.63	70
#10	2	17.75	6.59	36.95	63.05	63
#20	0.85	15.88	(**) 5.89	42.84	57.16	57
#40	0.425	14.90	5.53	48.37	51.63	52
#60	0.25	19.90	7.38	55.76	44.24	44
#100	0.15	26.88	9.97	65.73	34.27	34
#140	0.106	18.73	6.95	72.68	27.32	27
#200	0.075	17.11	6.35	79.03	20.97	21
Pan	-	56.53	20.97	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/28/20 Checked By JLK Date 2/3/20

SPECIFIC GRAVITY

ASTM D 854-14

Client:	D'Appolonia	Boring No.:	JB3-19-202
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	2.0-6.0
Project No.:	2020-002-001	Sample No.:	SpT-2/3
Lab ID:	2020-002-001-114	Visual Description:	Brown Sand

(Minus No.4 sieve material, oven dried)

Replicate Number	1	2
Pycnometer ID:	G 1917	G 1991
Weight of Pycnometer & Soil & Water (g):	725.49	728.59
Temperature (°C):	26.0	26.3
Weight of Pycnometer & Water (g):	683.85	684.36
Tare Number:	1463	1920
Weight of Tare & Dry Soil (g):	166.93	164.44
Weight of Tare (g):	99.01	94.92
Weight of Dry Soil (g):	67.92	69.52
Specific Gravity of Soil @ Measured Temperature:	2.584	2.749
Specific Gravity of Water @ Measured Temperature:	0.99679	0.99671
Conversion Factor for Measured Temperature:	0.99858	0.99850
Specific Gravity @ 20° Celsius:	2.588	2.753

Average Specific Gravity @ 20° Celsius	2.67
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Tested By TO Date 1/29/20 Checked By JLK Date 1/30/20

DCN: CT-S5 Date: 3/26/18 Revision: 21

S:\Excel\Excel QA\Spreadsheets\Specific Gravity.xls

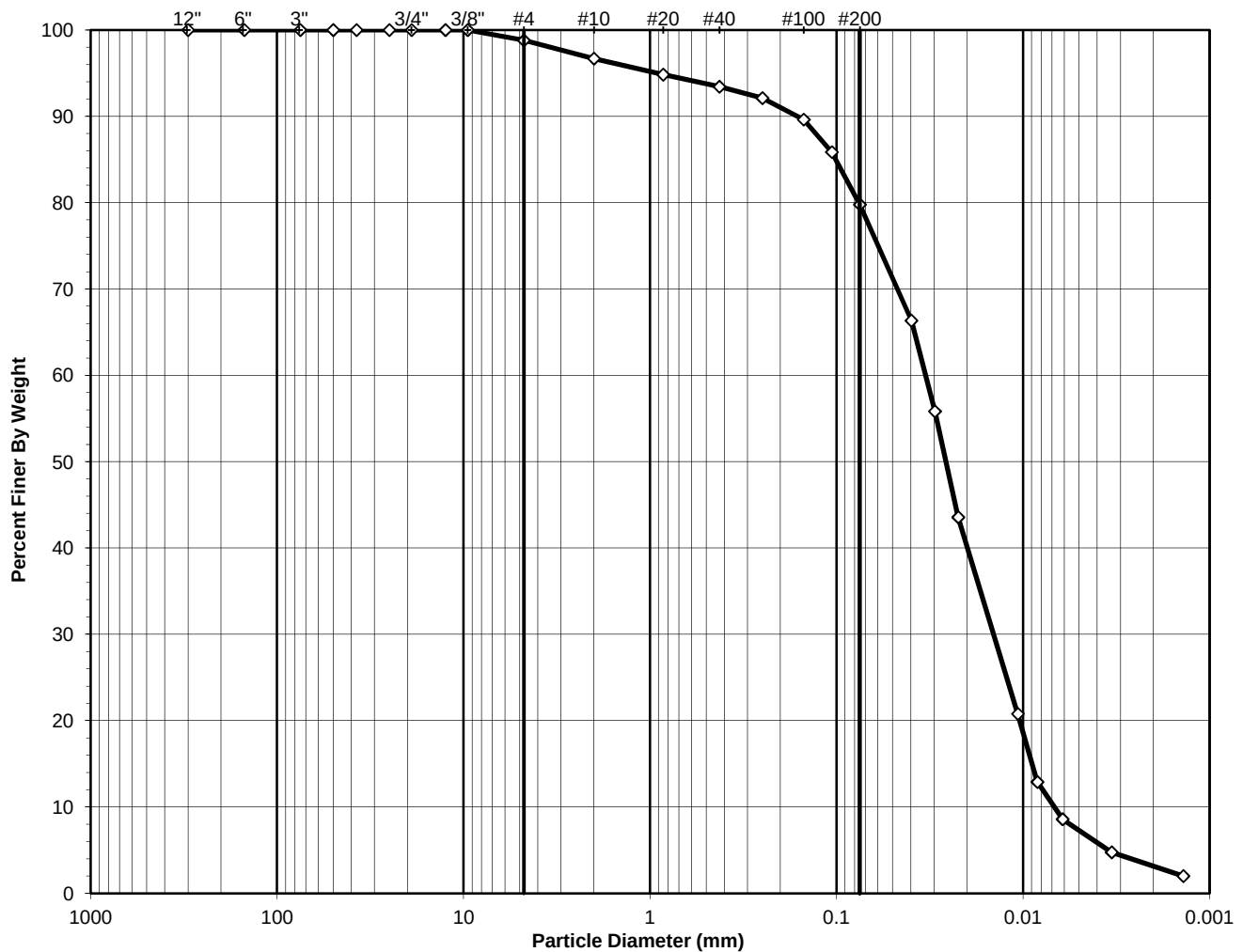
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-115

Boring No.: JB3-19-202
 Depth (ft): 6.0-10.0
 Sample No.: SpT-4/5
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
ML, TESTED

D50 = 0.03

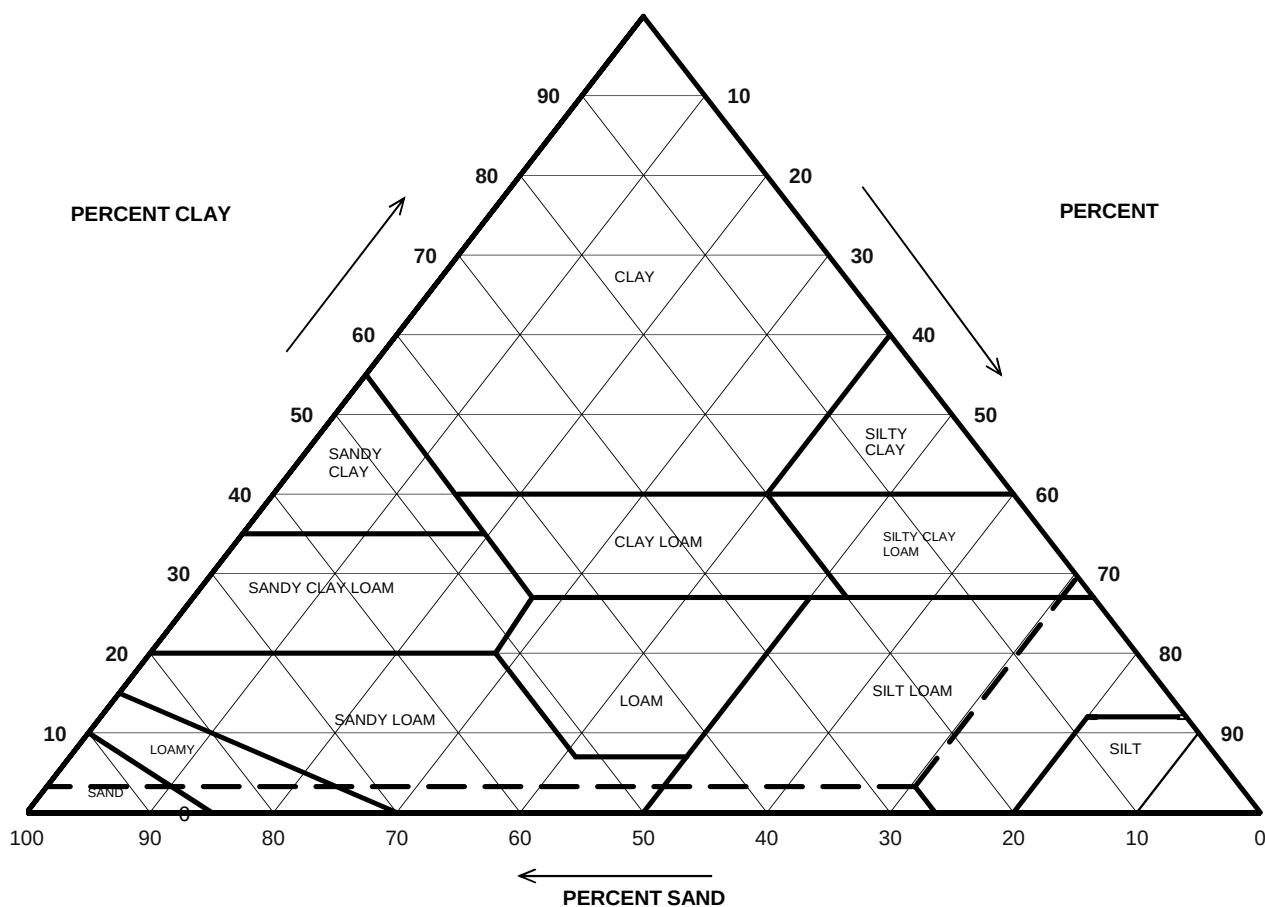
USCS Classification:
SILT WITH SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/28/20 Checked By JLK Date 1/30/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-115

Boring No.: JB3-19-202
Depth (ft): 6.0-10.0
Sample No.: SpT-4/5
Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	3.31	
2	96.69	Sand	25.48	26.35
0.05	71.21	Silt	68.06	70.39
0.002	3.16	Clay	3.16	3.26

USDA Classification: **SILT LOAM**

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-115

Boring No.: JB3-19-202
 Depth (ft): 6.0-10.0
 Sample No.: SpT-4/5
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1466	Tare No.:	NA	Tare No.:	1466	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	337.77	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	337.77	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	301.18	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	301.18	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.17	Weight of Tare (g):	NA	Weight of Tare (g):	145.17	Weight of Tare (g):	NA
Weight of Water (g):	36.59	Weight of Water (g):	NA	Weight of Water (g):	36.59	Weight of Water (g):	NA
Weight of Dry Soil (g):	156.01	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	156.01	Weight of Dry Soil (g):	NA
Moisture Content (%):	23.5	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	156.01	Total Dry Weight of Sample (g):	156.01	Dry Weight of Sample (g):	156.01	Total Dry Weight of Sample (g):	156.01
Tare No. (Sub-Specimen)	1466	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1466	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	337.77	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	337.77	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	145.17	Dry Weight of - 3/4" Sample (g):	156.01	Weight of Tare (g):	145.17	Dry Weight of - 3/4" Sample (g):	156.01
Sub-Specimen Wet Weight (g):	192.60	Dry Weight -3/4" +3/8" Sample (g):	0.00	Sub-Specimen Wet Weight (g):	192.60	Dry Weight -3/4" +3/8" Sample (g):	0.00
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	156.01	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	156.01
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**)	0.00	100.00	100
3/8"	9.5	0.00	0.00	0.00	100.00	100
#4	4.75	1.87	1.20	1.20	98.80	99
#10	2	3.29	2.11	3.31	96.69	97
#20	0.85	2.90	(**)	5.17	94.83	95
#40	0.425	2.18	1.40	6.56	93.44	93
#60	0.25	2.06	1.32	7.88	92.12	92
#100	0.15	3.89	2.49	10.38	89.62	90
#140	0.106	5.87	3.76	14.14	85.86	86
#200	0.075	9.48	6.08	20.22	79.78	80
Pan	-	124.47	79.78	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/28/20 Checked By JLK Date 1/30/20

HYDROMETER ANALYSIS

ASTM D7928-17

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-115

Boring No.: JB3-19-202
 Depth (ft): 6.0-10.0
 Sample No.: SpT-4/5
 Soil Color: Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	43.5	22.7	5.63	9.1	0.0397	83.2	66.3
2	37.5	22.7	5.63	10.2	0.0297	70.0	55.8
4	30.5	22.7	5.63	11.4	0.0223	54.6	43.6
21	17.5	22.7	5.63	13.8	0.0107	26.1	20.8
36	13.0	22.7	5.63	14.6	0.0084	16.2	12.9
69	10.5	22.8	5.60	15.0	0.0061	10.8	8.6
240	8.5	22.3	5.78	15.4	0.0033	6.0	4.8
1440	7.0	22.1	5.86	15.7	0.0014	2.5	2.0

Soil Specimen Data

Tare No.:	2331	Percent Finer than # 200:	79.78
Wt. of Tare & Dry Material (g):	142.35		
Weight of Tare (g):	92.32	Specific Gravity:	2.70 Assumed
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	45.03		

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	G- 1819
Cylinder	G- 205
Thermometer	G- 1505
Balance	G- 657
#200 Sieve	G- 1944
Foam Inhibitor Used	No

Tested By	TO	Date	1/28/20	Checked By	JLK	Date	1/30/20
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page 4 of 4

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-115

Boring No.: JB3-19-202
Depth (ft): 6.0-10.0
Sample No.: SpT-4/5
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	22
Wt. of Tare & Wet Sample (g)	32.99
Wt. of Tare & Dry Sample (g)	28.32
Weight of Tare (g)	8.31
Weight of Water (g)	4.67
Weight of Dry Sample (g)	20.01

Water Content (%)	23.3
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NON - PLASTIC MATERIAL

Tested By	FS	Date	1/29/20	Checked By	JLK	Date	1/29/20
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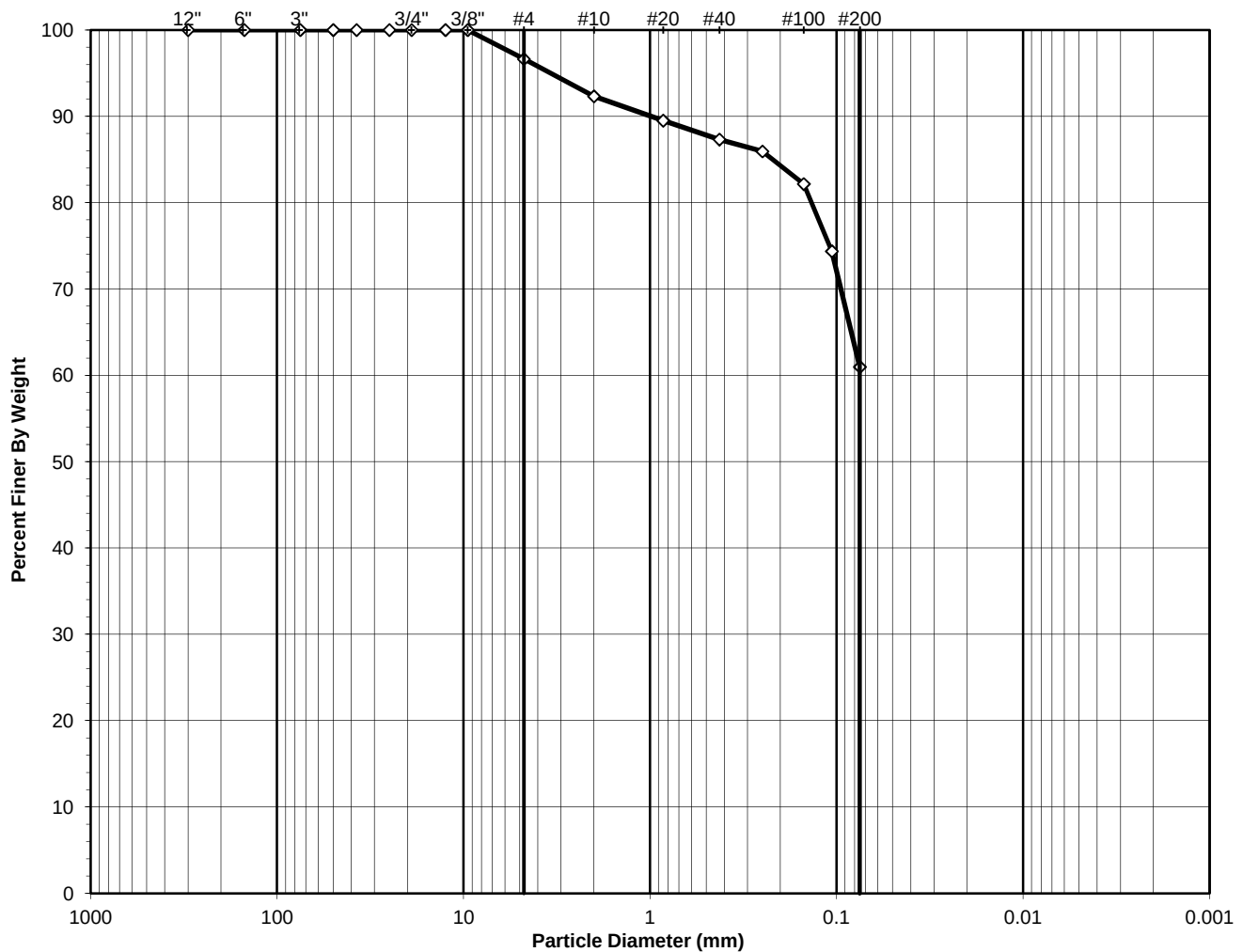
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-116

Boring No.: JB3-19-202
 Depth (ft): 10.0-14.0
 Sample No.: SpT-6/7
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
ML, TESTED

D50 = 0.04

USCS Classification:
SANDY SILT
(NON-PLASTIC FINES)

Tested By DS Date 1/30/20 Checked By JLK Date 1/31/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-116

Boring No.: JB3-19-202
 Depth (ft): 10.0-14.0
 Sample No.: SpT-6/7
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1615.5	Tare No.:	NA	Tare No.:	1615.5	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	268.04	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	268.04	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	249.27	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	249.27	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	147.80	Weight of Tare (g):	NA	Weight of Tare (g):	147.80	Weight of Tare (g):	NA
Weight of Water (g):	18.77	Weight of Water (g):	NA	Weight of Water (g):	18.77	Weight of Water (g):	NA
Weight of Dry Soil (g):	101.47	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	101.47	Weight of Dry Soil (g):	NA
Moisture Content (%):	18.5	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	101.47	Total Dry Weight of Sample (g):	101.47	Dry Weight of Sample (g):	101.47	Total Dry Weight of Sample (g):	101.47
Tare No. (Sub-Specimen)	1615.5	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1615.5	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	268.04	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	268.04	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	147.80	Dry Weight of - 3/4" Sample (g):	101.47	Weight of Tare (g):	147.80	Dry Weight of - 3/4" Sample (g):	101.47
Sub-Specimen Wet Weight (g):	120.24	Dry Weight -3/4" +3/8" Sample (g):	0.00	Sub-Specimen Wet Weight (g):	120.24	Dry Weight -3/4" +3/8" Sample (g):	0.00
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	101.47	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	101.47
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**)	0.00	100.00	100
3/8"	9.5	0.00	0.00	0.00	100.00	100
#4	4.75	3.41	3.36	3.36	96.64	97
#10	2	4.38	4.32	7.68	92.32	92
#20	0.85	2.86	(**)	10.50	89.50	90
#40	0.425	2.22	2.19	12.68	87.32	87
#60	0.25	1.40	1.38	14.06	85.94	86
#100	0.15	3.83	3.77	17.84	82.16	82
#140	0.106	7.90	7.79	25.62	74.38	74
#200	0.075	13.60	13.40	39.03	60.97	61
Pan	-	61.87	60.97	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/30/20 Checked By JLK Date 1/31/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-116

Boring No.: JB3-19-202
Depth (ft): 10.0-14.0
Sample No.: SpT-6/7
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	14
Wt. of Tare & Wet Sample (g)	34.14
Wt. of Tare & Dry Sample (g)	29.37
Weight of Tare (g)	8.46
Weight of Water (g)	4.77
Weight of Dry Sample (g)	20.91

Water Content (%)	22.8
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NON - PLASTIC MATERIAL

<i>Tested By</i>	<i>TO</i>	<i>Date</i>	<i>1/29/20</i>	<i>Checked By</i>	<i>BRB</i>	<i>Date</i>	<i>1/29/20</i>
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SPECIFIC GRAVITY

ASTM D 854-14

Client:	D'Appolonia	Boring No.:	JB3-19-202
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	10.0-14.0
Project No.:	2020-002-001	Sample No.:	SpT-6/7
Lab ID:	2020-002-001-116	Visual Description:	Brown Silty Clay

(Minus No.4 sieve material, oven dried)

Replicate Number	1	2
Pycnometer ID:	G 1917	G 1991
Weight of Pycnometer & Soil & Water (g):	733.26	734.28
Temperature (°C):	24.8	25.4
Weight of Pycnometer & Water (g):	684.01	684.48
Tare Number:	659	930
Weight of Tare & Dry Soil (g):	172.99	172.69
Weight of Tare (g):	93.49	94.84
Weight of Dry Soil (g):	79.50	77.85
Specific Gravity of Soil @ Measured Temperature:	2.629	2.776
Specific Gravity of Water @ Measured Temperature:	0.99710	0.99695
Conversion Factor for Measured Temperature:	0.99889	0.99874
Specific Gravity @ 20° Celsius:	2.631	2.779

Average Specific Gravity @ 20° Celsius

2.71

Tested By TO Date 1/29/20 Checked By JLK Date 1/30/20

DCN: CT-S5 Date: 3/26/18 Revision: 21

S:\Excel\Excel QA\Spreadsheets\Specific Gravity.xls

SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-117

Boring No.: JB3-19-202
 Depth (ft): 16.0-20.0
 Sample No.: SpT-9/10
 Soil Color: Brown



USCS Symbol:
ML, TESTED

D50 = 0.04

USCS Classification:
SANDY SILT
(NON-PLASTIC FINES)

Tested By DS Date 1/28/20 Checked By JLK Date 1/31/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-117

Boring No.: JB3-19-202
Depth (ft): 16.0-20.0
Sample No.: SpT-9/10
Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1538	Tare No.:	NA	Tare No.:	1538	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	462.44	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	462.44	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	407.01	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	407.01	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	147.10	Weight of Tare (g):	NA	Weight of Tare (g):	147.10	Weight of Tare (g):	NA
Weight of Water (g):	55.43	Weight of Water (g):	NA	Weight of Water (g):	55.43	Weight of Water (g):	NA
Weight of Dry Soil (g):	259.91	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	259.91	Weight of Dry Soil (g):	NA
Moisture Content (%):	21.3	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	259.91	Total Dry Weight of Sample (g):	259.91	Dry Weight of Sample (g):	259.91	Total Dry Weight of Sample (g):	259.91
Tare No. (Sub-Specimen)	1538	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1538	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	462.44	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	462.44	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	147.10	Dry Weight of - 3/4" Sample (g):	259.91	Weight of Tare (g):	147.10	Dry Weight of - 3/4" Sample (g):	259.91
Sub-Specimen Wet Weight (g):	315.34	Dry Weight -3/4" +3/8" Sample (g):	2.60	Sub-Specimen Wet Weight (g):	315.34	Dry Weight -3/4" +3/8" Sample (g):	2.60
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	257.31	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	257.31
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**)	0.00	100.00	100
3/8"	9.5	2.60	1.00	1.00	99.00	99
#4	4.75	6.03	2.32	3.32	96.68	97
#10	2	6.81	2.62	5.94	94.06	94
#20	0.85	4.94	(**)	7.84	92.16	92
#40	0.425	4.35	1.67	9.51	90.49	90
#60	0.25	5.68	2.19	11.70	88.30	88
#100	0.15	12.57	4.84	16.54	83.46	83
#140	0.106	22.18	8.53	25.07	74.93	75
#200	0.075	38.04	14.64	39.71	60.29	60
Pan	-	156.71	60.29	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
(**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/28/20 Checked By JLK Date 1/31/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-117

Boring No.: JB3-19-202
Depth (ft): 16.0-20.0
Sample No.: SpT-9/10
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	18
Wt. of Tare & Wet Sample (g)	30.98
Wt. of Tare & Dry Sample (g)	27.07
Weight of Tare (g)	8.46
Weight of Water (g)	3.91
Weight of Dry Sample (g)	18.61

Water Content (%)	21.0
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NON - PLASTIC MATERIAL

<i>Tested By</i>	<i>FS</i>	<i>Date</i>	<i>1/29/20</i>	<i>Checked By</i>	<i>JLK</i>	<i>Date</i>	<i>1/29/20</i>
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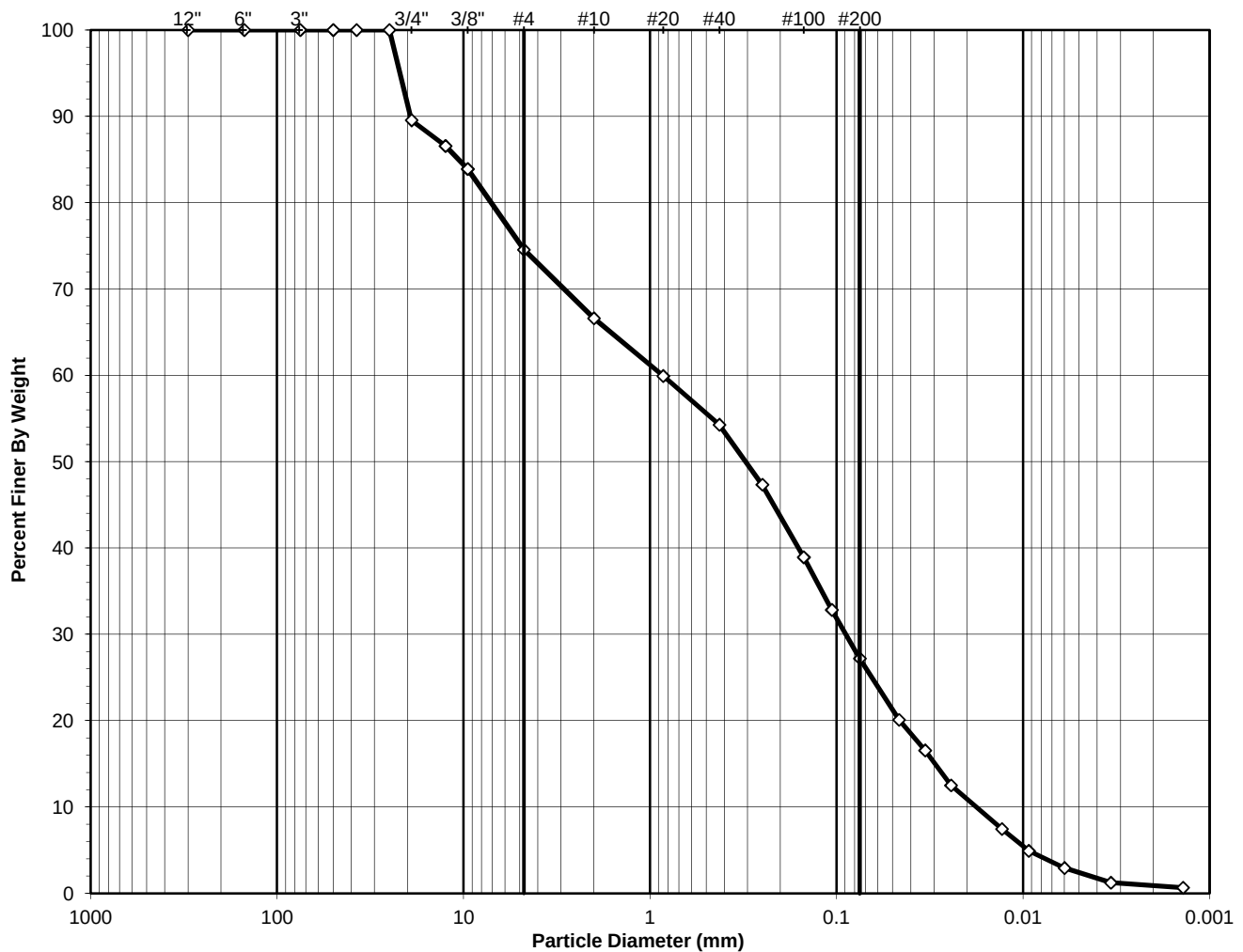
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-118

Boring No.: JB3-19-203
 Depth (ft): 0.0-3.4
 Sample No.: SpT-1/2
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
SM, TESTED

D50 = 0.31

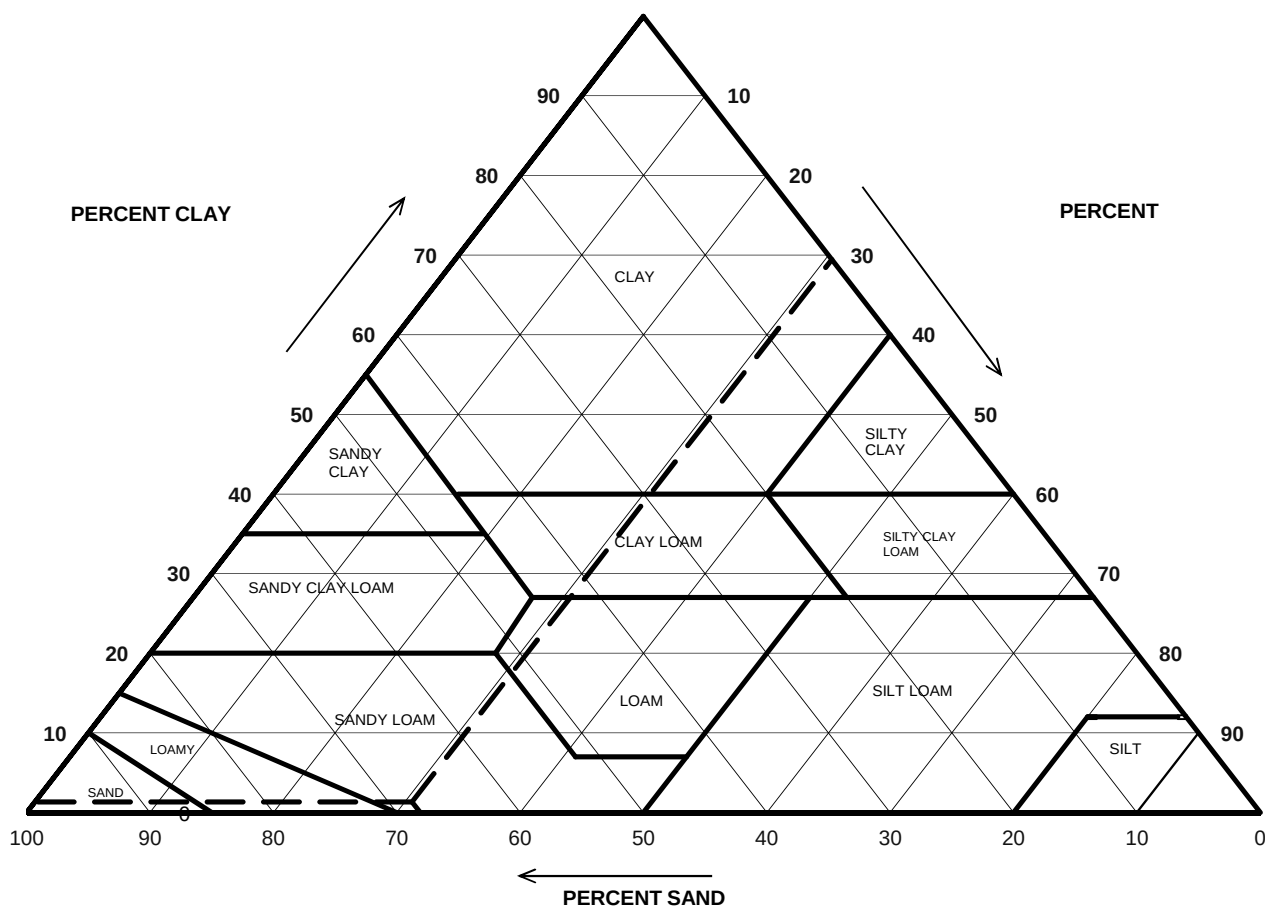
USCS Classification:
SILTY SAND WITH GRAVEL
(NON-PLASTIC FINES)

Tested By DS Date 1/28/20 Checked By JLK Date 1/30/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-118

Boring No.: JB3-19-203
Depth (ft): 0.0-3.4
Sample No.: SpT-1/2
Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	33.39	
2	66.61	Sand	45.36	68.10
0.05	21.25	Silt	20.36	30.56
0.002	0.89	Clay	0.89	1.34

USDA Classification: **SANDY LOAM**

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-118

Boring No.: JB3-19-203
Depth (ft): 0.0-3.4
Sample No.: SpT-1/2
Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1438	Tare No.:	NA	Tare No.:	1438	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	451.90	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	451.90	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	417.63	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	417.63	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	144.03	Weight of Tare (g):	NA	Weight of Tare (g):	144.03	Weight of Tare (g):	NA
Weight of Water (g):	34.27	Weight of Water (g):	NA	Weight of Water (g):	34.27	Weight of Water (g):	NA
Weight of Dry Soil (g):	273.60	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	273.60	Weight of Dry Soil (g):	NA
Moisture Content (%):	12.5	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	273.60	Total Dry Weight of Sample (g):	273.60	Dry Weight of Sample (g):	273.60	Total Dry Weight of Sample (g):	273.60
Tare No. (Sub-Specimen)	1438	Wet Weight of +3/4" Sample (g):	32.18	Tare No. (Sub-Specimen)	1438	Wet Weight of +3/4" Sample (g):	32.18
Wt. of Tare & Wet Sub-Specimen (g):	451.90	Dry Weight of + 3/4" Sample (g):	28.60	Wt. of Tare & Wet Sub-Specimen (g):	451.90	Dry Weight of + 3/4" Sample (g):	28.60
Weight of Tare (g):	144.03	Dry Weight of - 3/4" Sample (g):	245.00	Weight of Tare (g):	144.03	Dry Weight of - 3/4" Sample (g):	245.00
Sub-Specimen Wet Weight (g):	307.87	Dry Weight -3/4" +3/8" Sample (g):	15.45	Sub-Specimen Wet Weight (g):	307.87	Dry Weight -3/4" +3/8" Sample (g):	15.45
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	231.17	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	231.17
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	28.60	10.45	10.45	89.55	90
1/2"	12.5	8.15	(**)	13.43	86.57	87
3/8"	9.5	7.30	2.67	16.10	83.90	84
#4	4.75	25.58	9.35	25.45	74.55	75
#10	2	21.73	7.94	33.39	66.61	67
#20	0.85	18.28	(**)	40.07	59.93	60
#40	0.425	15.45	5.65	45.72	54.28	54
#60	0.25	19.00	6.94	52.66	47.34	47
#100	0.15	22.99	8.40	61.07	38.93	39
#140	0.106	16.69	6.10	67.17	32.83	33
#200	0.075	15.40	5.63	72.80	27.20	27
Pan	-	74.43	27.20	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
(**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/28/20 Checked By JLK Date 1/30/20

HYDROMETER ANALYSIS

ASTM D7928-17

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-118

Boring No.: JB3-19-203
 Depth (ft): 0.0-3.4
 Sample No.: SpT-1/2
 Soil Color: Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	25.5	22.7	5.63	12.3	0.0462	73.9	20.1
2	22.0	22.7	5.63	13.0	0.0335	60.9	16.6
4	18.0	22.7	5.63	13.7	0.0243	46.0	12.5
15	13.0	22.7	5.63	14.6	0.0130	27.4	7.5
30	10.5	22.7	5.63	15.0	0.0093	18.1	4.9
74	8.5	22.8	5.60	15.4	0.0060	10.8	2.9
240	7.0	22.3	5.78	15.7	0.0034	4.5	1.2
1440	6.5	22.1	5.86	15.8	0.0014	2.4	0.7

Soil Specimen Data

Tare No.: 972 Percent Finer than # 200: 27.20
 Wt. of Tare & Dry Material (g): 130.74
 Weight of Tare (g): 99.15 Specific Gravity: 2.70 Assumed
 Weight of Deflocculant (g): 5.0
 Weight of Dry Material (g): 26.59

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H G- 1819
 Cylinder G- 205
 Thermometer G- 1505
 Balance G- 657
 #200 Sieve G- 1944
 Foam Inhibitor Used No

Tested By TO Date 1/28/20 Checked By JLK Date 1/30/20
 page 4 of 4

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-118

Boring No.: JB3-19-203
Depth (ft): 0.0-3.4
Sample No.: SpT-1/2
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	32
Wt. of Tare & Wet Sample (g)	26.35
Wt. of Tare & Dry Sample (g)	24.04
Weight of Tare (g)	8.44
Weight of Water (g)	2.31
Weight of Dry Sample (g)	15.60

Water Content (%) **14.8**

NON - PLASTIC MATERIAL

Tested By *FS* *Date* *1/29/20* *Checked By* *JLK* *Date* *1/29/20*

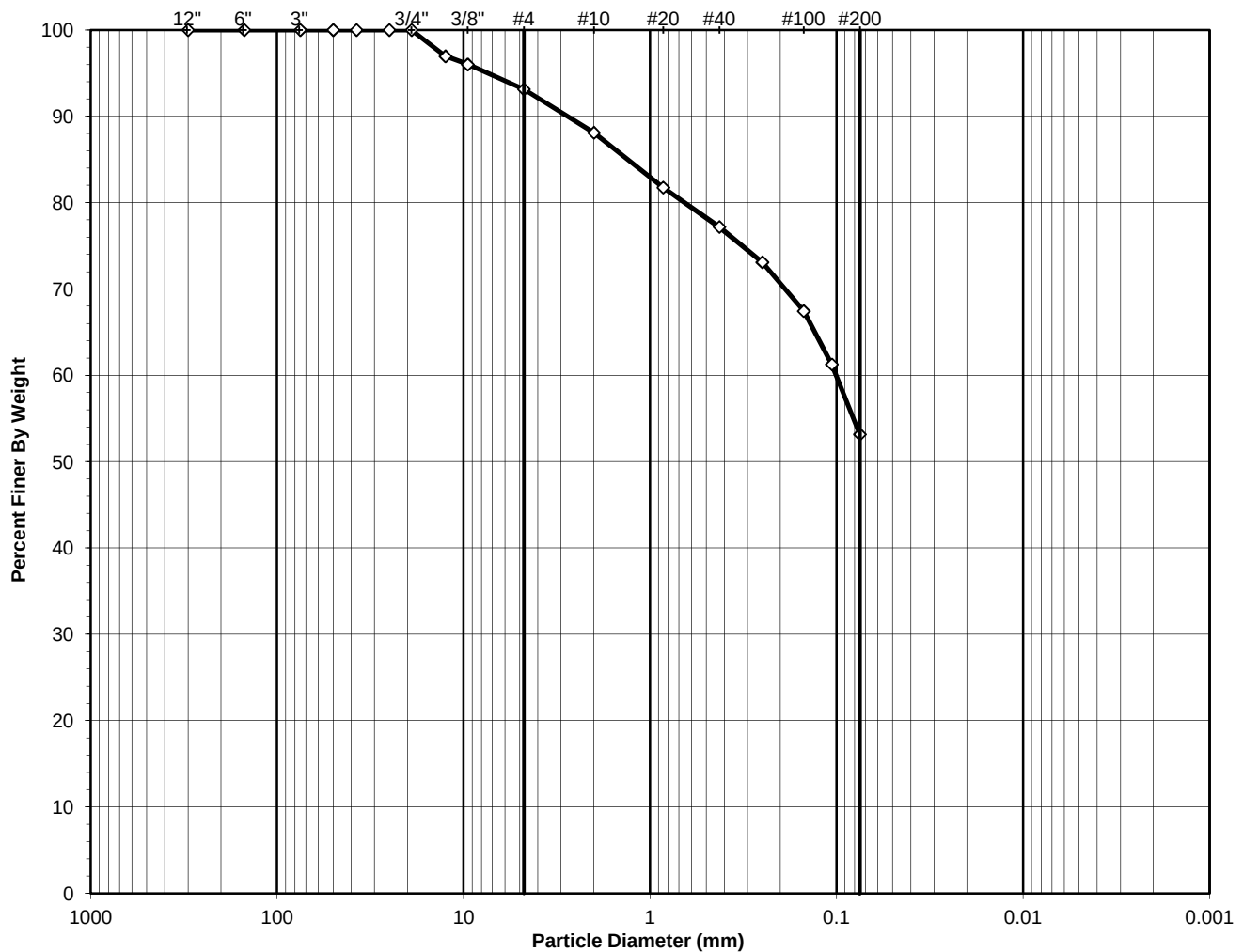
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-119

Boring No.: JB3-19-203A
 Depth (ft): 6.0-10.0
 Sample No.: SpT-2/3
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
ML, TESTED

D50 = 0.06

USCS Classification:
SANDY SILT
(NON-PLASTIC FINES)

Tested By DS Date 1/30/20 Checked By JLK Date 1/31/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-119

Boring No.: JB3-19-203A
 Depth (ft): 6.0-10.0
 Sample No.: SpT-2/3
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1460	Tare No.:	NA	Tare No.:	1460	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	447.40	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	447.40	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	399.92	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	399.92	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	142.39	Weight of Tare (g):	NA	Weight of Tare (g):	142.39	Weight of Tare (g):	NA
Weight of Water (g):	47.48	Weight of Water (g):	NA	Weight of Water (g):	47.48	Weight of Water (g):	NA
Weight of Dry Soil (g):	257.53	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	257.53	Weight of Dry Soil (g):	NA
Moisture Content (%):	18.4	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	257.53	Total Dry Weight of Sample (g):	257.53	Dry Weight of Sample (g):	257.53	Total Dry Weight of Sample (g):	257.53
Tare No. (Sub-Specimen)	1460	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1460	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	447.40	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	447.40	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	142.39	Dry Weight of - 3/4" Sample (g):	257.53	Weight of Tare (g):	142.39	Dry Weight of - 3/4" Sample (g):	257.53
Sub-Specimen Wet Weight (g):	305.01	Dry Weight -3/4" +3/8" Sample (g):	10.28	Sub-Specimen Wet Weight (g):	305.01	Dry Weight -3/4" +3/8" Sample (g):	10.28
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	247.25	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	247.25
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*) 0.00	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	7.85	(**) 3.05	3.05	96.95	97
3/8"	9.5	2.43	0.94	3.99	96.01	96
#4	4.75	7.40	2.87	6.87	93.13	93
#10	2	12.95	5.03	11.89	88.11	88
#20	0.85	16.37	(**) 6.36	18.25	81.75	82
#40	0.425	11.74	4.56	22.81	77.19	77
#60	0.25	10.53	4.09	26.90	73.10	73
#100	0.15	14.56	5.65	32.55	67.45	67
#140	0.106	15.91	6.18	38.73	61.27	61
#200	0.075	20.87	8.10	46.83	53.17	53
Pan	-	136.92	53.17	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/30/20 Checked By JLK Date 1/31/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-119

Boring No.: JB3-19-203A
Depth (ft): 6.0-10.0
Sample No.: SpT-2/3
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	5
Wt. of Tare & Wet Sample (g)	27.20
Wt. of Tare & Dry Sample (g)	24.56
Weight of Tare (g)	8.31
Weight of Water (g)	2.64
Weight of Dry Sample (g)	16.25

Water Content (%)	16.2
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NON - PLASTIC MATERIAL

<i>Tested By</i>	<i>TO</i>	<i>Date</i>	<i>1/29/20</i>	<i>Checked By</i>	<i>BRB</i>	<i>Date</i>	<i>1/29/20</i>
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SPECIFIC GRAVITY

ASTM D 854-14

Client:	D'Appolonia	Boring No.:	JB3-19-203A
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	6.0-10.0
Project No.:	2020-002-001	Sample No.:	SpT-2/3
Lab ID:	2020-002-001-119	Visual Description:	Brown Silty Clay

(Minus No.4 sieve material, oven dried)

Replicate Number	1	2
Pycnometer ID:	G 1917	G 1991
Weight of Pycnometer & Soil & Water (g):	734	735.75
Temperature (°C):	25.9	25.8
Weight of Pycnometer & Water (g):	683.86	684.43
Tare Number:	949	2324
Weight of Tare & Dry Soil (g):	176.67	176.81
Weight of Tare (g):	95.75	96.32
Weight of Dry Soil (g):	80.92	80.49
Specific Gravity of Soil @ Measured Temperature:	2.629	2.760
Specific Gravity of Water @ Measured Temperature:	0.99682	0.99684
Conversion Factor for Measured Temperature:	0.99861	0.99864
Specific Gravity @ 20° Celsius:	2.632	2.763

Average Specific Gravity @ 20° Celsius

2.70

Tested By TO Date 1/29/20 Checked By JLK Date 1/30/20

DCN: CT-S5 Date: 3/26/18 Revision: 21

S:\Excel\Excel QA\Spreadsheets\Specific Gravity.xls

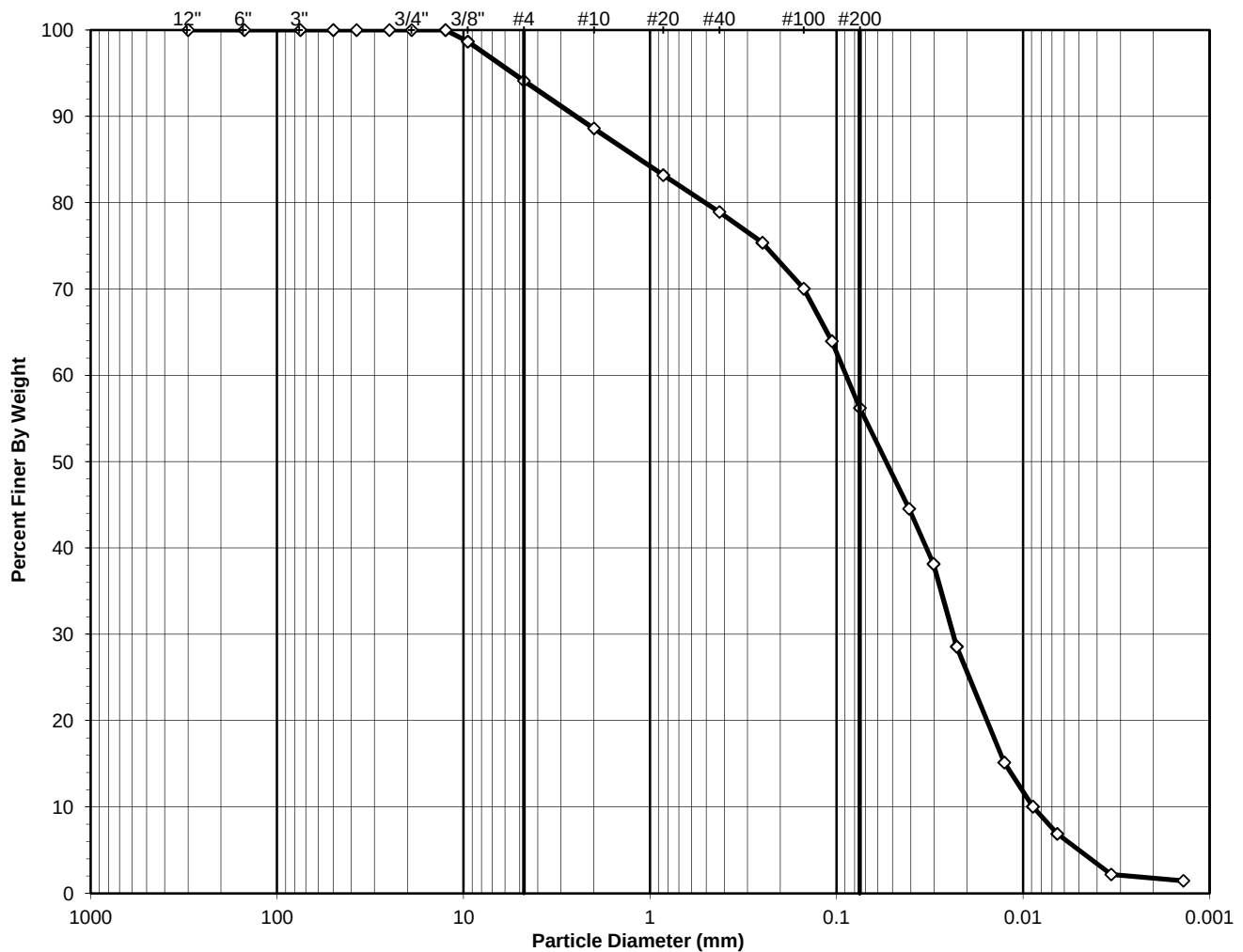
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-120

Boring No.: JB3-19-203A
 Depth (ft): 12.0-16.0
 Sample No.: SpT-5/6
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
ML, TESTED

D50 = 0.05

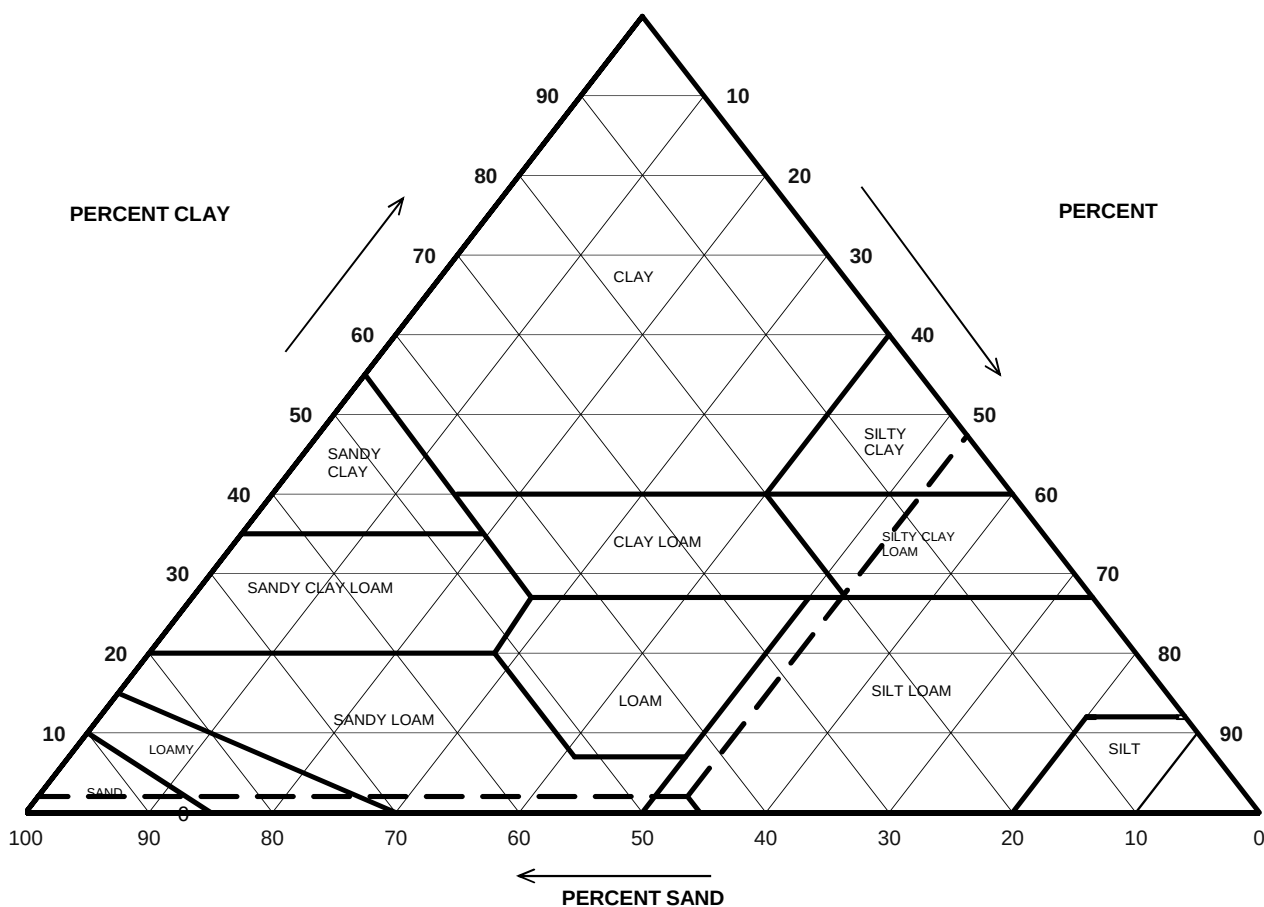
USCS Classification:
SANDY SILT
(NON-PLASTIC FINES)

Tested By DS Date 1/28/20 Checked By JLK Date 1/30/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-120

Boring No.: JB3-19-203A
Depth (ft): 12.0-16.0
Sample No.: SpT-5/6
Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	11.39	
2	88.61	Sand	40.18	45.35
0.05	48.43	Silt	46.66	52.66
0.002	1.77	Clay	1.77	1.99

USDA Classification: **SILT LOAM**

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-120

Boring No.: JB3-19-203A
 Depth (ft): 12.0-16.0
 Sample No.: SpT-5/6
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1450	Tare No.:	NA	Tare No.:	1450	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	437.77	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	437.77	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	386.32	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	386.32	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	144.82	Weight of Tare (g):	NA	Weight of Tare (g):	144.82	Weight of Tare (g):	NA
Weight of Water (g):	51.45	Weight of Water (g):	NA	Weight of Water (g):	51.45	Weight of Water (g):	NA
Weight of Dry Soil (g):	241.50	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	241.50	Weight of Dry Soil (g):	NA
Moisture Content (%):	21.3	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	241.50	Total Dry Weight of Sample (g):	241.50	Dry Weight of Sample (g):	241.50	Total Dry Weight of Sample (g):	241.50
Tare No. (Sub-Specimen)	1450	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1450	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	437.77	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	437.77	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	144.82	Dry Weight of - 3/4" Sample (g):	241.50	Weight of Tare (g):	144.82	Dry Weight of - 3/4" Sample (g):	241.50
Sub-Specimen Wet Weight (g):	292.95	Dry Weight -3/4" +3/8" Sample (g):	3.23	Sub-Specimen Wet Weight (g):	292.95	Dry Weight -3/4" +3/8" Sample (g):	3.23
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	238.27	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	238.27
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*) 0.00	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**) 0.00	0.00	100.00	100
3/8"	9.5	3.23	1.34	1.34	98.66	99
#4	4.75	10.97	4.54	5.88	94.12	94
#10	2	13.31	5.51	11.39	88.61	89
#20	0.85	13.09	(**) 5.42	16.81	83.19	83
#40	0.425	10.28	4.26	21.07	78.93	79
#60	0.25	8.61	3.57	24.63	75.37	75
#100	0.15	12.86	5.33	29.96	70.04	70
#140	0.106	14.68	6.08	36.04	63.96	64
#200	0.075	18.69	7.74	43.78	56.22	56
Pan	-	135.78	56.22	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/28/20 Checked By JLK Date 1/30/20

HYDROMETER ANALYSIS

ASTM D7928-17

Client:	D'Appolonia	Boring No.:	JB3-19-203A
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	12.0-16.0
Project No.:	2020-002-001	Sample No.:	SpT-5/6
Lab ID:	2020-002-001-120	Soil Color:	Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	40.5	22.7	5.63	9.6	0.0409	79.2	44.6
2	35.5	22.7	5.63	10.5	0.0302	67.9	38.2
4	28.0	22.7	5.63	11.9	0.0227	50.8	28.6
15	17.5	22.7	5.63	13.8	0.0126	27.0	15.2
32	13.5	22.7	5.63	14.5	0.0089	17.9	10.1
60	11.0	22.8	5.60	15.0	0.0066	12.3	6.9
240	7.5	22.3	5.78	15.6	0.0034	3.9	2.2
1440	7.0	22.1	5.86	15.7	0.0014	2.6	1.5

Soil Specimen Data

Tare No.:	929	Percent Finer than # 200:	56.22
Wt. of Tare & Dry Material (g):	147.66		
Weight of Tare (g):	99.15	Specific Gravity:	2.70 Assumed
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	43.51		

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	G- 1819
Cylinder	G- 205
Thermometer	G- 1505
Balance	G- 657
#200 Sieve	G- 1944
Foam Inhibitor Used	No

Tested By	TO	Date	1/28/20	Checked By	JLK	Date	1/30/20
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ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-120

Boring No.: JB3-19-203A
Depth (ft): 12.0-16.0
Sample No.: SpT-5/6
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	30
Wt. of Tare & Wet Sample (g)	36.25
Wt. of Tare & Dry Sample (g)	31.90
Weight of Tare (g)	8.48
Weight of Water (g)	4.35
Weight of Dry Sample (g)	23.42

Water Content (%)	18.6
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NON - PLASTIC MATERIAL

<i>Tested By</i>	<i>FS</i>	<i>Date</i>	<i>1/29/20</i>	<i>Checked By</i>	<i>JLK</i>	<i>Date</i>	<i>1/29/20</i>
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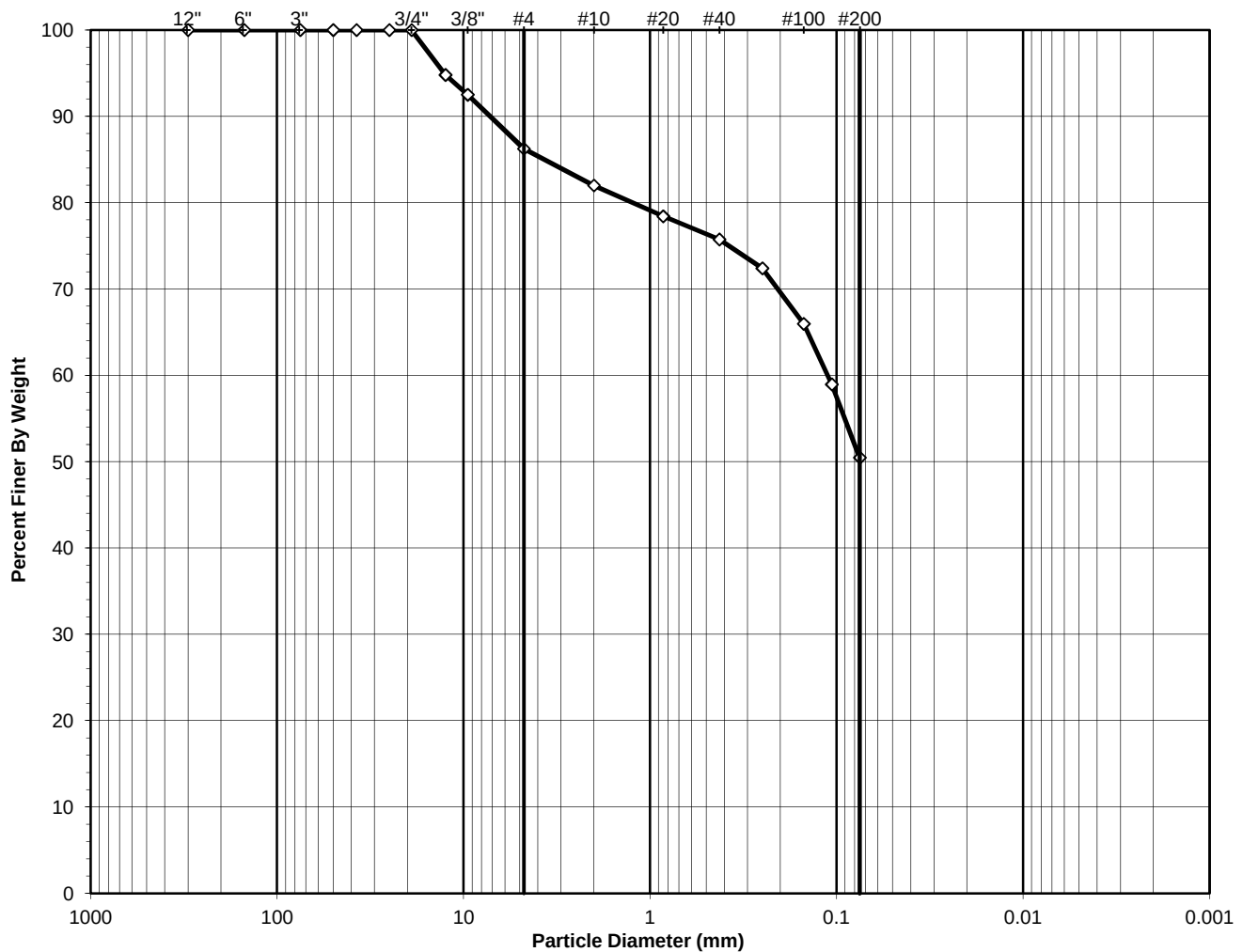
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-121

Boring No.: JB3-19-203A
 Depth (ft): 18.0-19.8
 Sample No.: SpT-8
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
ML, TESTED

D50 = 0.07

USCS Classification:
SANDY SILT
(NON-PLASTIC FINES)

Tested By DS Date 1/30/20 Checked By JLK Date 1/31/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-121

Boring No.: JB3-19-203A
 Depth (ft): 18.0-19.8
 Sample No.: SpT-8
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	2037	Tare No.:	NA	Tare No.:	2037	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	365.08	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	365.08	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	333.37	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	333.37	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	146.81	Weight of Tare (g):	NA	Weight of Tare (g):	146.81	Weight of Tare (g):	NA
Weight of Water (g):	31.71	Weight of Water (g):	NA	Weight of Water (g):	31.71	Weight of Water (g):	NA
Weight of Dry Soil (g):	186.56	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	186.56	Weight of Dry Soil (g):	NA
Moisture Content (%):	17.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	186.56	Total Dry Weight of Sample (g):	186.56	Dry Weight of Sample (g):	186.56	Total Dry Weight of Sample (g):	186.56
Tare No. (Sub-Specimen)	2037	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	2037	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	365.08	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	365.08	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	146.81	Dry Weight of - 3/4" Sample (g):	186.56	Weight of Tare (g):	146.81	Dry Weight of - 3/4" Sample (g):	186.56
Sub-Specimen Wet Weight (g):	218.27	Dry Weight -3/4" +3/8" Sample (g):	13.98	Sub-Specimen Wet Weight (g):	218.27	Dry Weight -3/4" +3/8" Sample (g):	13.98
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	172.58	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	172.58
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	9.70	(**)	5.20	94.80	95
3/8"	9.5	4.28	2.29	7.49	92.51	93
#4	4.75	11.68	6.26	13.75	86.25	86
#10	2	7.93	4.25	18.00	82.00	82
#20	0.85	6.66	(**)	21.57	78.43	78
#40	0.425	5.00	2.68	24.25	75.75	76
#60	0.25	6.24	3.34	27.60	72.40	72
#100	0.15	12.00	6.43	34.03	65.97	66
#140	0.106	13.08	7.01	41.04	58.96	59
#200	0.075	15.84	8.49	49.53	50.47	50
Pan	-	94.15	50.47	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/30/20 Checked By JLK Date 1/31/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-121

Boring No.: JB3-19-203A
Depth (ft): 18.0-19.8
Sample No.: SpT-8
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	3
Wt. of Tare & Wet Sample (g)	23.62
Wt. of Tare & Dry Sample (g)	21.13
Weight of Tare (g)	8.43
Weight of Water (g)	2.49
Weight of Dry Sample (g)	12.70

Water Content (%)	19.6
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NON - PLASTIC MATERIAL

Tested By	TO	Date	1/29/20	Checked By	BRB	Date	1/29/20
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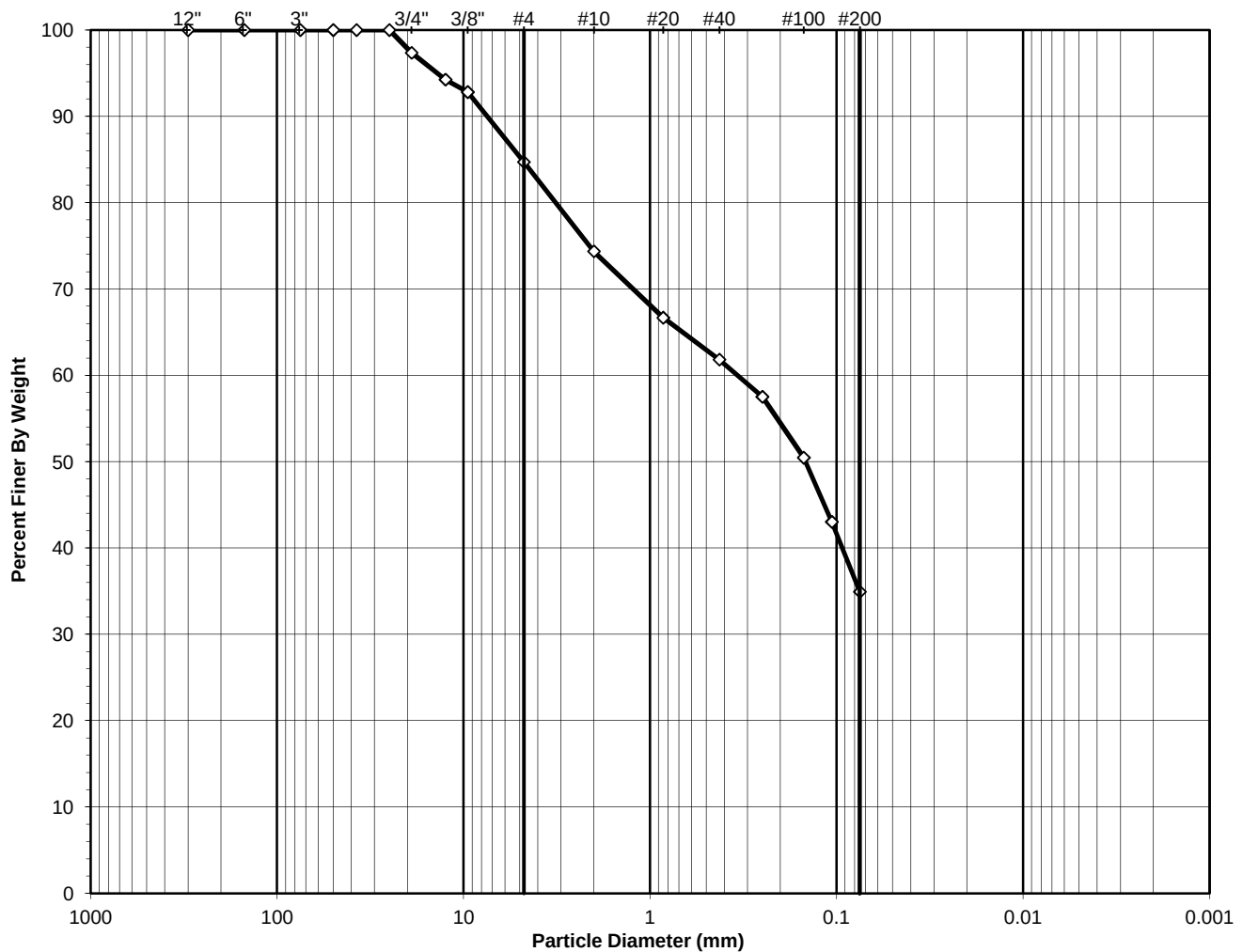
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-122

Boring No.: JB3-19-204
 Depth (ft): 2.0-6.0
 Sample No.: SpT-2/3
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
SM, TESTED

D50 = 0.15

USCS Classification:
SILTY SAND WITH GRAVEL
(NON-PLASTIC FINES)

Tested By DS Date 1/28/20 Checked By JLK Date 1/31/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-122

Boring No.: JB3-19-204
 Depth (ft): 2.0-6.0
 Sample No.: SpT-2/3
 Soil Color: Brown

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	1442	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	662.29	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	608.43	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.65	Weight of Tare (g):	NA
Weight of Water (g):	53.86	Weight of Water (g):	NA
Weight of Dry Soil (g):	462.78	Weight of Dry Soil (g):	NA
Moisture Content (%):	11.6	Moisture Content (%):	0.0
Dry Weight of Sample (g):	462.78	Total Dry Weight of Sample (g):	462.78
Tare No. (Sub-Specimen)	1442	Wet Weight of +3/4" Sample (g):	13.63
Wt. of Tare & Wet Sub-Specimen (g):	662.29	Dry Weight of + 3/4" Sample (g):	12.21
Weight of Tare (g):	145.65	Dry Weight of - 3/4" Sample (g):	450.57
Sub-Specimen Wet Weight (g):	516.64	Dry Weight -3/4" +3/8" Sample (g):	21.04
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	430.09
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*) 0.00	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	12.21	2.64	2.64	97.36	97
1/2"	12.5	14.37	(**) 3.11	5.74	94.26	94
3/8"	9.5	6.67	1.44	7.18	92.82	93
#4	4.75	37.49	8.10	15.29	84.71	85
#10	2	47.88	10.35	25.63	74.37	74
#20	0.85	35.57	(**) 7.69	33.32	66.68	67
#40	0.425	22.45	4.85	38.17	61.83	62
#60	0.25	19.92	4.30	42.47	57.53	58
#100	0.15	32.67	7.06	49.53	50.47	50
#140	0.106	34.39	7.43	56.96	43.04	43
#200	0.075	37.46	8.09	65.06	34.94	35
Pan	-	161.70	34.94	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/28/20 Checked By JLK Date 1/31/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-122

Boring No.: JB3-19-204
Depth (ft): 2.0-6.0
Sample No.: SpT-2/3
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	31
Wt. of Tare & Wet Sample (g)	63.84
Wt. of Tare & Dry Sample (g)	58.17
Weight of Tare (g)	8.35
Weight of Water (g)	5.67
Weight of Dry Sample (g)	49.82

Water Content (%) **11.4**

NON - PLASTIC MATERIAL

Tested By *FS* *Date* *1/29/20* *Checked By* *JLK* *Date* *1/29/20*

SPECIFIC GRAVITY

ASTM D 854-14

Client:	D'Appolonia	Boring No.:	JB3-19-204
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	2.0-6.0
Project No.:	2020-002-001	Sample No.:	SpT-2/3
Lab ID:	2020-002-001-122	Visual Description:	Brown Sandy Clay

(Minus No.4 sieve material, oven dried)

Replicate Number	1	2
Pycnometer ID:	G 1917	G 1991
Weight of Pycnometer & Soil & Water (g):	747.59	749.24
Temperature (°C):	26.1	26.6
Weight of Pycnometer & Water (g):	683.84	684.32
Tare Number:	1466	961
Weight of Tare & Dry Soil (g):	210.61	201.59
Weight of Tare (g):	108.13	99.93
Weight of Dry Soil (g):	102.48	101.66
Specific Gravity of Soil @ Measured Temperature:	2.646	2.767
Specific Gravity of Water @ Measured Temperature:	0.99677	0.99663
Conversion Factor for Measured Temperature:	0.99856	0.99842
Specific Gravity @ 20° Celsius:	2.650	2.771

Average Specific Gravity @ 20° Celsius

2.71

Tested By TO Date 1/29/20 Checked By JLK Date 1/30/20

DCN: CT-S5 Date: 3/26/18 Revision: 21

S:\Excel\Excel QA\Spreadsheets\Specific Gravity.xls

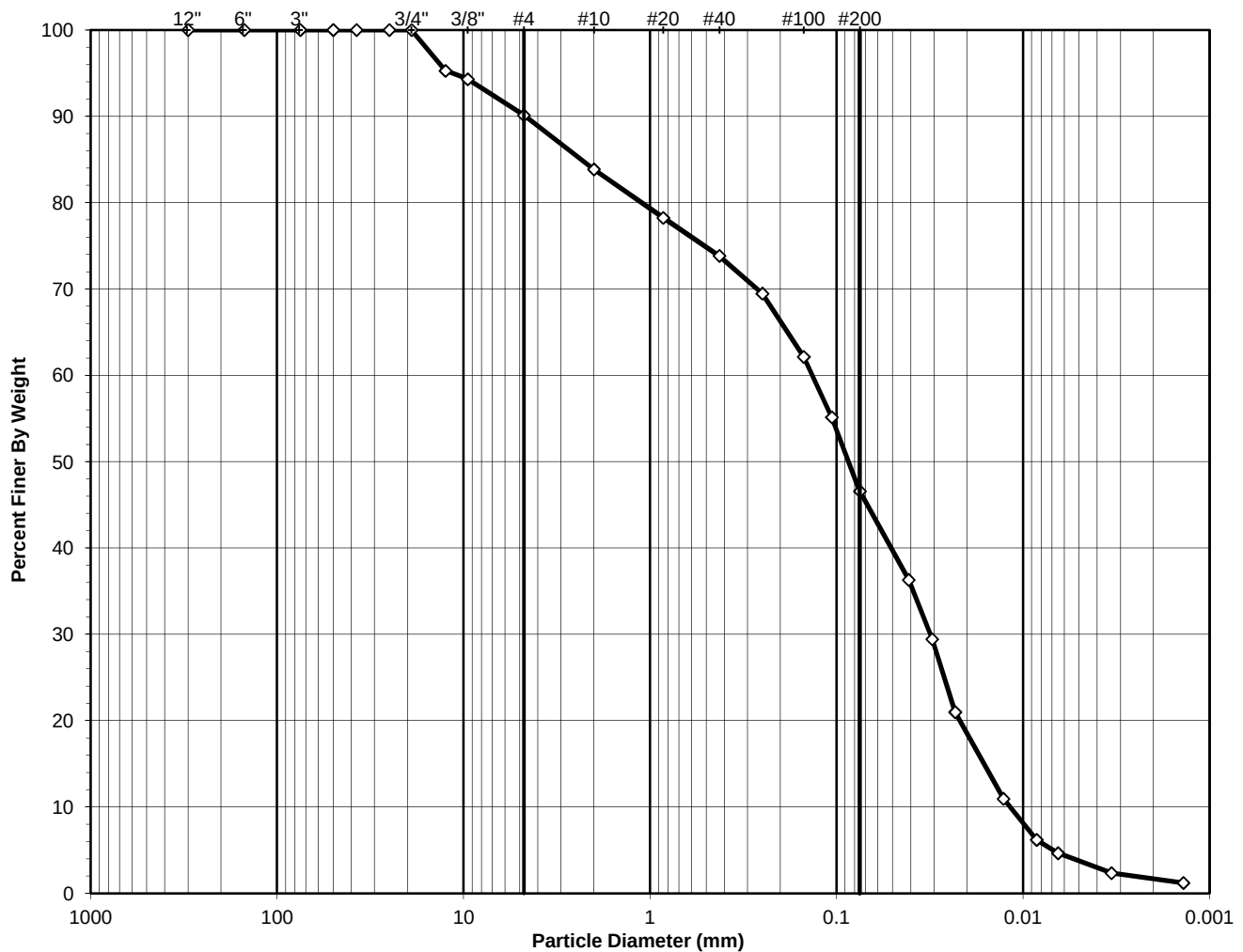
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-123

Boring No.: JB3-19-204
 Depth (ft): 6.0-10.0
 Sample No.: SpT-4/5
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
SM, TESTED

D50 = 0.09

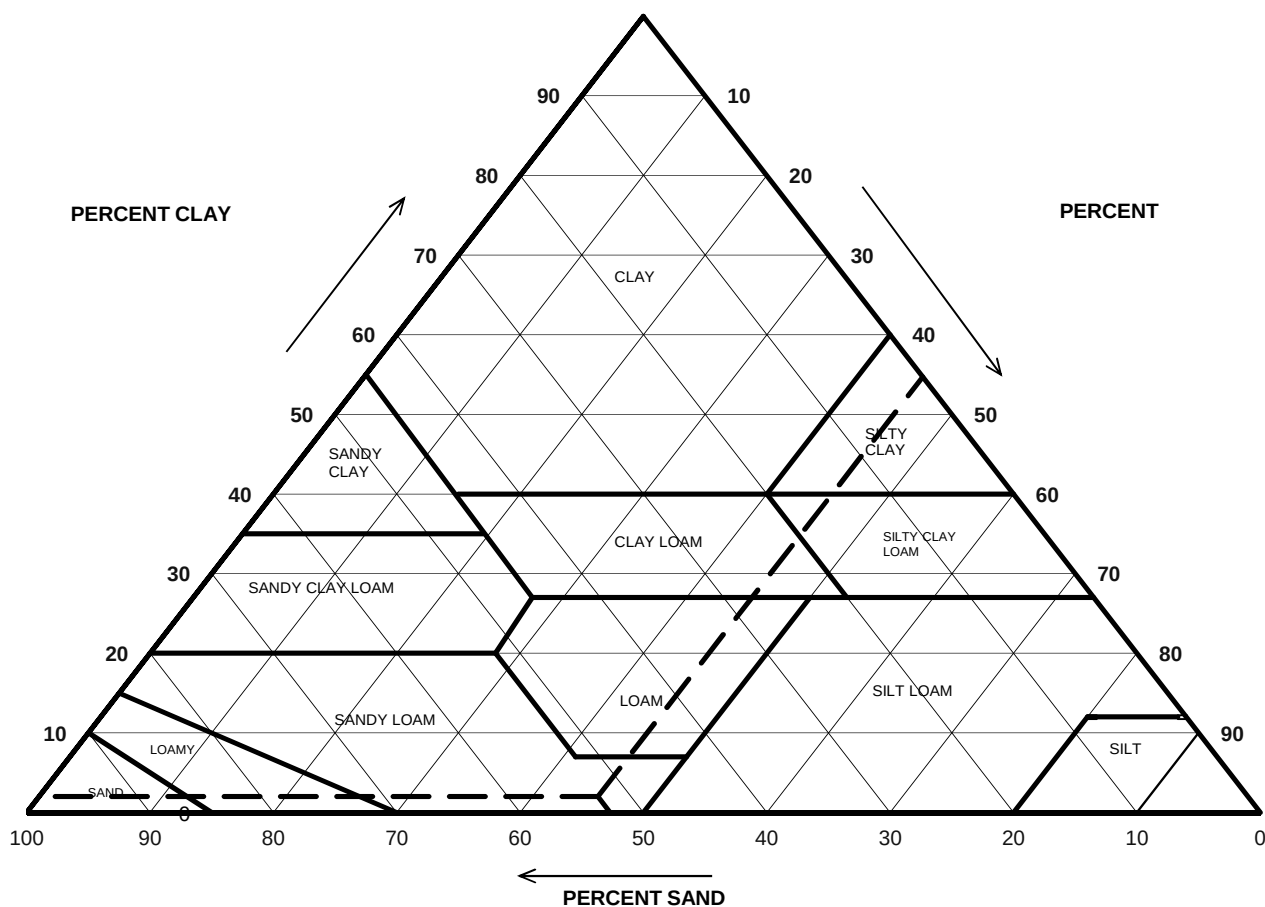
USCS Classification:
SILTY SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/28/20 Checked By JLK Date 1/30/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-123

Boring No.: JB3-19-204
Depth (ft): 6.0-10.0
Sample No.: SpT-4/5
Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification

		Gravel	16.14	
2	83.86	Sand	44.19	52.70
0.05	39.67	Silt	37.99	45.30
0.002	1.68	Clay	1.68	2.00

USDA Classification: **SANDY LOAM**

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-123

Boring No.: JB3-19-204
 Depth (ft): 6.0-10.0
 Sample No.: SpT-4/5
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1429	Tare No.:	NA	Tare No.:	1429	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	443.11	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	443.11	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	401.13	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	401.13	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	144.01	Weight of Tare (g):	NA	Weight of Tare (g):	144.01	Weight of Tare (g):	NA
Weight of Water (g):	41.98	Weight of Water (g):	NA	Weight of Water (g):	41.98	Weight of Water (g):	NA
Weight of Dry Soil (g):	257.12	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	257.12	Weight of Dry Soil (g):	NA
Moisture Content (%):	16.3	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	257.12	Total Dry Weight of Sample (g):	257.12	Dry Weight of Sample (g):	257.12	Total Dry Weight of Sample (g):	257.12
Tare No. (Sub-Specimen)	1429	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1429	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	443.11	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	443.11	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	144.01	Dry Weight of - 3/4" Sample (g):	257.12	Weight of Tare (g):	144.01	Dry Weight of - 3/4" Sample (g):	257.12
Sub-Specimen Wet Weight (g):	299.10	Dry Weight -3/4" +3/8" Sample (g):	14.66	Sub-Specimen Wet Weight (g):	299.10	Dry Weight -3/4" +3/8" Sample (g):	14.66
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	242.46	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	242.46
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	12.15	(**)	4.73	95.27	95
3/8"	9.5	2.51	0.98	5.70	94.30	94
#4	4.75	10.73	4.17	9.87	90.13	90
#10	2	16.11	6.27	16.14	83.86	84
#20	0.85	14.45	(**)	21.76	78.24	78
#40	0.425	11.31	4.40	26.16	73.84	74
#60	0.25	11.24	4.37	30.53	69.47	69
#100	0.15	18.85	7.33	37.86	62.14	62
#140	0.106	18.00	7.00	44.86	55.14	55
#200	0.075	22.00	8.56	53.42	46.58	47
Pan	-	119.77	46.58	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/28/20 Checked By JLK Date 1/30/20

HYDROMETER ANALYSIS

ASTM D7928-17

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-123

Boring No.: JB3-19-204
 Depth (ft): 6.0-10.0
 Sample No.: SpT-4/5
 Soil Color: Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	40.0	22.7	5.63	9.7	0.0411	77.9	36.3
2	33.5	22.7	5.63	10.9	0.0307	63.2	29.4
4	25.5	22.7	5.63	12.3	0.0231	45.1	21.0
15	16.0	22.7	5.63	14.1	0.0127	23.5	11.0
36	11.5	22.7	5.63	14.9	0.0085	13.3	6.2
62	10.0	22.8	5.60	15.1	0.0065	10.0	4.7
240	8.0	22.3	5.78	15.5	0.0034	5.0	2.3
1440	7.0	22.1	5.86	15.7	0.0014	2.6	1.2

Soil Specimen Data

Tare No.:	706	Percent Finer than # 200:	46.58
Wt. of Tare & Dry Material (g):	145.82		
Weight of Tare (g):	97.22	Specific Gravity:	2.70 Assumed
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	43.60		

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	G- 1819
Cylinder	G- 205
Thermometer	G- 1505
Balance	G- 657
#200 Sieve	G- 1944
Foam Inhibitor Used	No

Tested By	TO	Date	1/28/20	Checked By	JLK	Date	1/30/20
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ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-123

Boring No.: JB3-19-204
Depth (ft): 6.0-10.0
Sample No.: SpT-4/5
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	43
Wt. of Tare & Wet Sample (g)	30.59
Wt. of Tare & Dry Sample (g)	27.48
Weight of Tare (g)	8.48
Weight of Water (g)	3.11
Weight of Dry Sample (g)	19.00

Water Content (%)	16.4
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NON - PLASTIC MATERIAL

Tested By	FS	Date	1/29/20	Checked By	JLK	Date	1/29/20
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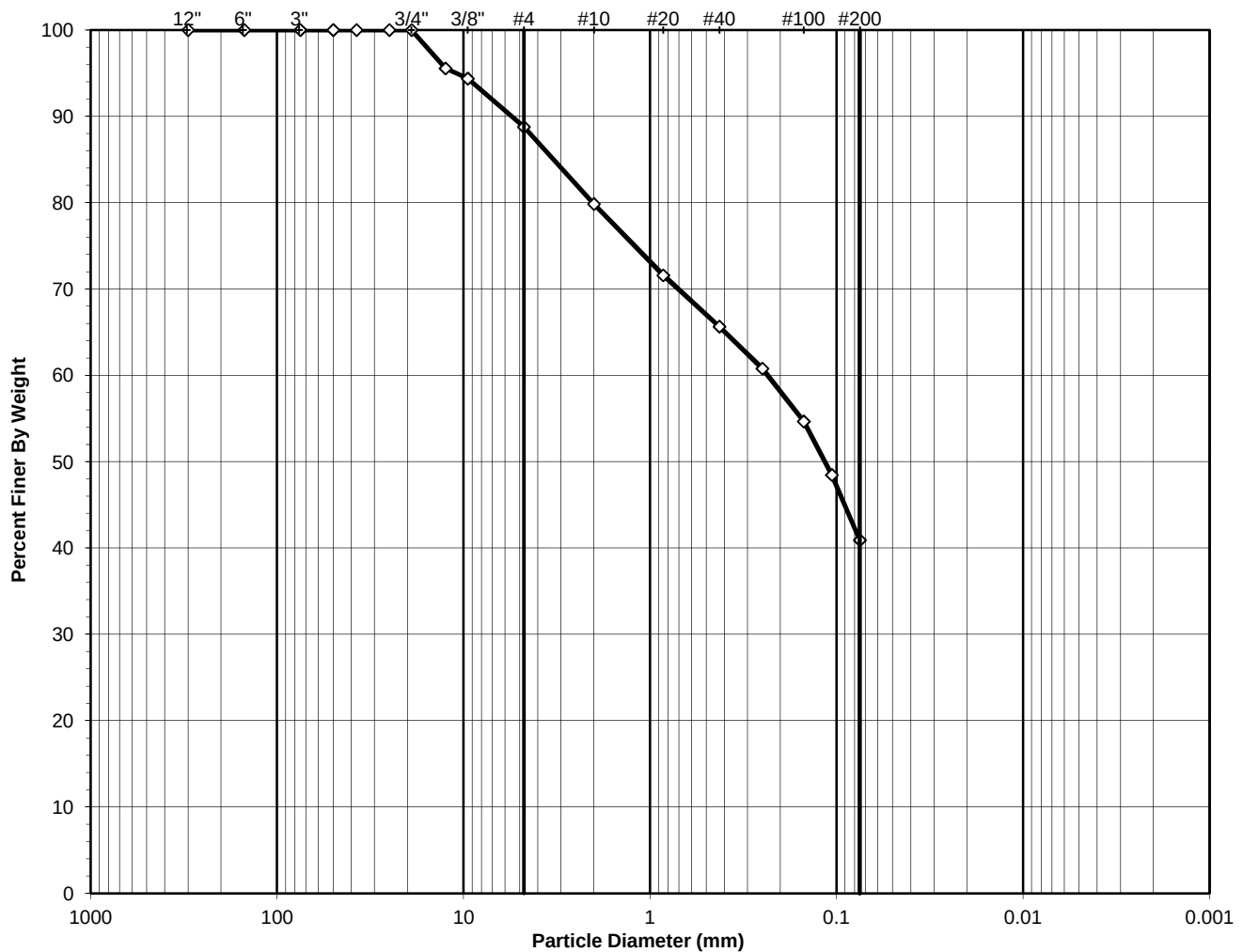
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-124

Boring No.: JB3-19-204
 Depth (ft): 12.0-16.0
 Sample No.: SpT-7/8
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
SM, TESTED

D50 = 0.12

USCS Classification:
SILTY SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/28/20 Checked By JLK Date 1/31/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-124

Boring No.: JB3-19-204
 Depth (ft): 12.0-16.0
 Sample No.: SpT-7/8
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1472	Tare No.:	NA	Tare No.:	1472	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	456.40	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	456.40	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	414.68	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	414.68	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	144.01	Weight of Tare (g):	NA	Weight of Tare (g):	144.01	Weight of Tare (g):	NA
Weight of Water (g):	41.72	Weight of Water (g):	NA	Weight of Water (g):	41.72	Weight of Water (g):	NA
Weight of Dry Soil (g):	270.67	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	270.67	Weight of Dry Soil (g):	NA
Moisture Content (%):	15.4	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	270.67	Total Dry Weight of Sample (g):	270.67	Dry Weight of Sample (g):	270.67	Total Dry Weight of Sample (g):	270.67
Tare No. (Sub-Specimen)	1472	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1472	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	456.40	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	456.40	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	144.01	Dry Weight of - 3/4" Sample (g):	270.67	Weight of Tare (g):	144.01	Dry Weight of - 3/4" Sample (g):	270.67
Sub-Specimen Wet Weight (g):	312.39	Dry Weight -3/4" +3/8" Sample (g):	15.24	Sub-Specimen Wet Weight (g):	312.39	Dry Weight -3/4" +3/8" Sample (g):	15.24
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	255.43	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	255.43
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	12.04	(**)	4.45	95.55	96
3/8"	9.5	3.20	1.18	5.63	94.37	94
#4	4.75	15.15	5.60	11.23	88.77	89
#10	2	24.15	8.92	20.15	79.85	80
#20	0.85	22.37	(**)	28.41	71.59	72
#40	0.425	16.07	5.94	34.35	65.65	66
#60	0.25	13.15	4.86	39.21	60.79	61
#100	0.15	16.58	6.13	45.34	54.66	55
#140	0.106	16.78	6.20	51.54	48.46	48
#200	0.075	20.44	7.55	59.09	40.91	41
Pan	-	110.74	40.91	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/28/20 Checked By JLK Date 1/31/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-124

Boring No.: JB3-19-204
Depth (ft): 12.0-16.0
Sample No.: SpT-7/8
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	26
Wt. of Tare & Wet Sample (g)	42.00
Wt. of Tare & Dry Sample (g)	37.98
Weight of Tare (g)	8.46
Weight of Water (g)	4.02
Weight of Dry Sample (g)	29.52

Water Content (%)	13.6
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NON - PLASTIC MATERIAL

Tested By	FS	Date	1/29/20	Checked By	JLK	Date	1/29/20
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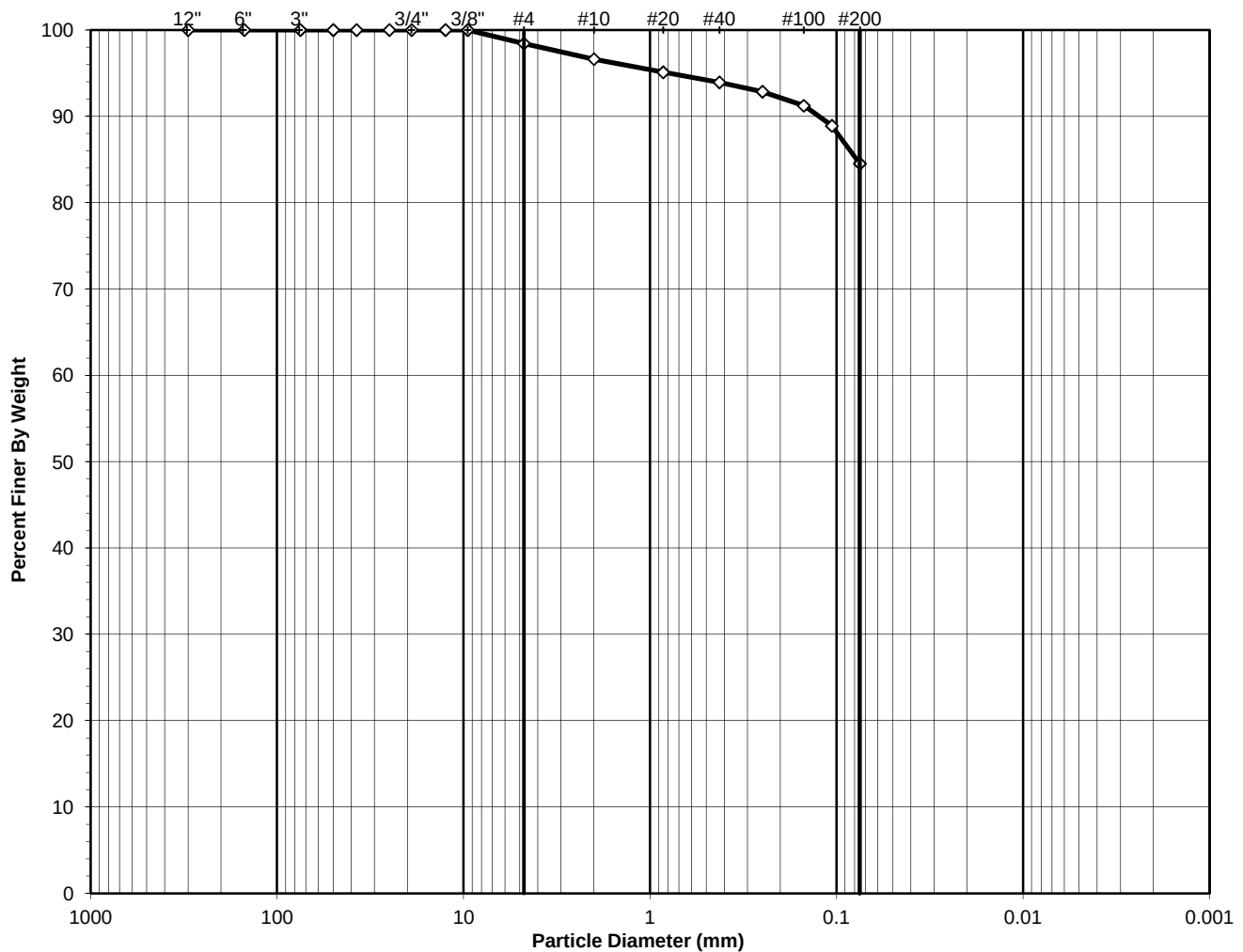
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-125

Boring No.: JB3-19-204
 Depth (ft): 20.0-24.0
 Sample No.: SpT-11/12
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol:
ML, TESTED

D50 = 0.02

USCS Classification:
SILT WITH SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/28/20 Checked By JLK Date 1/31/20
 page 1 of 2 DCN: CT-S73J, DATE 5/22/17, REV. 1e

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-125

Boring No.: JB3-19-204
 Depth (ft): 20.0-24.0
 Sample No.: SpT-11/12
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1512	Tare No.:	NA	Tare No.:	1512	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	414.16	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	414.16	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	369.69	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	369.69	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	149.34	Weight of Tare (g):	NA	Weight of Tare (g):	149.34	Weight of Tare (g):	NA
Weight of Water (g):	44.47	Weight of Water (g):	NA	Weight of Water (g):	44.47	Weight of Water (g):	NA
Weight of Dry Soil (g):	220.35	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	220.35	Weight of Dry Soil (g):	NA
Moisture Content (%):	20.2	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	220.35	Total Dry Weight of Sample (g):	220.35	Dry Weight of Sample (g):	220.35	Total Dry Weight of Sample (g):	220.35
Tare No. (Sub-Specimen)	1512	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1512	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	414.16	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	414.16	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	149.34	Dry Weight of - 3/4" Sample (g):	220.35	Weight of Tare (g):	149.34	Dry Weight of - 3/4" Sample (g):	220.35
Sub-Specimen Wet Weight (g):	264.82	Dry Weight -3/4" +3/8" Sample (g):	0.00	Sub-Specimen Wet Weight (g):	264.82	Dry Weight -3/4" +3/8" Sample (g):	0.00
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	220.35	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	220.35
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**)	0.00	100.00	100
3/8"	9.5	0.00	0.00	0.00	100.00	100
#4	4.75	3.44	1.56	1.56	98.44	98
#10	2	4.00	1.82	3.38	96.62	97
#20	0.85	3.34	(**)	4.89	95.11	95
#40	0.425	2.58	1.17	6.06	93.94	94
#60	0.25	2.38	1.08	7.14	92.86	93
#100	0.15	3.58	1.62	8.77	91.23	91
#140	0.106	5.13	2.33	11.10	88.90	89
#200	0.075	9.65	4.38	15.48	84.52	85
Pan	-	186.25	84.52	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/28/20 Checked By JLK Date 1/31/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-125

Boring No.: JB3-19-204
Depth (ft): 20.0-24.0
Sample No.: SpT-11/12
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	12
Wt. of Tare & Wet Sample (g)	37.98
Wt. of Tare & Dry Sample (g)	32.81
Weight of Tare (g)	8.46
Weight of Water (g)	5.17
Weight of Dry Sample (g)	24.35

Water Content (%)	21.2
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NON - PLASTIC MATERIAL

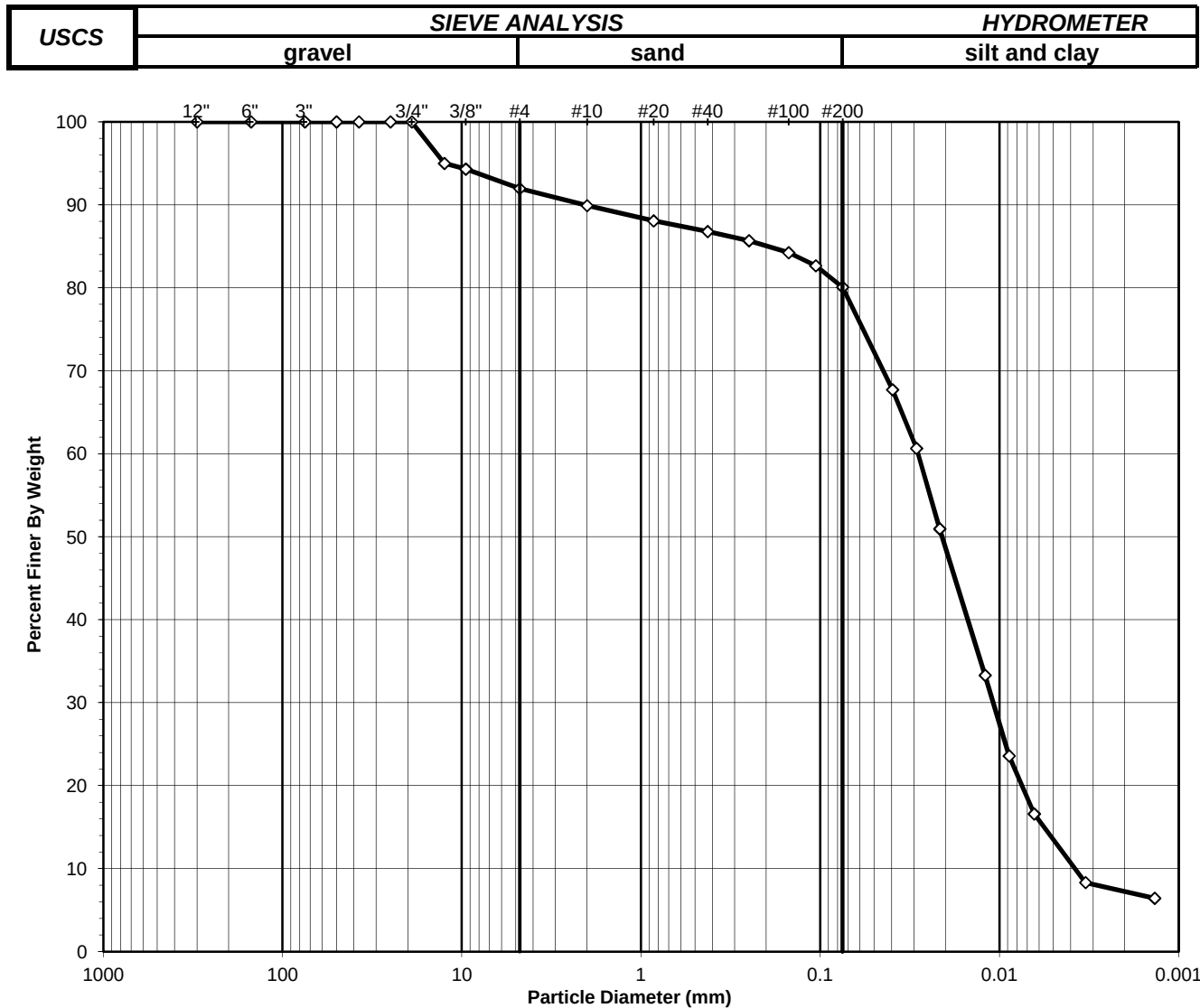
Tested By	FS	Date	1/29/20	Checked By	JLK	Date	1/29/20
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SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-126

Boring No.: JB3-19-204
 Depth (ft): 24.0-28.0
 Sample No.: SpT-13/14
 Soil Color: Brown



USCS Symbol:
ML, TESTED

D50 = 0.02

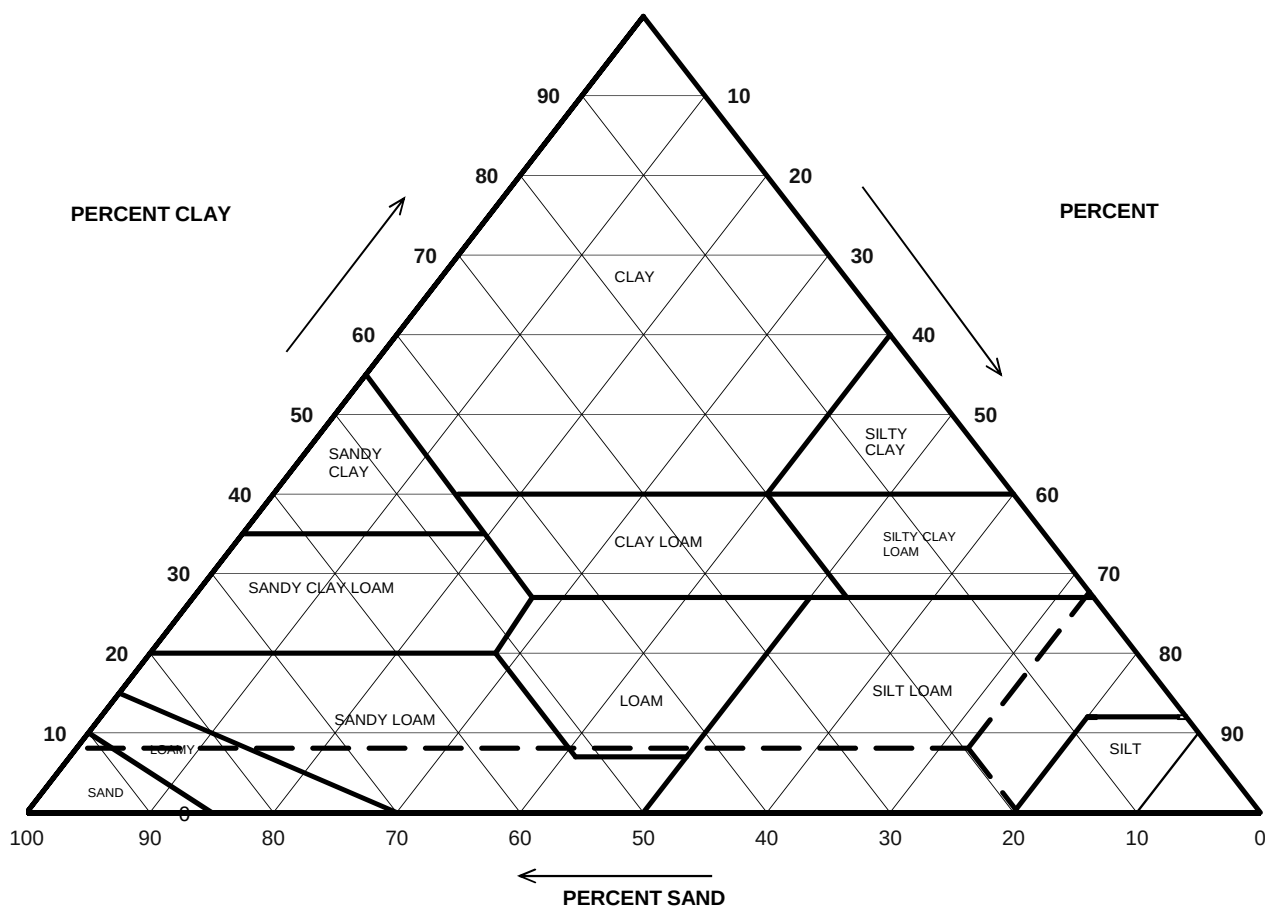
USCS Classification:
SILT WITH SAND
(NON-PLASTIC FINES)

Tested By DS Date 1/28/20 Checked By JLK Date 1/30/20
 page 1 of 4 DCN: CT-S73J, DATE 5/22/17, REV. 1e

USDA CLASSIFICATION CHART

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-126

Boring No.: JB3-19-204
Depth (ft): 24.0-28.0
Sample No.: SpT-13/14
Soil Color: Brown



USDA SUMMARY				
Particle Size (mm)	Percent Finer		Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	10.09	
2	89.91	Sand	17.65	19.64
0.05	72.26	Silt	65.00	72.30
0.002	7.25	Clay	7.25	8.07

USDA Classification: **SILT LOAM**

WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-126

Boring No.: JB3-19-204
 Depth (ft): 24.0-28.0
 Sample No.: SpT-13/14
 Soil Color: Brown

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	1526	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	399.40	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	355.76	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.95	Weight of Tare (g):	NA
Weight of Water (g):	43.64	Weight of Water (g):	NA
Weight of Dry Soil (g):	209.81	Weight of Dry Soil (g):	NA
Moisture Content (%):	20.8	Moisture Content (%):	0.0
Dry Weight of Sample (g):	209.81	Total Dry Weight of Sample (g):	209.81
Tare No. (Sub-Specimen)	1526	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	399.40	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	145.95	Dry Weight of - 3/4" Sample (g):	209.81
Sub-Specimen Wet Weight (g):	253.45	Dry Weight -3/4" +3/8" Sample (g):	11.94
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	197.87
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*) 0.00	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	10.50	(**) 5.00	5.00	95.00	95
3/8"	9.5	1.44	0.69	5.69	94.31	94
#4	4.75	4.93	2.35	8.04	91.96	92
#10	2	4.30	2.05	10.09	89.91	90
#20	0.85	3.86	(**) 1.84	11.93	88.07	88
#40	0.425	2.70	1.29	13.22	86.78	87
#60	0.25	2.32	1.11	14.32	85.68	86
#100	0.15	3.03	1.44	15.77	84.23	84
#140	0.106	3.29	1.57	17.33	82.67	83
#200	0.075	5.44	2.59	19.93	80.07	80
Pan	-	168.00	80.07	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/28/20 Checked By JLK Date 1/30/20

HYDROMETER ANALYSIS

ASTM D7928-17

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-126

Boring No.: JB3-19-204
 Depth (ft): 24.0-28.0
 Sample No.: SpT-13/14
 Soil Color: Brown

Elapsed Time (min)	Reading rm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	44.0	22.7	5.63	9.0	0.0395	84.6	67.7
2	40.0	22.7	5.63	9.7	0.0290	75.8	60.7
4	34.5	22.7	5.63	10.7	0.0215	63.6	50.9
15	24.5	22.7	5.63	12.5	0.0120	41.6	33.3
30	19.0	22.7	5.63	13.5	0.0088	29.5	23.6
60	15.0	22.8	5.60	14.2	0.0064	20.7	16.6
240	10.5	22.3	5.78	15.0	0.0033	10.4	8.3
1440	9.5	22.1	5.86	15.2	0.0014	8.0	6.4

Soil Specimen Data

Tare No.:	1681	Percent Finer than # 200:	80.07
Wt. of Tare & Dry Material (g):	147.21		
Weight of Tare (g):	97.35	Specific Gravity:	2.70 Assumed
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	44.86		

Notes: Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	G- 1819
Cylinder	G- 205
Thermometer	G- 1505
Balance	G- 657
#200 Sieve	G- 1944
Foam Inhibitor Used	No

Tested By	TO	Date	1/28/20	Checked By	JLK	Date	1/30/20
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page 4 of 4

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-126

Boring No.: JB3-19-204
Depth (ft): 24.0-28.0
Sample No.: SpT-13/14
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	45
Wt. of Tare & Wet Sample (g)	36.45
Wt. of Tare & Dry Sample (g)	31.29
Weight of Tare (g)	8.46
Weight of Water (g)	5.16
Weight of Dry Sample (g)	22.83

Water Content (%)	22.6
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NON - PLASTIC MATERIAL

Tested By	FS	Date	1/29/20	Checked By	JLK	Date	1/29/20
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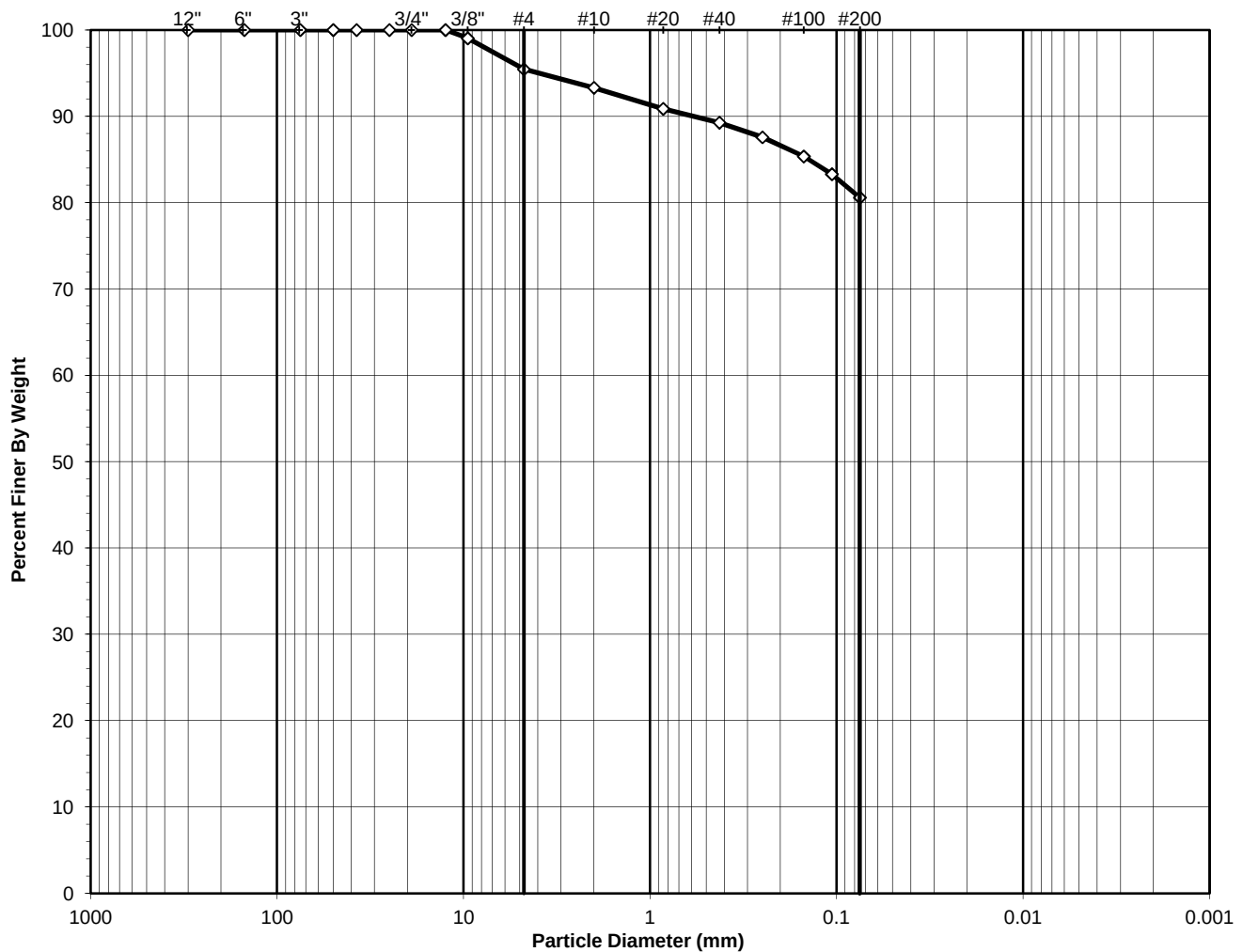
SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-127

Boring No.: JB3-19-204
 Depth (ft): 28.0-32.0
 Sample No.: SpT-15/16
 Soil Color: Brown

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



WASH SIEVE ANALYSIS

ASTM D6913-17



Client: D'Appolonia
 Client Reference: NRCS-Jewell Brook 172719-17
 Project No.: 2020-002-001
 Lab ID: 2020-002-001-127

Boring No.: JB3-19-204
 Depth (ft): 28.0-32.0
 Sample No.: SpT-15/16
 Soil Color: Brown

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	1478	Tare No.:	NA	Tare No.:	1478	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	326.26	Weight of Tare & Wet Sample (g):	NA	Wt. of Tare & Wet Sample (g):	326.26	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	290.98	Weight of Tare & Dry Sample (g):	NA	Wt. of Tare & Dry Sample (g):	290.98	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	147.09	Weight of Tare (g):	NA	Weight of Tare (g):	147.09	Weight of Tare (g):	NA
Weight of Water (g):	35.28	Weight of Water (g):	NA	Weight of Water (g):	35.28	Weight of Water (g):	NA
Weight of Dry Soil (g):	143.89	Weight of Dry Soil (g):	NA	Weight of Dry Soil (g):	143.89	Weight of Dry Soil (g):	NA
Moisture Content (%):	24.5	Moisture Content (%):	0.0	Moisture Content (%):	0.0	Moisture Content (%):	0.0
Dry Weight of Sample (g):	143.89	Total Dry Weight of Sample (g):	143.89	Dry Weight of Sample (g):	143.89	Total Dry Weight of Sample (g):	143.89
Tare No. (Sub-Specimen)	1478	Wet Weight of +3/4" Sample (g):	0.00	Tare No. (Sub-Specimen)	1478	Wet Weight of +3/4" Sample (g):	0.00
Wt. of Tare & Wet Sub-Specimen (g):	326.26	Dry Weight of + 3/4" Sample (g):	0.00	Wt. of Tare & Wet Sub-Specimen (g):	326.26	Dry Weight of + 3/4" Sample (g):	0.00
Weight of Tare (g):	147.09	Dry Weight of - 3/4" Sample (g):	143.89	Weight of Tare (g):	147.09	Dry Weight of - 3/4" Sample (g):	143.89
Sub-Specimen Wet Weight (g):	179.17	Dry Weight -3/4" +3/8" Sample (g):	1.38	Sub-Specimen Wet Weight (g):	179.17	Dry Weight -3/4" +3/8" Sample (g):	1.38
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	142.51	Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	142.51
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA	Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA	Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA
Sub-Specimen -3/8" Wet Weight (g):	NA			Sub-Specimen -3/8" Wet Weight (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100
6"	150	0.00	0.00	0.00	100.00	100
3"	75	0.00	0.00	0.00	100.00	100
2"	50	0.00	(*)	0.00	100.00	100
1 1/2"	37.5	0.00	0.00	0.00	100.00	100
1"	25	0.00	0.00	0.00	100.00	100
3/4"	19	0.00	0.00	0.00	100.00	100
1/2"	12.5	0.00	(**)	0.00	100.00	100
3/8"	9.5	1.38	0.96	0.96	99.04	99
#4	4.75	5.16	3.59	4.55	95.45	95
#10	2	3.09	2.15	6.69	93.31	93
#20	0.85	3.50	(**)	9.13	90.87	91
#40	0.425	2.31	1.61	10.73	89.27	89
#60	0.25	2.44	1.70	12.43	87.57	88
#100	0.15	3.19	2.22	14.64	85.36	85
#140	0.106	2.96	2.06	16.70	83.30	83
#200	0.075	3.90	2.71	19.41	80.59	81
Pan	-	115.96	80.59	100.00	-	-

Notes : (*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample
 (**) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By DS Date 1/30/20 Checked By JLK Date 1/31/20

ATTERBERG LIMITS

ASTM D 4318-17

Client: D'Appolonia
Client Reference: NRCS-Jewell Brook 172719-17
Project No.: 2020-002-001
Lab ID: 2020-002-001-127

Boring No.: JB3-19-204
Depth (ft): 28.0-32.0
Sample No.: SpT-15/16
Color: Brown
(Minus No. 40 sieve material)

As Received Water Content

Tare Number	28
Wt. of Tare & Wet Sample (g)	29.45
Wt. of Tare & Dry Sample (g)	25.77
Weight of Tare (g)	8.34
Weight of Water (g)	3.68
Weight of Dry Sample (g)	17.43

Water Content (%)	21.1
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NON - PLASTIC MATERIAL

Tested By *TO* *Date* *1/29/20* *Checked By* *BRB* *Date* *1/29/20*

SPECIFIC GRAVITY

ASTM D 854-14

Client:	D'Appolonia	Boring No.:	JB3-19-204
Client Reference:	NRCS-Jewell Brook 172719-17	Depth (ft):	28.0-32.0
Project No.:	2020-002-001	Sample No.:	SpT-15/16
Lab ID:	2020-002-001-127	Visual Description:	Brown Silty Clay

(Minus No.4 sieve material, oven dried)

Replicate Number	1	2
Pycnometer ID:	G 1917	G 1991
Weight of Pycnometer & Soil & Water (g):	730.89	734.97
Temperature (°C):	25.3	25.0
Weight of Pycnometer & Water (g):	683.94	684.53
Tare Number:	1913	925
Weight of Tare & Dry Soil (g):	170.68	175.41
Weight of Tare (g):	95.33	97.19
Weight of Dry Soil (g):	75.35	78.22
Specific Gravity of Soil @ Measured Temperature:	2.653	2.816
Specific Gravity of Water @ Measured Temperature:	0.99698	0.99705
Conversion Factor for Measured Temperature:	0.99877	0.99884
Specific Gravity @ 20° Celsius:	2.656	2.819

Average Specific Gravity @ 20° Celsius	2.74
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Tested By TO Date 1/30/20 Checked By JLK Date 1/31/20

DCN: CT-S5 Date: 3/26/18 Revision: 21

S:\Excel\Excel QA\Spreadsheets\Specific Gravity.xls

UNCONFINED COMPRESSION STRENGTH of INTACT ROCK CORE SPECIMENS

ASTM D 7012-14 Method C

This method does not report strain rate or deformation.

Sample Prep and Conformance Verification: ASTM D 4543-08

Client: D'Appolonia
Client Project: NRCS-Jewel Brook 172719-17
Project No.: 2020-002-001
Lab ID No.: 2020-002-001-128

Boring No.: JB3-19-204A
Depth (ft): 37.3-38.1
Sample ID: R-1
Moisture Condition: As Received-Unpreserved

Specimen Weight (g): 566.46

SPECIMEN LENGTH (in)

Reading 1: 3.98
Reading 2: 3.98
Reading 3: 3.98
Average: 3.98

SPECIMEN DIAMETER (in)

Reading 1: 1.99
Reading 2: 1.99
Average: **1.99**
Area (in²): 3.10
L/D: 2.01

MOISTURE CONTENT

Tare Number: 3321
Wt. of Tare & Wet Sample (g): 574.58
Wt. of Tare & Dry Sample (g): 574.48
Weight of Tare (g): 8.38
Weight of Wet Sample (g): 566.20
Sample Volume (cm³): 202.07
Moisture Content (%): 0.02
Unit Wet Weight (g/cm³): 2.803
Unit Wet Weight (pcf): 174.9
Unit Dry Weight (g/cm³): 2.803
Unit Dry Weight (pcf): 174.9

Total Load (lb): 19,150
Uniaxial Compressive Strength (psi): 6,180

Fracture Type: **Shear**

Rate of Loading (lb/sec): 120
Time to Break (min:sec): 2:39.82
Deviation From Straightness³:
AXIAL: Pass TOP: Pass BOTTOM: Pass

Physical Description:

Rock Core

Notes:

- 1) Moisture conditions at time of the test are: As Received-Unpreserved
- 2) Sample prep conforms to ASTM D4543-08 "best effort" if applicable
- 3) Deviation from straightness, Procedure A of ASTM D 4543-08
Pass/Fail criteria: gap < 0.02 = Pass, gap > 0.02 = Fail
- 4) Temperature is laboratory room temperature.
- 5) D4543 Prep and D7012 Testing Equipment Used:
- 6) Tool / Machine List:
G788 Compression Machine
G1661 Digital Calipers, G1380 Dial Gauge
G1616 Straight Edge, G1571 Feeler Gauge
G1633 V-Block, G1634 Rock Saw, G1635 Grinder



Tested By: JAC Date: 1/7/20 Checked By: NJM Date: 1/8/20

APPENDIX D
GEOLOGIC MAPS