



GEODesign, Inc.
85 Granite Shed Lane
Unit 1
Montpelier, VT 05602
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July 13, 2023
Project No.: 0750-12.18

Stephen Madden
Project Manager
Vermont Agency of Transportation
Construction & Materials Bureau
Geotechnical Engineering Section
2178 Airport Road, Unit B
Berlin, VT 05641

Re: Geotechnical Data Report
Springfield IM 091(83)
Springfield, VT

Dear Mr. Madden:

GEODesign, Inc. (GEODesign) is pleased to provide this Geotechnical Data Report for the above captioned project. This report summarizes subsurface conditions encountered from a subsurface exploration program performed at the site.

We look forward to continuing our work with you on this project. Please call Jason Gaudette at 802-798-4538 if you have any questions.

Sincerely,

GEODesign, Inc.

A blue ink signature of Jason Gaudette, featuring a stylized "JG" followed by a horizontal line.

Jason Gaudette,
Associate

A blue ink signature of Jacob Wimett, featuring a stylized "JW" followed by a horizontal line.

Jacob Wimett, P.E.
Senior Associate

Enclosed: Geotechnical Data Report

GEOTECHNICAL DATA REPORT

Springfield IM 091(83)

Springfield, Vermont

**Prepared for
Vermont Agency of Transportation
Construction & Materials Bureau
Geotechnical Engineering Section
2178 Airport Road Airport Road, Unit B
Berlin, VT 05641**

July 13, 2023



85 Granite Shed Lane, Unit 1, Montpelier, VT 05602
(T) 802.674.2033, (F) 802.674.5943
GEODesign Project Number: 0750-12.18

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1.0 INTRODUCTION

1.1 Summary

This Geotechnical Data Report presents a summary of subsurface conditions for the proposed improvements of bridges and on and off ramps associated with the Interstate I-91 interchange at Exit 7 in Springfield, Vermont. Refer to Figure 1 in Appendix A for the general site location. Soil borings and rock coring were completed in two phases, and laboratory testing was performed by VTrans on representative samples collected from the borings.

1.2 Scope of Work

GEODesign's scope of services was based on our proposal dated 12/23/22. Our services proposal was developed in response to the VTrans Work Order Request (WOR) dated 12/15/22 and related project documents, a site visit with VTrans Geotechnical Section staff (Steve Madden and Callie Ewald) on 12/9/22, and follow-up correspondence with VTrans. HNTB is serving as the project design consultant.

VTrans / HNTB provided a preliminary boring layout consisting of 11 borings. GEODesign recommended the addition of a 12th boring which was accepted by VTrans. We provided details on the objectives of each boring in our WOR response and developed a table with anticipated boring depths and proposed bedrock core lengths for exploration planning. VTrans district crew assisted GEODesign with traffic control and drill rig access at boring locations.

We completed the following tasks as outlined in our scope of services:

- Project Management;
- Pre-marking work limits and notifying Dig Safe;
- Subcontracting a private utility locator for Boring B-112;
- Subcontracting a drilling company to drill twelve soil borings;
- Observing and logging the soil borings;
- Assigning laboratory soil index testing for VTrans; and,
- Preparing a report summarizing the subsurface conditions encountered.

2.0 PROJECT AND SITE DESCRIPTION

Overall, the Springfield IM 091-1(83) project involves improvements to a section of Interstate I-91 that includes 4 bridges carrying I-91 over Route 5/Missing Link Road (Bridge 25), Black River (Bridge 26), Toonerville Rail-Trail (Bridge 27) and Route 5 at the Exit 7 interchange (Bridge 28).

The focus of the WOR and GEODesign's scope of work pertains to the replacement of Bridge 28 and new on and off ramps for I-91 NB at Exit 7. Per the WOR, integral abutments are the preferred foundation type for the replacement of Bridges 28 N/S. New on and off ramp alignments are proposed to allow removal of Bridges 27 N/S and realigning the Toonerville Rail-Trail. The new on and off ramp alignments include the following related work:

- Removing Bridges 27 N/S and related relocation of the Toonerville Rail-Trail;
- Adding light poles at I-91 SB on ramp and I-91 NB off ramp intersections with US Rte. 5;
- Cutting (up to 30 feet) along a +/- 500-foot portion of the I-91 NB off ramp;
- Filling (up to 30 feet) along a +/- 400-foot portion of the I-91 NB on ramp;
- Relocating portions of the Spencer Brook within +/- 700 feet of cut areas; and,
- Extending (or replacing) a culvert in a fill area at the northeast end of Spencer Brook.

Refer to Figures A (site plan) through E (profiles) attached in Appendix A and B.

2.1 Existing Information

VTrans prepared a preliminary geotechnical information report dated 2/24/20. GEODesign used this information for planning our exploration objectives, depths, and rock coring. The report included the following information:

- Surficial geologic and bedrock mapping (as discussed below in Section 2.2);
- Four borings previously performed at the intersection of VT-11 and Missing Link Rd indicating silty sand, gravelly sand and silt overburden soils with bedrock depths between 10.1 and 23.0 feet, corresponding to between El. 299.6 and El. 289.5. For reference, the approximate Bridge 28 surface elevation was estimated from Google Earth to be approximately El. 350 to 360.
- The three nearby wells indicate bedrock depths between 3 and 14 feet at distances of approximately 909 to 1879 feet from the project site.

VTrans provided GEODesign with record plan documents on 6/14/23 for the original Bridges 28 and 27. These documents consisted of 7 sheets and provided some insight on the cut and fill site history. The documents suggest that the project site was generally cut down to current grades with some possible localized fill areas. Based on our boring data, these localized fills were likely natural site soils that were reworked, and were difficult to distinguish between undisturbed natural soils.

2.2 Regional Geology

GEODesign reviewed available mapping information for this site using the Vermont Agency of Natural Resources (VTANR) On-line Atlas.

Surficial geology mapping indicates glaciolacustrine deposits, predominantly sand at the project site and alluvium just south of the I-91 on ramp and Toonerville Rail-Trail.

Bedrock mapping indicates the site is underlain primarily by slate and secondarily by quartzite. Specifically, the mapping description includes light to dark gray carbonaceous slate, phyllite, or schist containing interbeds of quartzite and weathered limestone.

Soil and bedrock types encountered in the soil borings performed on site are generally consistent with the VTANR mapping information and those presented in the VTrans preliminary report.

3.0 SUBSURFACE INVESTIGATION PROGRAM

3.1 Subsurface Explorations

Subsurface explorations consisted of twelve soil borings completed in two Phases as shown in Table 1 (below) and at the locations shown on the attached Figure 2 in Appendix A. Soil borings were drilled by Northern Test Boring and were observed/logged by GEODesign personnel. Refer to the drilling and sampling details presented on each boring log in Appendix B.

Table 1 – Summary of Explorations

Phase	Dates	Borings	Features
Phase I	February 8 to 10, 2023	B-107, B-109 (OW)	Bridge 28 N On/Off Ramps
		B-108, B-110	Light Poles
		B-111	Culvert
		B-112	Bridges 27 N/S
Phase II	April 17 to 26, 2023	B-101, B-103, B-105	Bridge 28 S
		B-102, B-104, B-106	Bridge 28 N

3.2 Soil Sampling

Borings from both Phases were advanced using 4-inch diameter flush joint casing and drive and wash drilling methods. Soil sampling was typically performed semi-continuously in the upper 12 feet (i.e., sampling 4 feet of every 5 feet) then approximately every 5 feet after that using the Standard Penetration Test (SPT). Sampling was performed typically at 10-foot intervals at Boring B-106 as agreed upon with VTrans based on the overall boring depth and schedule constraints.

SPT sampling consisted of dropping a 140-pound automatic hammer in free fall for 30 inches on to an anvil that is threaded on top of a drill string that is attached to the split-spoon soil sampler. The number of hammer blows to drive the sampler each 6-inch increment were recorded and the cumulative number of hammer blows recorded between 6 and 18 inches is the SPT N-value.

3.3 Bedrock Coring

Bedrock coring was performed at ten of the twelve borings using an NQ core barrel (1-7/8 inch core) at the depths and with the recoveries indicated on the boring logs.

In Phase I, five feet of bedrock was cored at Borings B-107, B-108, B-110, and B-112. Bedrock was not encountered to the extent of exploration in Borings B-109 and B-111.

In Phase II, ten feet of bedrock was cored in Borings B-101, B-103, B-104, B-105, and B-106. Rock coring was limited to only 5.7 feet at Boring B-102 (from 94.0' to 99.7' deep) due to poor quality rock and scheduling constraints, as discussed with VTrans.

3.4 Groundwater Observation Well

One groundwater observation well was installed in Boring B-109(OW) to a depth of 47 feet to allow monitoring of groundwater levels over time. Refer to the boring log for additional details related to the installation.

3.5 Laboratory Testing

GEODesign assigned 48 laboratory index tests based on samples collected from the soil borings. 24 samples were assigned from Phase I (completed 3/22/23) and 24 samples were assigned from Phase II (completed 5/18/23). Samples were transmitted to VTrans material lab for analysis.

Laboratory results were used to determine material gradations, check field descriptions, and to assist with evaluating subsurface strata. Laboratory testing results are presented in Appendix C.

4.0 SUBSURFACE CONDITIONS

A summary of subsurface conditions encountered in the borings is presented below. A generalized subsurface profile is described for the overall site, followed by subsurface details by feature area. Refer to the tabulated summary (Table 2 in Section 4.1) and Figures 3 through 6 in Appendix A for subsurface cross-sections along the alignments for the I-91 bridges and on and off ramps.

4.1 Generalized Subsurface Profile

Subsurface materials encountered across this site generally consist of the following:

- Fill materials (e.g., pavement, asphalt, and soils associated with prior construction);
- Natural, layered sandy silt and silty sand (possibly reworked in some areas);
- Glacial till (dense to very dense silt, sand, and gravel); and,
- Bedrock (including possible weathered zones overlying more competent rock).

Fill materials were generally encountered at borings drilled near the I-91 and Route 5 roadways and on and off ramps (associated with their original construction). These soils typically contained some gravel and occasionally contained traces of roots and organics. The original Bridge 28 plans suggest current site grades were achieved from a combination of mostly cuts with some fills. One exception was at the existing culvert where fill soils extended to the full depth of the boring.

Natural soils overlying the glacial till and bedrock generally consist of predominantly silts (containing fine to coarse sand) and predominantly fine to coarse sands (containing silt). These soils appear to be layered based on the observed range in gradations, locations, and depths in the borings. Some of these soils may have also been reworked below or within the upper fill soils that were associated with the original bridge and on and off ramp construction. For this reason, actual transitions to undisturbed natural soils were difficult to distinguish from the soil sampling.

Table 2 – Summary of Subsurface Conditions

Boring No.	Feature	Ground Surface (EL.)	Total Depth (ft)	Bottom of Borehole (EL.)	Fill / Possible Reworked Soil Depth* (ft)	Top of Bedrock (ft)	Top of Bedrock (EL.)
B-101	Bridges 28 N/S	363.1	89.0	274.1	2	76.9	286.2
B-102		361.5	99.7	261.8	9	92.7	268.8
B-103		340.0	70.0	270.0	7	59.5	280.5
B-104		339.4	74.0	265.4	7	62.8	276.6
B-105		363.3	94.0	269.3	17	84.0	279.3
B-106		359.9	82.0	277.9	12	72.0	287.9
B-107	I-91 NB On Ramp	312.0	27.0	285.0	4	21.5	290.5
B-108	Light Pole	334.2	17.0	317.2	4	12.0	322.2
B-109	I-91 NB Off Ramp	370.7	47.0	323.7	17	N/A	N/A
B-110	Light Pole	334.2	12.5	321.7	4	6.5	327.7
B-111	Culvert	327.9	32.0	295.9	32	N/A	N/A
B-112	Bridges 27 N/S	332.4	70.7	261.7	12	66.0	266.4

*Fill/possible reworked soil depths are estimated. Refer to the boring logs for additional information.

4.2 Subsurface Profile – Bridges 28 N/S

This area includes Borings B-101, B-102, B-103, B-104, B-105, and B-106. Refer to the logs, Figures 3 and 4 in Appendix A, and generalized descriptions below.

4.2.1 Fill / Possible Reworked Soils

Borings B-103 and B-104 were drilled within the median of Route 5 and encountered 2 inches and 3 inches of pavement, respectively.

An upper layer of fill soils consisted of silty gravelly sand from the ground surface to up 2 feet deep at Boring B-101, 4 feet deep at Boring B-102, and 7 feet deep at Boring B-104 directly below pavement. SPT N-values indicate these soils were loose to medium dense.

Possible reworked soils extended deeper on the north side of Bridge 28 at Borings B-105 and B-106, to up to 17 feet deep. The composition of these soils appeared to be a mixture of the upper silty gravelly sand fill and the underlying natural silty sandy and sandy silts (as discussed below).

4.2.2 Layered Silty Sand / Sandy Silt

Natural silty sand and sandy silt layers were encountered below the fill and/or possibly reworked soils. The silty sand typically consisted of fine to coarse sand, and to little silt, and trace to no gravel. The sandy silt typically consisted of silt, and to trace fine to coarse sand, and little to no fine Gravel. SPT N-values indicate these layered soils ranged from loose to dense.

4.2.3 Glacial Till

Glacial till was encountered above the bedrock in all borings in this area beginning between approximately 57 and 90 feet deep, except at Boring B-104 (where it was not observed). This stratum typically consisted of fine to coarse sand, little gravel, and little silt. SPT N-values indicate the glacial till layer is very dense, including refusals with the split spoon sampler.

4.2.4 Bedrock

Bedrock was encountered between 60 and 94 feet deep in this area. Bedrock was classified as very poor to excellent quality phyllite, with core advance rate ranging from 1 to 3 minutes per foot.

4.3 Subsurface Profile – Bridge 28 N On/Off Ramp

This area included Borings B-107, B-109, and B-112. Boring B-108 (drilled for the proposed light pole) was also projected to the subsurface profile for visualization. Refer to the logs, Figures 5 and 6 in Appendix A, and generalized descriptions below.

4.3.1 Fill / Possible Reworked Soils

Fill and/or possible reworked soils were encountered up to approximately 17 feet deep and primarily consisted of gravel, and (to little) fine to coarse sand, little (to no) silt. SPT N-values typically indicated these soils were loose to medium dense.

4.3.2 Silt / Sandy Silt

A possibly layered silt and sandy silt stratum was encountered below the fill / possible reworked soils. This material consisted of silt, and (to little) fine to coarse sand, and little (to no) gravel. SPT N-values indicated this stratum was loose to medium dense.

4.3.3 Bedrock

Bedrock was encountered at Boring B-107 at 22 feet deep and Boring B-112 at 60.5 feet deep. Bedrock was classified as poor quality phyllite, with core advance rate ranging from 2 to 5 minutes per foot of coring. Bedrock was not encountered at Boring B-109.

4.4 Subsurface Profile – Light Pole Locations

This area included Borings B-108 and B-110. Refer to the logs and generalized description below.

4.4.1 *Fill / Possible Reworked Soils*

A 6-inch topsoil layer was observed at Boring B-108. Fill soils were encountered to approximately 4 feet deep in both Borings B-108 and B-110. Fill soils mostly consisted of sands and gravels with varying amounts of silt and trace organics. SPT N-values indicated loose to dense conditions.

4.4.2 *Sandy Silt*

Sandy silt was encountered in Boring B-108 from 4 feet to 12 feet, with SPT N-values indicating medium dense. This material consisted of silt, little fine sand, and trace (to no) fine Gravel.

4.4.3 *Glacial Till*

Glacial till was encountered between 4 and 6.5 feet deep at Boring B-110 above the bedrock. Glacial till consisted of fine to coarse gravel and fine to coarse sand, trace silt. SPT N-values indicated a very dense condition.

4.4.4 *Bedrock*

Bedrock was encountered in both Borings B-108 and B-110 at depths of 12 feet and 7.5 feet, respectively. Bedrock was classified as poor quality (B-110) to excellent quality (B-108) phyllite, with core advance rates between 2 to 3 minutes per foot.

4.5 Subsurface Profile – Culvert

This area included Boring B-111. Refer to the log and generalized description below.

4.5.1 *Fill*

Boring B-111 was drilled adjacent to the existing culvert. As such, fill soils were inferred from the ground surface to the bottom of the boring at 32 feet deep with erratic densities between loose to dense. Fill depths roughly matched the culvert invert depths as shown on the topographic plan.

Fill soils consisted of an upper layer of fine to coarse gravel and fine to coarse sand, and little silt with trace organics and roots. Below this upper layer, fill soils generally consisted of silt, and (to trace) fine to medium sand, and trace (to no) gravel.

4.6 Subsurface Profile – Bridges 27 N/S

This area included Boring B-112. Refer to the log and generalized description below.

4.6.1 *Fill / Possible Reworked Soils*

Fill and/or possibly reworked fill soils were inferred from the ground surface up to about 12 feet deep. These soils typically consisted of silty, gravelly sand near the surface and SPT N-values indicated loose to medium dense. Silt and sand content increased toward the bottom of this layer at the transition with the natural soils.

4.6.2 *Sandy Silt*

Sandy silt was encountered from 15 feet to 55 feet, with SPT N-values indicating loose to medium dense. This layer primarily consisted of silt, little (to no) fine sand, and trace (to no) fine gravel.

4.6.3 *Glacial Till*

Glacial till was encountered from approximately 55 feet to 66 feet deep above bedrock, with SPT N-values indicating a dense condition. This material typically consisted of fine to coarse sand, and (to trace) silt, and trace (to no) fine gravel.

4.6.4 *Bedrock*

Bedrock was encountered from 66 to 70.6 feet deep. As discussed above, rock coring was limited at this location as agreed upon with VTrans. Bedrock consisted of poor quality phyllite, with coring advance rates between 3 and 5 minutes per foot.

4.7 Groundwater

Groundwater observations were made at each boring location and at the time of drilling noted on the boring logs. Refer to the tabulated summary below (Table 3) and details on the boring logs presented in Appendix B.

Groundwater was measured in Observation Well B-109 (OW) at 30.6 feet deep, 33.9 feet deep, and 35.3 feet deep after approximately one day, ten days, and one month after well installation, respectively.

The groundwater depths observed in the borings/observation wells were measured below ground surface and are likely to vary due to factors such as seasonal variations, temperature, rainfall, and other factors which differ from conditions at the time the data was obtained.

Table 3 – Summary of Groundwater Observations

Boring No.	Depth (ft)	Date	Observation
B-101	20.0	4/19/2023	Wet soil sample
	26.5	4/20/2023	In open borehole
B-102	11.5	4/21/2023	Wet soil sample
	11.6	4/25/2023	In open borehole
B-103	15.0	4/25/2023	Wet soil sample
B-104	15.0	4/26/2023	Wet soil sample
B-105	21.3	4/17/2023	Wet soil sample
	20.1	4/17/2023	In open borehole
B-106	NA		Not encountered
B-107	2.0	2/9/2023	Wet soil sample
	1.5	2/9/2023	In open borehole
B-108	NA		Not encountered
B-109 (OW)	Refer to the boring log for groundwater well observations and readings.		
B-110	5.7	2/8/2023	In open borehole
B-111	5.0	2/9/2023	In open borehole
B-112	15.0	2/10/2023	Wet soil sample

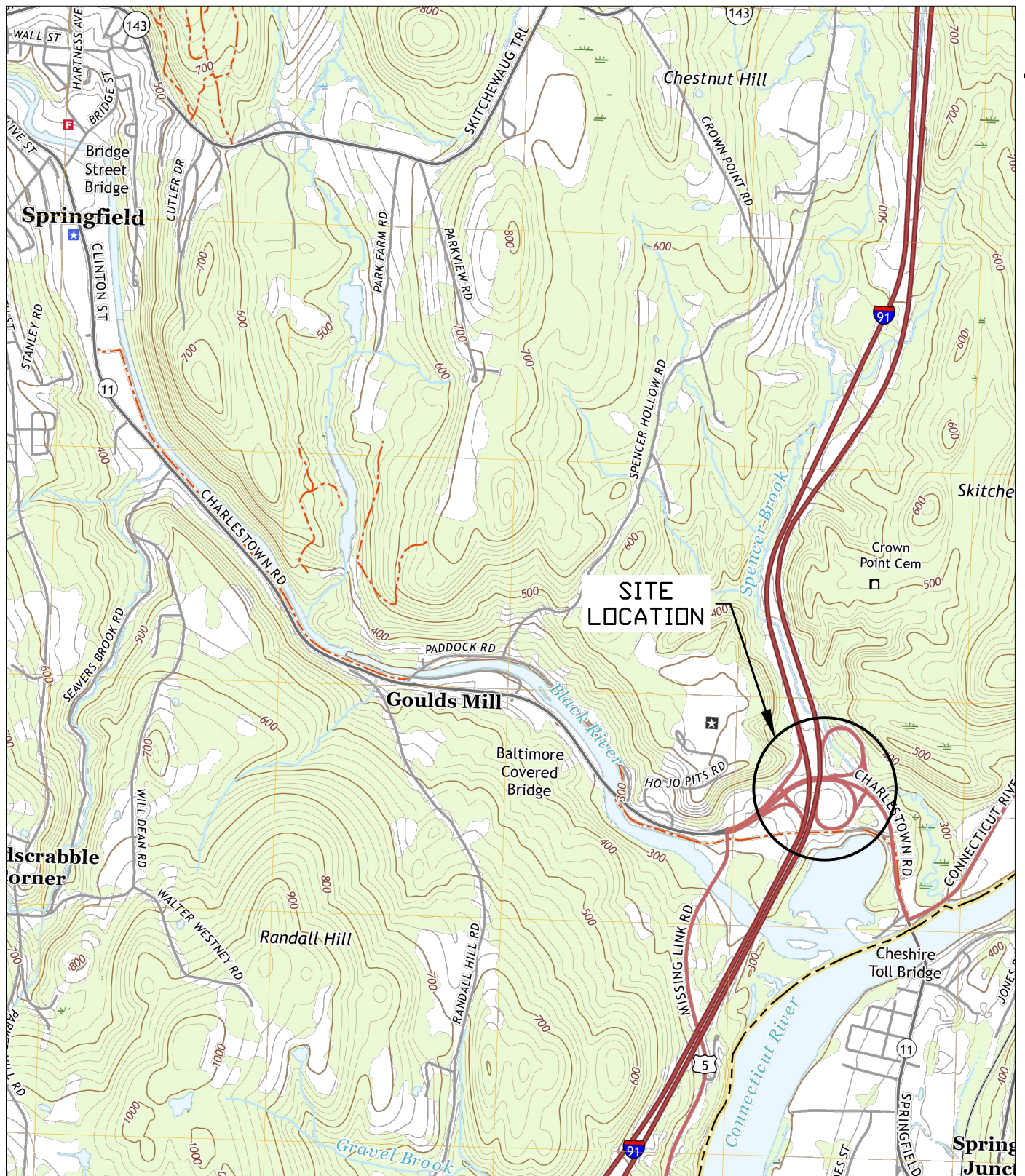
5.0 REPORT LIMITATIONS

This report is subject to the limitations provided in Appendix D.

APPENDIX A

FIGURES

CAD FILE No. M:\CL0750\VAOT\750-12.18 Springfield IM 091-1(83)\CAD\750-12.18 Locus.dwg



GEO DESIGN

85 GRANITE SHED LANE
UNIT 1
MONTPELIER, VT 05602
802.674.2033
geocompanies.com



QUADRANGLE LOCATION

**SITE LOCATION PLAN
SPRINGFIELD IM 091-1(83)
SPRINGFIELD, VERMONT**

REFERENCE:
U.S.G.S. 7.5 MINUTE QUADRANGLE: SPRINGFIELD, VT, NH

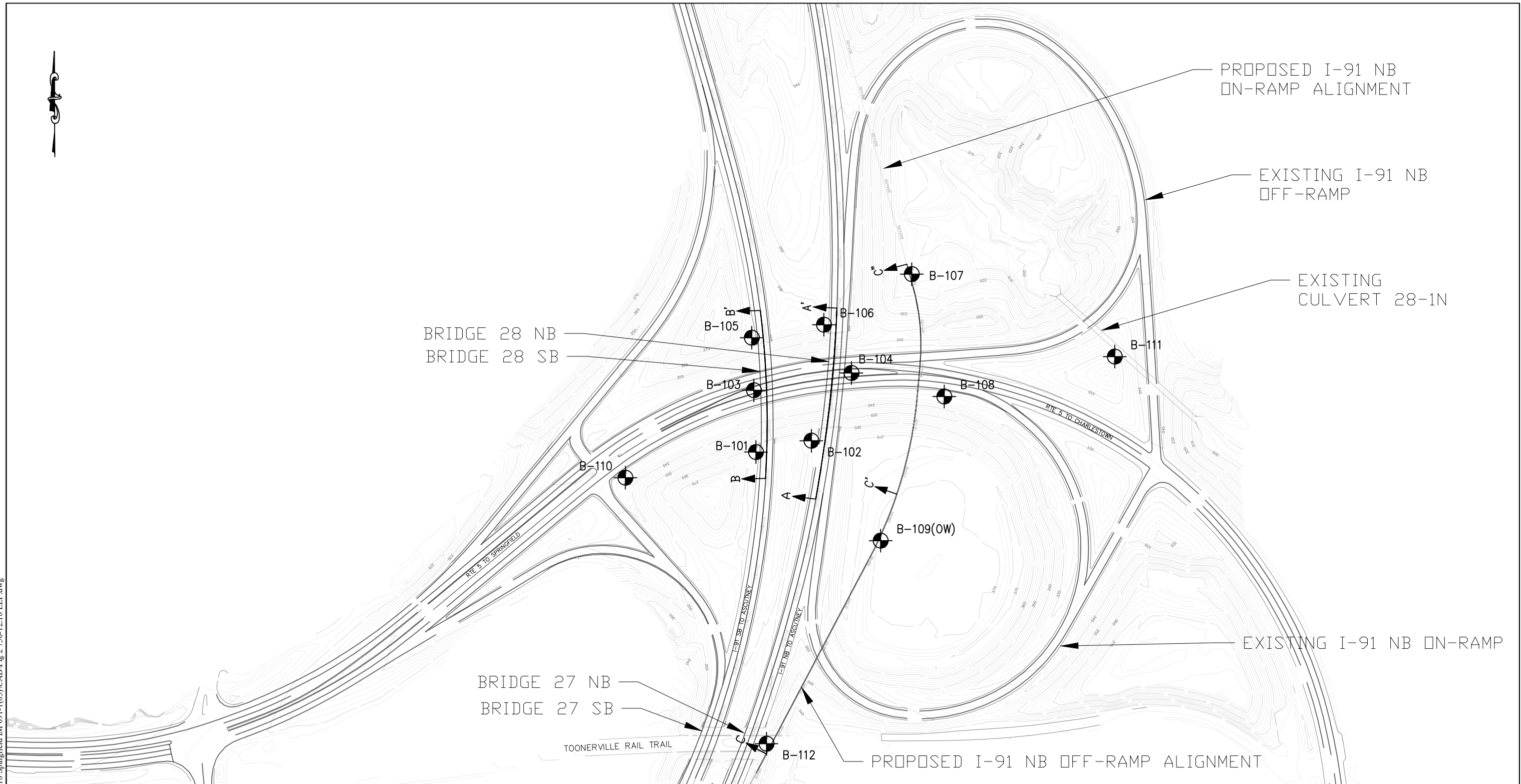
SCALE IN FEET



PROJECT NO.	0750-012.18
DATE	JUNE 22, 2023
FIGURE NO.	1

DRAWN BY:	BHA	REVIEWED BY:	JAG
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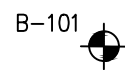
CAD FILE No. M:\CL\0750 VAO\750-12.18 Springfield IM 091-1(83)\CAD\Fig 2 750-12.18 ELP.dwg



NOTES:

1. BASE MAP DEVELOPED FROM ELECTRONIC FILES ENTITLED "z12a574ctr.dgn" AND OTHERS PROVIDED BY VAOT VIA SHAREPOINT DOWNLOAD JUNE 2, 2023, AND "z12a574sv(1).dgn" ON JUNE 5, 2023.
2. B-1XX SERIES TEST BORINGS WERE PERFORMED BY NORTHERN TEST BORING ON FEBRUARY 8 THROUGH 11, 2023 AND APRIL 17 THROUGH 27, 2023 AND OBSERVED AND LOGGED BY GEODESIGN PERSONNEL.
3. THE LOCATIONS OF THE BORINGS WERE DETERMINED BY VAOT SURVEY AND PROVIDED TO GEODESIGN AS NOTED ABOVE. THESE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

LEGEND



B-101
TEST BORING NO.
AND LOCATION BY
GEODESIGN, INC.



A
A'
SUBSURFACE PROFILE
AND LOCATION

GEO DESIGN

85 GRANITE SHED LANE
UNIT 1
MONTPELIER, VT 05602
802.674.2033
geocompanies.com

DRAWN BY: BHA

REVIEWED BY: JAG

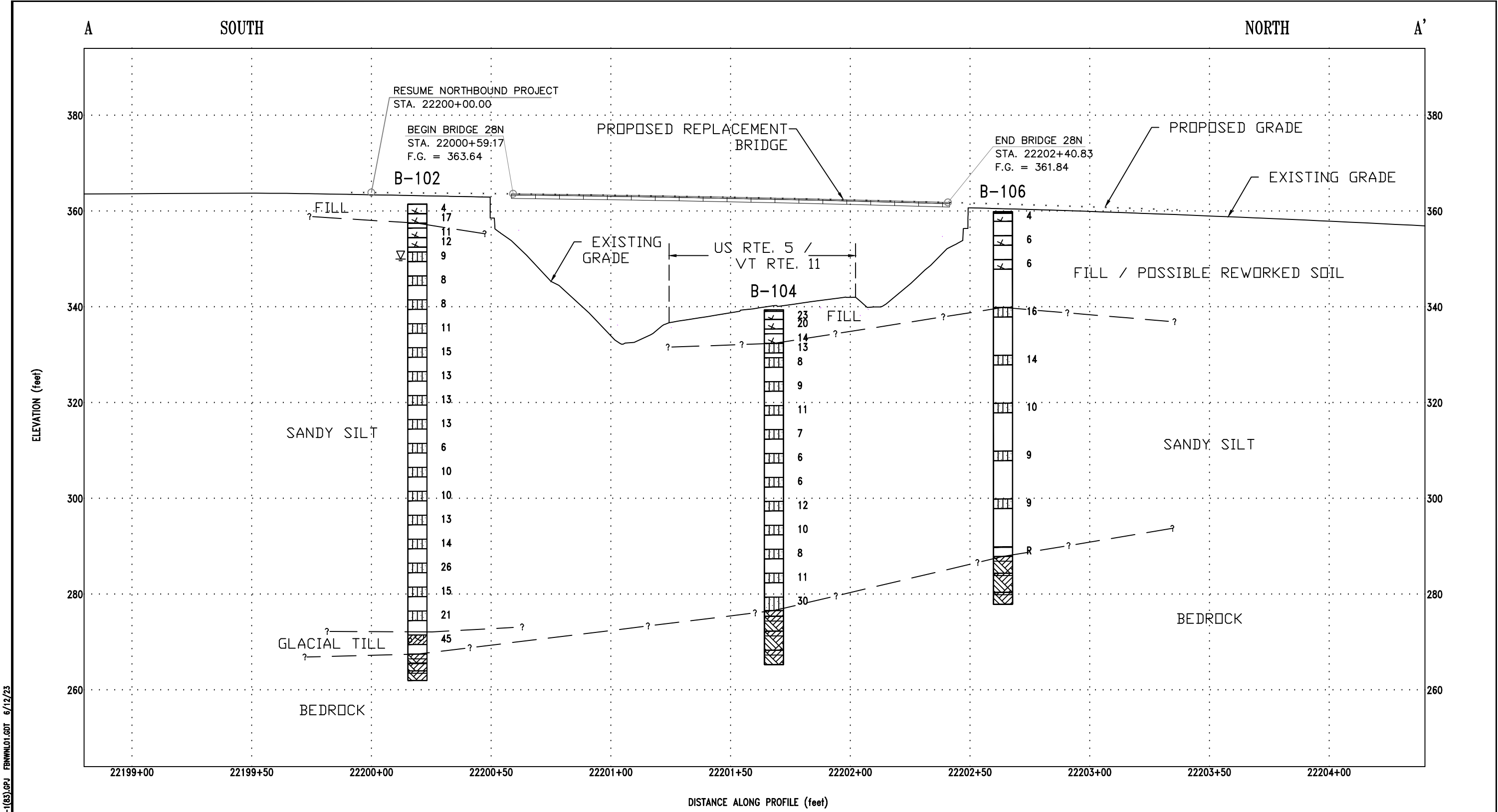
**EXPLORATION LOCATION PLAN
SPRINGFIELD IM 091-1(83)
SPRINGFIELD, VT
PROJECT NO: 0750-12.18**

APPROXIMATE SCALE IN FEET
1" = 200'



DATE: JUNE 22, 2023

FIGURE NO. 2



GEO-VTRANS PROFILE SPRINGFIELD IM 091-1(83).GDT 6/12/23

GEO DESIGN

85 GRANITE SHED LANE
MONTPELIER, VT 05602
PHONE: 802-674-2033/FAX: 802-674-5943
WWW.GEOCOMPANIES.COM

VTrans Working to Get You There
Vermont Agency of Transportation

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

0 40
Horizontal Scale (feet)

Vertical Exaggeration: 2x

Notes:

1. Data concerning the various strata have been interpreted at boring locations only. The stratigraphy between borings may vary from that shown.
2. Refer to plan view for subsurface profile location. For strata details and symbol legend, see Subsurface Profile Legend and boring logs appended to this report.
3. Numbers displayed beside boring(s) represent SPT "N" values corresponding to their respective sampling interval. Where coring was performed, numbers represent Recovery and RQD values.

Date: 6/22/2023

Drawn By: BHA

Reviewed By: JAG

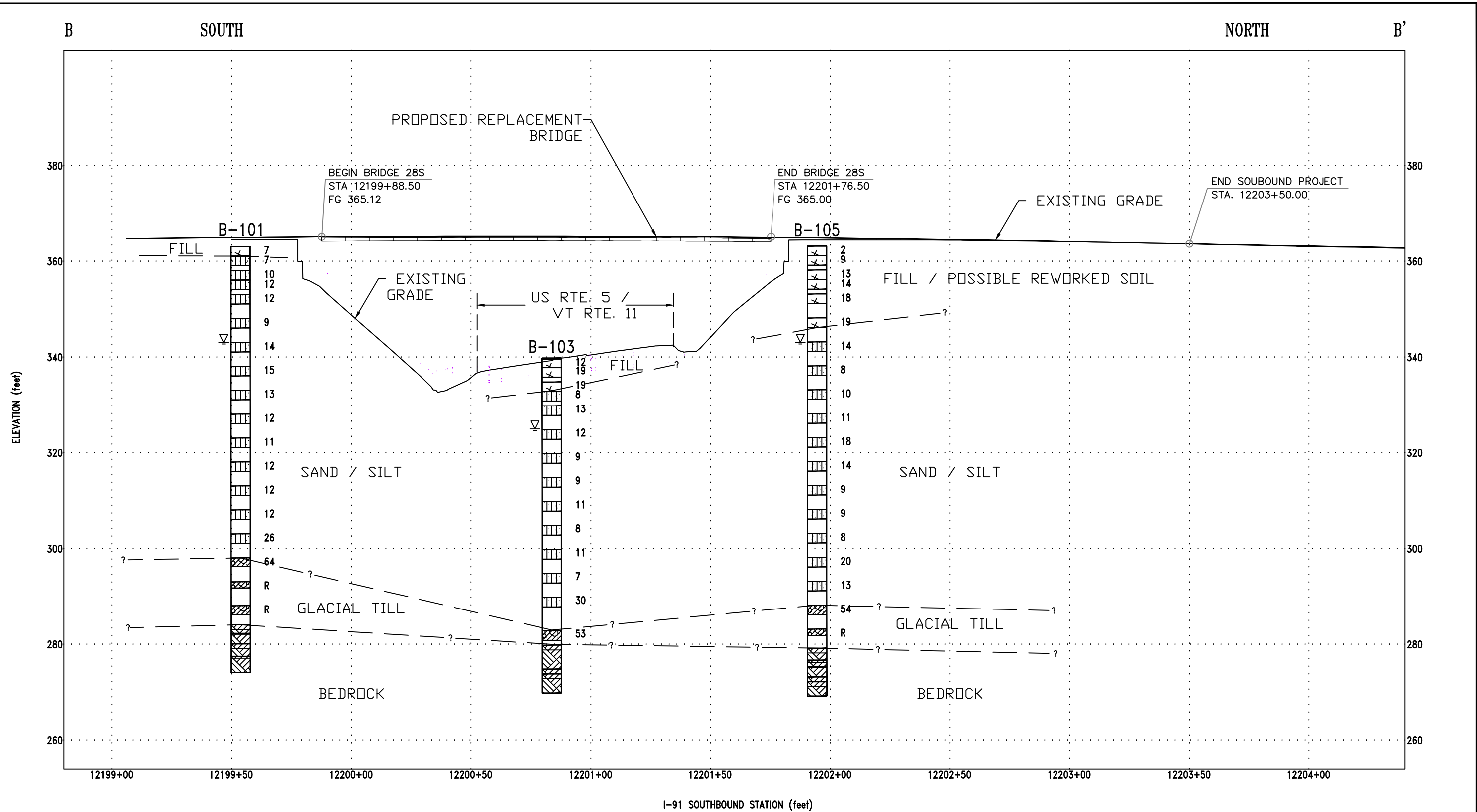
SUBSURFACE PROFILE
I-91 NORTHBOUND (NB)

Springfield, VT
Springfield IM 091-1(83)
GEODesign File No.0750-12.18

File No.: 0750-12.18

Figure No.: 3

GEO-VTRANS PROFILE SPRINGFIELD IM 091-1(83).GPJ FBWNL01.GDT 6/12/23



GEO DESIGN

85 GRANITE SHED LANE
MONTPELIER, VT 05602
PHONE: 802-674-2033/FAX: 802-674-5943
WWW.GEOCOMPANIES.COM



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION



Horizontal Scale (feet)

Vertical Exaggeration: 2x

Notes:

1. Data concerning the various strata have been interpreted at boring locations only. The stratigraphy between borings may vary from that shown.
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Date: 6/22/2023

Drawn By: BHA

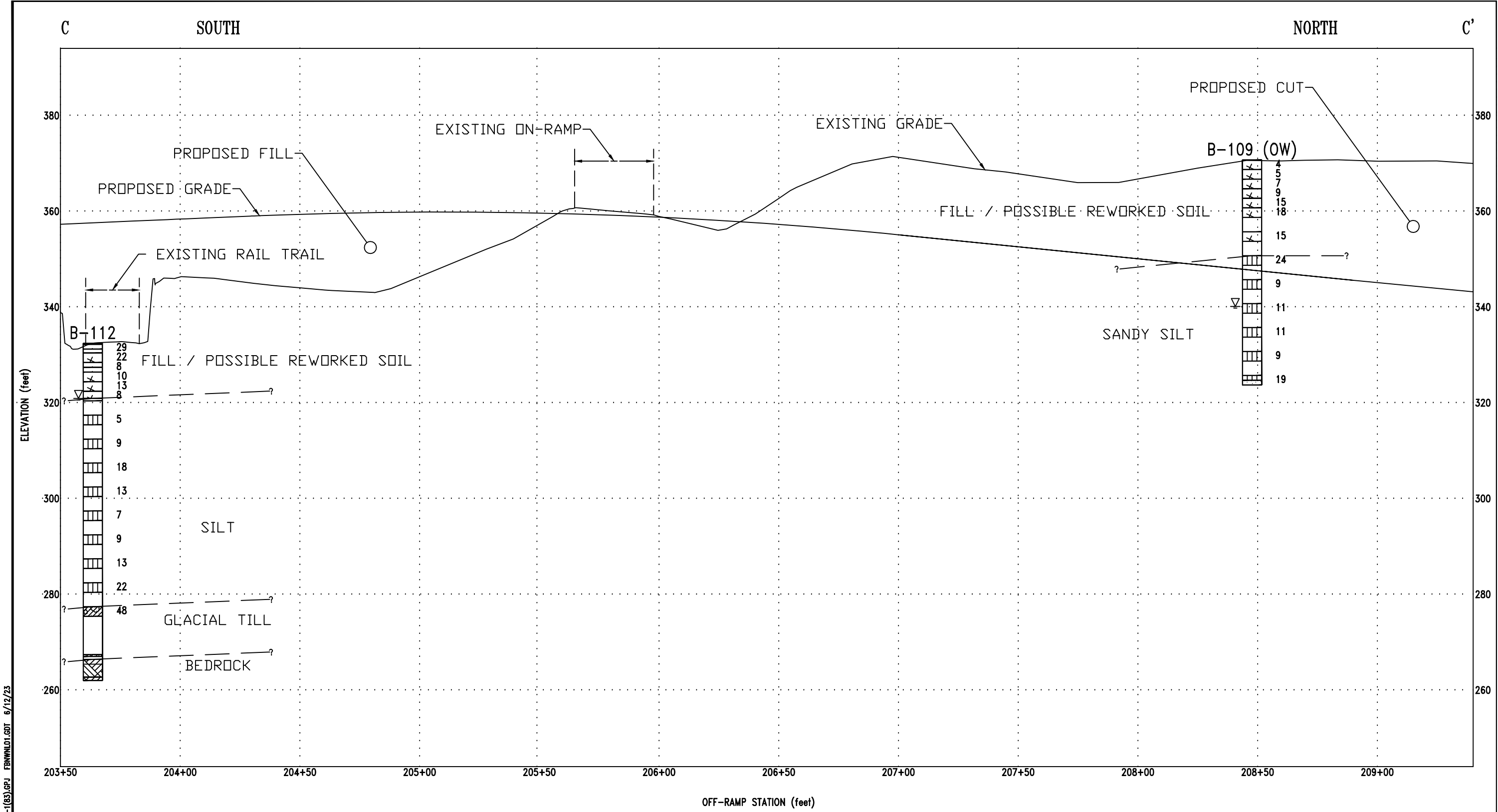
Reviewed By: JAG

**SUBSURFACE PROFILE
I-91 SOUTHBOUND (SB)**

Springfield, VT
Springfield IM 091-1(83)
GEODesign File No. 0750-12.18

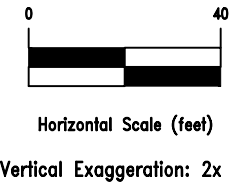
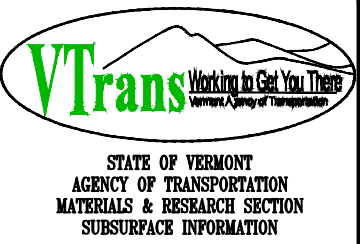
File No.: 0750-12.18

Figure No.: 4



GEO-VTRANS PROFILE SPRINGFIELD IM 091-1(83).GDT 6/12/23

GEO DESIGN
85 GRANITE SHED LANE
MONTPELIER, VT 05602
PHONE: 802-674-2033/FAX: 802-674-5943
WWW.GEOCOMPANIES.COM



- Notes:
1. Data concerning the various strata have been interpreted at boring locations only. The stratigraphy between borings may vary from that shown.
 2. Refer to plan view for subsurface profile location. For strata details and symbol legend, see Subsurface Profile Legend and boring logs appended to this report.
 3. Numbers displayed beside boring(s) represent SPT "N" values corresponding to their respective sampling interval. Where coring was performed, numbers represent Recovery and RQD values.

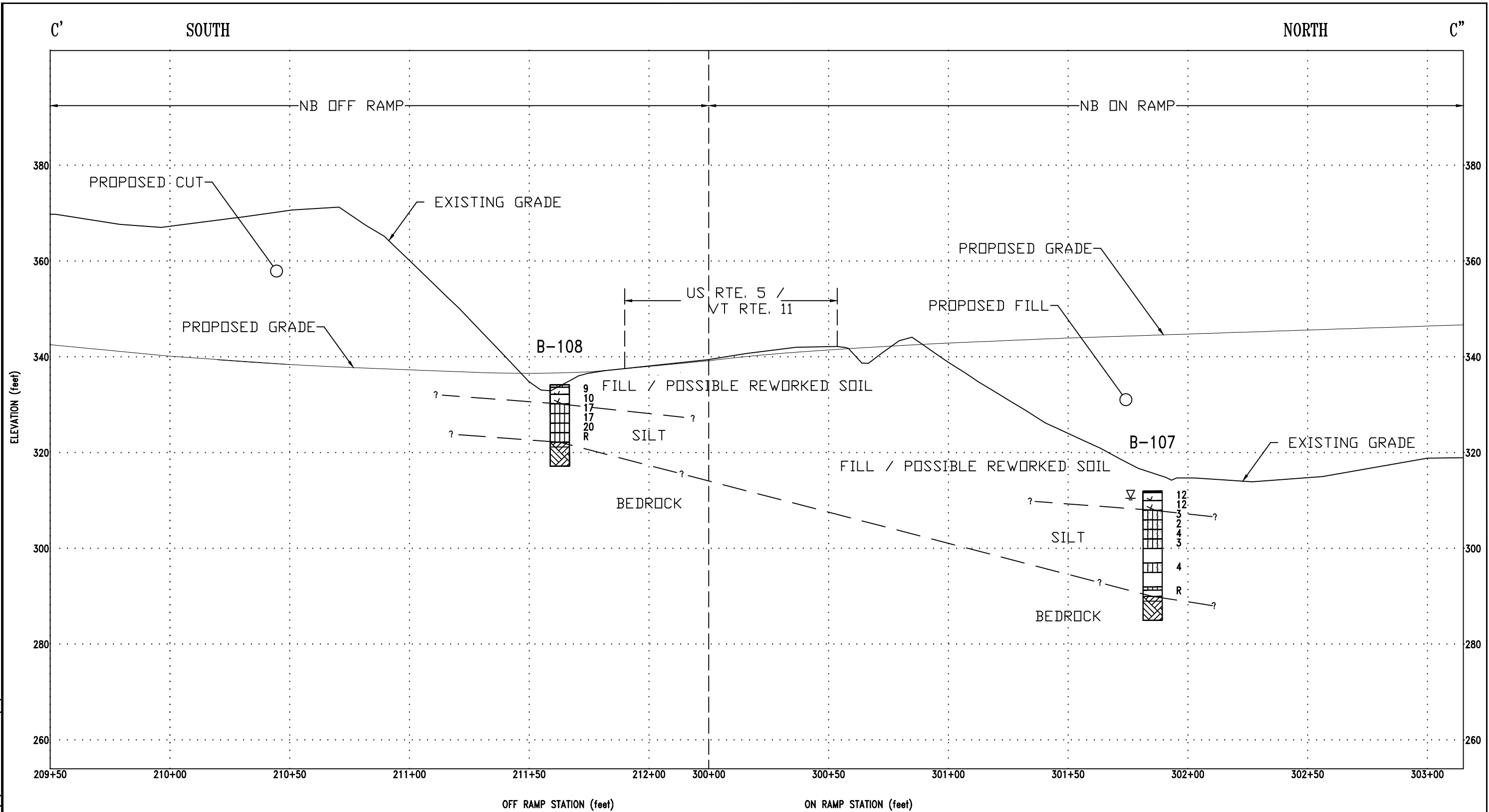
Date: 6/22/2023 Drawn By: BHA Reviewed By: JAG

**SUBSURFACE PROFILE
I-91 NORTHBOUND OFF RAMP**

Springfield, VT
Springfield IM 091-1(83)
GEODesign File No. 0750-12.18

File No.: 0750-12.18 Figure No.: 5

GEO-VTRANS PROFILE SPRINGFIELD IM 091-1(83).GDT 6/15/23



GEO DESIGN

85 GRANITE SHED LANE
MONTPELIER, VT 05602
PHONE: 802-674-2033/FAX: 802-674-5943
WWW.GEOCOMPANIES.COM



STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION



Horizontal Scale (feet)

Vertical Exaggeration: 2x

Notes:

1. Data concerning the various strata have been interpreted at boring locations only. The stratigraphy between borings may vary from that shown.
2. Refer to plan view for subsurface profile location. For strata details and symbol legend, see Subsurface Profile Legend and boring logs appended to this report.
3. Numbers displayed beside boring(s) represent SPT "N" values corresponding to their respective sampling interval. Where coring was performed, numbers represent Recovery and RQD values.

Date: 6/22/2023

Drawn By: BHA

Reviewed By: JAG

**SUBSURFACE PROFILE
I-91 NORTHBOUND (NB) ON & OFF RAMP**

Springfield, VT
Springfield IM 091-1(83)
GEODesign File No.0750-12.18

File No.: 0750-12.18

Figure No.: 6

APPENDIX B
BORING LOGS

EXPLANATION OF THE FORM - BORING LOG

The following provides an explanation of the various fields on the Boring Log form.

UPPER PORTION OF BORING LOG

Project and Boring Details

Within the upper portion of the Boring Log, details with regards to the Project Name and Location, Boring Number, and VTrans PIN number are provided. In addition, within the upper section of the Boring Log, the Boring Crew details - Driller (and name of the Drilling Company), together with the name of GeoDesign's representative, are presented. Details with regards to the dates when the boring was drilled, its coordinates or other location references and the corresponding surface elevation may also be provided.

Casing and Sampler

This section provides a summary of the typical size of samplers and casings used, together with the type of drilling rig. See below for a description of samplers. The type of drill rods and sampling hammer used is also provided in this section along with the hammer energy correction factor (C_2) to be used for converting N-values to N_{60} -Values.

Groundwater Observations

Water levels typically indicated on the Boring Log are levels measured in the boring at the date indicated. In permeable materials, the indicated levels may reflect the location of groundwater. In low permeability soils and/or due to effects of the casing, the accurate determination of groundwater levels may not be possible with only short term observations.

CENTRAL PORTION OF BORING LOG

DEPTH

This column gives the depth scale of the boring, in feet or meters.

STRATA

This column provides a graphical representation of the soil and bedrock units, and inferred geological contacts. See Subsurface Profile Legend. Stratification lines represent approximate boundaries between material types, transitions may be gradual.

SAMPLE INFORMATION

The initial columns provide the sample number, sample type, penetration, recovery and sample depth. The Sample Type Coding is as follows:

A - Auger Sample PS- Undisturbed Piston - 3" (76 mm) SSL - Large Split-Barrel - 3" (76 mm) V - Vane Test
C - Core - Diamond Bit - NX double tube, unless otherwise noted. SS - Split-Barrel (Split-Spoon) ST - Shelby Tube - 3" (76 mm)

Blows / 6 " (N Value)

Representative soil samples were obtained in the boring by split-barrel sampling procedures in general accordance with ASTM D 1586. The split-barrel sampling procedure utilizes a standard 51 mm (2") outside diameter split-barrel sampler that is driven into the bottom of the boring with a 63.5 kg (140-pound) hammer falling a distance of 0.76 m (30"). The number of blows required to advance the sampler in 0.15 m (6") increments is recorded as part of the Standard Penetration Test (SPT). These values are indicated at their depth of occurrence.

The number of blows required to advance the split-barrel sampler the middle two - 0.15 m (6") increments is recorded as the Standard Penetration Resistance Value ("N") and is listed in parenthesis.

Where the sampler advanced by Weight of Rods or Weight of Hammer, the designation WOR and WOH, respectively, was used.

Coring Time (Where Applicable)

This column provides the rate in minutes at which the core barrel was advanced into the bedrock (or boulder) in one foot (0.3 m) intervals.

Moisture Content % (Where Applicable)

This column provides moisture content determination results for the samples tested.

Gravel% / Sand% / Fines % (Where Applicable)

These columns provides the grain size breakdown per AASHTO M145 for the samples tested.

LL% / PI% (Where Applicable)

This column provides Liquid Limit and Plasticity Index results for the samples tested.

SAMPLE DESCRIPTION

This column provides a description of the soil and bedrock units, based on visual observation of the samples, sometimes in conjunction with field and laboratory tests. Each sample was generally described according to the following classification and terminology. In general, description of the soil units followed the Burmister classification system. AASHTO M145 Classifications where given are based on the results of laboratory testing.

SOIL PROPERTIES & DESCRIPTIONS

TEXTURE*		COMPOSITION		COHESIVE SOILS		COHESIONLESS SOILS	
Component	Size (mm)			ESTIMATED CONSISTENCY	"N"	ESTIMATED	"N"
CLAY	< 0.002 mm	Principal Component in Upper Case i.e. >50%		CLASSIFICATION ***	Value	COMPACTNESS	Value
SILT	< #200 Sieve (0.075 mm)	CLAY, SILT, SAND, GRAVEL, COBBLES, BOULDERS		Very Soft	< 2	DESCRIPTION ***	
SAND	#200 to #4 Sieve (0.075 mm to 4.75 mm)	Minor Component Upper and Lower Case i.e.<50%		Soft	2 - 4	Very Loose	< 4
	Fine #200 to #40 Sieve (0.075 mm to 0.425 mm)	Clay, Silt, Sand, Gravel, Cobbles, Boulders		Medium	4 - 8	Loose	4 - 10
	Medium #40 to #10 Sieve (0.425 mm to 2.00 mm)	DESCRIPTIVE ADJECTIVE	PERCENTAGE REQUIREMENT	Stiff	8 - 15	Medium Dense	10 - 30
	Coarse #10 to #4 Sieve (2.00 mm to 4.75 mm)			Very Stiff	15 - 30	Dense	30 - 50
GRAVEL	#4 Sieve to 3 in (4.75 mm to 76 mm)	trace	<10 %	Hard	> 30	Very Dense	> 50
	Fine #4 Sieve to 3/4 in (4.75 mm to 19 mm)	little	10 - 20 %				
		some	20 - 35 %				
	Coarse 3/4 in to 3 in (19 mm to 76 mm)	and	35 - 50 %				
				PLASTICITY - Burmister		STRUCTURE	
				Degree of Plasticity	Soil Type	Smallest Diameter of Thread**	
				Non-Plastic	SILT	None	Stratified, >6 mm (1/4")
COBBLES	3 in to 12 in (76 mm to 305 mm)	Dry	Absence of moisture, dusty	Slight	Clayey SILT	1/4" (6 mm)	Laminated, < 6 mm (1/4")
BOULDERS	> 12 in (305 mm)	Moisture	Damp but no visible water	Low	SILT & CLAY	1/8" (3 mm)	Parting, 0 to 1.6 mm (1/16")
		Wet	Visible free water	Medium	CLAY & SILT	1/16" (1.6 mm)	Seam, 1.6 to 13 mm (1/2")
				High	Silty CLAY	1/32" (0.8 mm)	Layer, 13 to 305 mm (12")
				Very High	CLAY	1/64" (0.4 mm)	Stratum, > 305 mm (12")
*textural classification as determined by sieve and hydrometer analyses				** moisture at or near optimum			

*textural classification as determined by sieve and hydrometer analyses

BEDROCK PROPERTIES & DESCRIPTIONS

RECOVERY AND ROCK QUALITY DESIGNATION (RQD)		HARDNESS		Moh's Hardness			
Recovery is defined as the length of core obtained expressed as a percentage of the total length cored.							
RQD is defined as the total length of sound core pieces, 4 inches (100 mm) or greater in length, excluding drilling breaks, expressed as a percentage of the total length cored. RQD provides an indication of the integrity of the rock mass and relative extent of seams and bedding planes.							
Classification		RQD %		TYPICAL ROCK TYPES			
Very Poor Quality		0 - 25		Hard	Cannot be scratched with knife	Scale	> 5.5
Poor Quality		25 - 50		Moderately Hard	Can scratch with knife but not fingernail		5.5 - 2.5
Fair Quality		50 - 75		Soft	Can be scratched with fingernail		< 2.5
Good Quality		75 - 90		SANDSTONE			
Excellent Quality		90 - 100		Well Cemented	Capable of scratching a knife blade		5.5 - 2.5
				Cemented	Can be scratched with knife		< 2.5
				Poorly Cemented	Can be broken apart easily with fingers		
WEATHERING		SPACING OF DISCONTINUITIES					
Fresh	No visible signs of weathering	Bedding	Jointing	Spacing (inches)	Spacing (mm)		
Slightly Weathered	Slight discoloration of parent material in joints and seams	Very Thick Bedded	Very Wide	>80	>2000		
Moderately Weathered	Less than 35% of rock material is decomposed.	Thick Bedded	Wide	24 - 80	600 - 2000		
	Fresh or discolored rock is present.	Medium Bedded	Moderate	8 - 24	200 - 600		
	More than 35% of rock material is decomposed.	Thin Bedded	Close	2.4 - 8	60 - 200		
Highly Weathered	Fresh or discolored rock is present.	Very Thin Bedded	Very Close	0.8 - 2.4	20 - 60		
Extremely Weathered	All rock material is decomposed to soil. Rock mass structure may still be intact.	Laminated	Shattered	0.24 - 0.8	6 - 20		
		Thinly Laminated	Fissured	<0.24	<6		

When classification of rock materials has been estimated from disturbed samples, core samples and petrographic analysis may reveal other rock types.

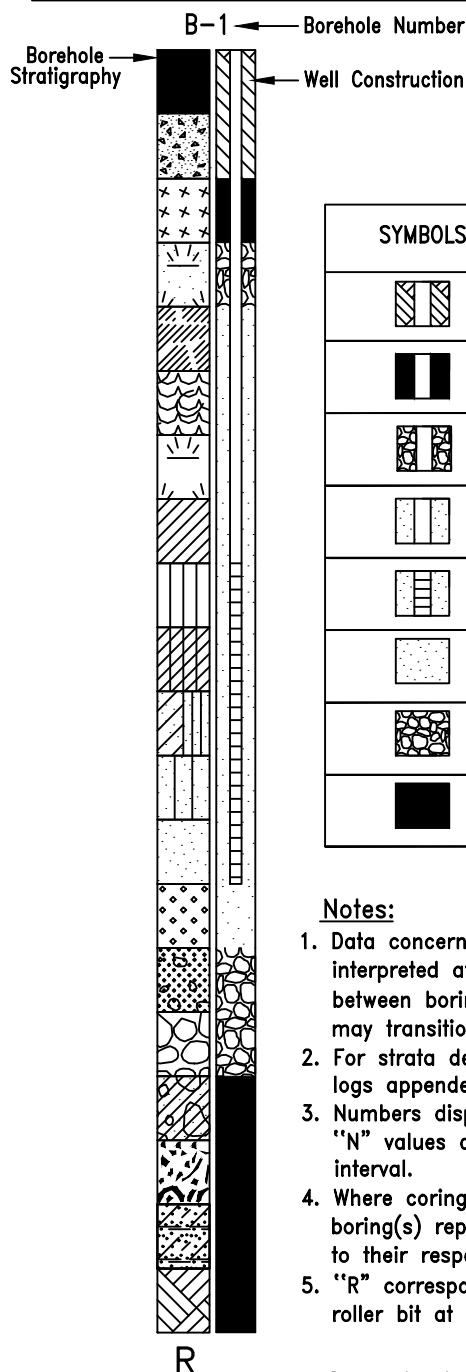
BOTTOM PORTION OF BORING LOG

The lower portion of the log provides borehole termination depth, termination criteria, and additional drilling notes within the Remarks section.

STRATIGRAPHY SYMBOLS

SYMBOLS	TYPICAL DESCRIPTIONS OF PREDOMINANT MATERIAL TYPE
	ASPHALT
	CONCRETE
	FILL
	TOPSOIL
	SUBSOIL
	ORGANIC SILT OR CLAY WITH SHELLS
	PEAT
	CLAY
	SILT
	CLAY/SILT MIXTURE
	CLAY/SILT/SAND MIXTURE
	SANDY SILT
	SILTY SAND
	POORLY-GRADED SAND
	WELL-GRADED SAND
	SAND/SILT/GRAVEL MIXTURE
	BOULDERS AND/OR COBBLES
	GLACIAL TILL
	WEATHERED BEDROCK
	BEDROCK

EXPLANATION OF BORING



WELL SYMBOLS

SYMBOLS	TYPICAL DESCRIPTIONS
	CEMENT SEAL: 1 PIPE
	BENTONITE SEAL: 1 PIPE
	SLOUGH BACKFILL: 1 PIPE
	FILTER PACK: 1 PIPE
	SLOTTED PIPE WITH FILTER PACK: 1 PIPE
	FILTER PACK AT BOTTOM OF HOLE
	SLOUGH AT BOTTOM OF HOLE
	BENTONITE AT BOTTOM OF HOLE

Notes:

1. Data concerning the various strata have been interpreted at boring locations only. The stratigraphy between borings may vary from that shown, and may transition more gradually within borings.
2. For strata details, see Report and boring logs appended to this report.
3. Numbers displayed beside boring(s) represent SPT "N" values corresponding to their respective sampling interval.
4. Where coring was performed, numbers displayed beside boring(s) represent Recovery and RQD values corresponding to their respective sampling interval.
5. "R" corresponds to refusal of sampler, casing and/or roller bit at bottom of boring.

Groundwater Observations (where applicable)

- ▽ Water Level Reading at time of drilling.
- ▼ Water Level Reading after completing drilling.

GEO DESIGN

85 GRANITE SHED LANE
MONTPELIER, VT 05602
PHONE: 802-674-2033/FAX: 802-674-5943
WWW.GEOCOMPANIES.COM

BORING LOG / SUBSURFACE PROFILE LEGEND



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-101**
Page No.: 1 of 3
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 4/19/23 Date Finished: 4/19/23
VTSPG NAD83: N 279330.2 ft E 1658223.3 ft
Station: 12199+54.1 Offset: 22.3' L
Ground Elevation: 363.1 ft

Casing: FJ Sampler: SS
Type: I.D.: 4 in 1.5 in
Hammer Wt: 140 lb. 140 lb.
Hammer Fall: 30 in. 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
04/19/23	20.0	Wet sample
04/20/23	26.5	In open hole

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
5	× × ×	S1 (0' - 2'): Loose, brownish gray fine to coarse SAND, some fine to coarse Gravel, little Silt, trace Organics, moist. Rec. = 0.7 ft				2-3-4-3 (7)						
		S2 (2' - 4'): Loose, tan fine to medium SAND, some Silt, trace Organics, moist. Rec. = 0.9 ft (A-2-4.)				2-2-5-6 (7)		1.0	72.3	26.7	NP	NP
		S3 (5' - 7'): Medium dense, tan fine to coarse SAND, some Silt, moist. Rec. = 1.4 ft				6-5-5-4 (10)						
		S4 (7' - 9'): Medium dense fine to coarse SAND, little Silt, little fine to coarse Gravel, moist. Rec. = 1.6 ft				4-6-6-6 (12)						
10		S5 (10' - 12'): Medium dense, olive-brown fine to medium SAND and SILT, moist. Rec. = 1.5 ft				16-8-4-5 (12)						
15		S6 (15' - 17'): Loose, olive-tan SILT, little fine Sand, moist. Rec. = 1.4 ft (A-4.)				2-2-7-6 (9)			11.4	88.6	NP	NP
20		S7 (20' - 22'): Medium dense, gray SILT, little fine Sand, wet. Rec. = 0.0 ft				5-6-8-9 (14)						
25		S8 (25' - 27'): Medium dense, gray SILT, little fine Sand, wet. Rec. = 0.9 ft				4-7-8-7 (15)						
30		S9 (30' - 32'): Medium dense, olive-gray SILT, trace fine Sand, wet. Rec. = 1.7 ft (A-4.)				6-6-7-10 (13)			1.3	98.7	NP	NP
35		S10 (35' - 37'): Medium dense, olive-gray SILT, little fine Sand, wet. Rec. = 1.7 ft				6-5-7-10 (12)						

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-101**
Page No.: 2 of 3
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 4/19/23 Date Finished: 4/19/23
VTSPG NAD83: N 279330.2 ft E 1658223.3 ft
Station: 12199+54.1 Offset: 22.3' L
Ground Elevation: 363.1 ft

Type:	Casing	Sampler	Groundwater Observations		
	FJ	SS	Date	Depth (ft)	Notes
I.D.:	4 in	1.5 in	04/19/23	20.0	Wet sample
Hammer Wt:	140 lb.	140 lb.	04/20/23	26.5	In open hole
Hammer Fall:	30 in.	30 in.			
Hammer/Rod Type:	Auto				
Rig: Diedrich D-50 Track		C _E = 1.52			

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
		S11 (40' - 42'): Medium dense, olive-gray SILT, little fine Sand, wet. Rec. = 1.6 ft				6-5-6-8 (11)						
45		S12 (45' - 47'): Medium dense, olive-gray SILT, little fine Sand, wet. Rec. = 1.3 ft				7-6-6-6 (12)						
50		S13 (50' - 52'): Medium dense, olive-gray SILT, little fine Sand, wet. Rec. = 2.0 ft				4-6-6-7 (12)						
55		S14 (55' - 57'): Medium dense, olive-gray SILT, little fine Sand, wet. Rec. = 1.6 ft				5-6-6-10 (12)						
60		S15 (60' - 62'): Medium dense, olive-gray SILT, trace fine Sand, wet. Rec. = 1.3 ft				7-12-14-20 (26)						
65		S16 (65' - 66.8'): Very dense, gray SILT and fine to coarse SAND, some fine to coarse Gravel, moist. Rec. = 1.5 ft				18-29-35-50/4" (64)						
70		S17 (70' - 71.3'): Very dense, gray SILT, some fine Gravel, some fine to coarse Sand, moist. Rec. = 1.3 ft				16-42-50/4" (R)						
75		S18 (75' - 76.9'): Very dense, gray SILT and fine to coarse SAND, little fine Gravel moist. Rec. = 1.1 ft (A-4.)				33-44-67/5" (R)		19.0	31.4	49.6	NP	NP
		79.0 ft to 80.8 ft, C1: Poor Quality, moderately hard,	C1	73	2							

Top of Bedrock @ 76.9 ft

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-101**
Page No.: 3 of 3
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 4/19/23 Date Finished: 4/19/23
VTSPG NAD83: N 279330.2 ft E 1658223.3 ft
Station: 12199+54.1 Offset: 22.3' L
Ground Elevation: 363.1 ft

Casing Sampler
Type: FJ SS
I.D.: 4 in 1.5 in
Hammer Wt: 140 lb. 140 lb.
Hammer Fall: 30 in. 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
04/19/23	20.0	Wet sample
04/20/23	26.5	In open hole

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/ft (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
85		slightly weathered, very closely to closely jointed, dark gray, PHYLLITE, fracturing +/- 45 degrees. NQ2	C2	(45)	2							
		80.8 ft to 83.0 ft, C2: Fair Quality, moderately hard, slightly weathered, shattered to closely jointed, dark gray, PHYLLITE, fracturing +/- 45 degrees. NQ2		100 (65)	0							
		83.0 ft to 85.6 ft, C3: Poor Quality, moderately hard, slightly weathered, very closely to closely jointed, dark gray, PHYLLITE, fracturing +/- 45 degrees. NQ2	C3	71 (45)	2							
		85.6 ft to 89.0 ft, C4: Fair Quality, moderately hard, slightly weathered, very closely to moderately jointed, dark gray, PHYLLITE, fracturing +/- 45 degrees. NQ2		88 (56)	1							
			C4		2							
					2							
					2							
					2							
					2							
					2							
90		Hole stopped @ 89.0 ft										
95		Remarks: 1) Boring advanced using drive and wash methods; sample moisture description may be influenced by drilling method. 2) Driller noted hard drilling at ~62.5'. 3) Driller assumed weathered rock at ~76.9'-79', medium resistance before bit refusal. 4) Telescoped 3" casing through 4" casing to 79' deep, seated on rock. Began coring rock at 79'. 5) Mica/metallica sheen on wash water at ~80'. 6) Visual descriptions are based on Modified Burmister system. Laboratory gradations (% gravel, sand, and silt as applicable) are per AASHTO M145.										
100												
105												
110												
115												

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-102**
Page No.: 1 of 3
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 4/21/23 Date Finished: 4/21/23
VTSPG NAD83: N 279353.6 ft E 1658338.4 ft
Station: 22200+18.8 Offset: 28.2' L
Ground Elevation: 361.5 ft

Casing Sampler
Type: FJ SS
I.D.: 4 in 1.5 in
Hammer Wt: 140 lb. 140 lb.
Hammer Fall: 30 in. 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
04/21/23	11.5	Wet sample
04/25/23	11.6	In open hole

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
5	× × ×	S1 (0' - 2'): Loose, orange-brown fine to coarse SAND, little Silt, little fine Gravel, trace Organics, moist. Rec. = 1.7 ft				1-1-3-7 (4)						
	× × ×	S2 (2' - 4'): Medium dense, gray and orange-brown fine to coarse SAND, little fine Gravel, trace Silt, moist. Rec. = 1.7 ft (A-1-b.)				6-8-9-9 (17)		24.2	69.0	6.8	NP	NP
	× × ×					6-6-5-5 (11)						
	× × ×					5-6-6-6 (12)						
	× × ×											
10		S3 (5' - 7'): Medium dense, fine to medium SAND, little Silt, moist. Rec. = 1.2 ft										
		S4 (7' - 9'): Medium dense, fine to medium SAND, little Silt, moist. Rec. = 1.6 ft										
15		S5 (10' - 12'): Loose, light brown fine to medium SAND, some Silt, moist (bottom 5" of spoon wet). Rec. = 1.7 ft				5-5-4-5 (9)						
20		S6 (15' - 17'): Loose, light brown Silt, little fine Sand, wet. Rec. = 1.3 ft (A-4.)				5-4-4-5 (8)			18.1	81.9	NP	NP
25		S7 (20' - 22'): Loose, gray SILT and fine SAND, trace fine Gravel, wet. Rec. = 1.5 ft				4-3-5-5 (8)						
30		S8 (25' - 27'): Medium dense, gray SILT, some fine Sand, wet. Rec. = 1.6 ft				4-5-6-5 (11)						
35		S9 (30' - 32'): Medium dense, gray SILT and fine SAND, wet. Rec. = 0.8 ft				7-8-7-10 (15)						
		S10 (35' - 37'): Medium dense, gray SILT and fine SAND, wet. Rec. = 1.7 ft				5-7-6-7 (13)						

Notes:

- Stratification lines represent approximate boundary between material types. Transition may be gradual.
- N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
- Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-102**
Page No.: 2 of 3
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 4/21/23 Date Finished: 4/21/23
VTSPG NAD83: N 279353.6 ft E 1658338.4 ft
Station: 22200+18.8 Offset: 28.2' L
Ground Elevation: 361.5 ft

Casing Sampler
Type: FJ SS
I.D.: 4 in 1.5 in
Hammer Wt: 140 lb. 140 lb.
Hammer Fall: 30 in. 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
04/21/23	11.5	Wet sample
04/25/23	11.6	In open hole

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
		S11 (40' - 42'): Medium dense, gray SILT, trace fine Sand, wet. Rec. = 1.4 ft (A-4.)				5-6-7-7 (13)		0.2	6.3	93.5	NP	NP
45		S12 (45' - 47'): Medium dense, gray SILT and fine SAND, wet. Rec. = 1.3 ft				5-5-8-11 (13)						
50		S13 (50' - 52'): Loose, gray SILT and fine SAND, wet. Rec. = 1.8 ft				4-3-3-4 (6)						
55		S14 (55' - 57'): Medium dense, SILT, little fine Sand, wet. Rec. = 1.8 ft				4-5-5-9 (10)						
60		S15 (60' - 62'): Medium dense, gray SILT, some fine Sand, wet. Rec. = 1.5 ft				5-5-5-6 (10)						
65		S16 (65' - 67'): Medium dense, gray SILT, some fine Sand, wet. Rec. = 1.6 ft				5-5-8-11 (13)						
70		S17 (70' - 72'): Medium dense, gray SILT and fine SAND, wet. Rec. = 1.6 ft				7-5-9-14 (14)						
75		S18 (75' - 77'): Medium dense, SILT, some fine Sand, wet. Rec. = 1.4 ft				10-12-14-17 (26)						

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GEODESIGN BORING LOG SPRINGFIELD IM 091-1(83).GPJ VERMONT AOT.GDT 6/22/23



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-102**

Page No.: 3 of 3

Pin No.: 12a574

Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign

Date Started: 4/21/23 Date Finished: 4/21/23

VTSPG NAD83: N 279353.6 ft E 1658338.4 ft

Station: 22200+18.8 Offset: 28.2' L

Ground Elevation: 361.5 ft

Type:	Casing	Sampler	Groundwater Observations		
	FJ	SS	Date	Depth (ft)	Notes
I.D.:	4 in	1.5 in			
Hammer Wt:	140 lb.	140 lb.	04/21/23	11.5	Wet sample
Hammer Fall:	30 in.	30 in.	04/25/23	11.6	In open hole
Hammer/Rod Type:	Auto				
Rig:	Diedrich D-50 Track	C _E = 1.52			

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
		S19 (80' - 82'): Medium dense, SILT, little fine Sand, wet. Rec. = 1.3 ft (A-4.)				10-7-8-13 (15)			13.4	86.6	NP	NP
85		S20 (85' - 87'): Medium dense, gray SILT, some fine Sand, wet. Rec. = 1.7 ft				10-11-10-15 (21)						
90		S21 (90' - 92'): Dense, gray SILT and fine to coarse SAND, some fine to coarse Gravel. Rec. = 1.0 ft				7-15-30-28 (45)						
		Top of Bedrock @ 92.7 ft										
95		94.0 ft to 95.9 ft, C1: Very poor Quality, moderately hard, moderately weathered, shattered, dark gray, PHYLLITE. NQ2	C1	39 (0)	2							
		95.9 ft to 97.5 ft, C2: Very poor Quality, moderately hard, slightly weathered, very closely jointed, dark gray, PHYLLITE. NQ2	C2	100 (0)	0							
		97.5 ft to 99.7 ft, C3: Very poor Quality, moderately hard, slightly weathered, very closely to closely jointed, dark gray, PHYLLITE, fracturing +/- 30-45 degrees. NQ2	C3	77 (15)	1							
100		Hole stopped @ 99.7 ft			3							
					1							
105												
110												
115												

Remarks:

- 1) Boring advanced using drive and wash methods; sample moisture description may be influenced by drilling method.
- 2) Driller noted hard drilling at ~75'.
- 3) Hard drilling into assumed rock at ~92.7', roller bit advanced to 94'.
- 4) Telescoped 3" casing through 4" casing to 94' deep, seated on rock prior to coring. Began coring rock at 94'.
- 5) Losing water at C2, mica/metallic sheen on wash water before loss of water.
- 6) Visual descriptions are based on Modified Burmister system. Laboratory gradations (% gravel, sand, and silt as applicable) are per AASHTO M145.

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GEODESIGN BORING LOG SPRINGFIELD IM 091-1(83).GPJ VERMONT AOT.GDT 6/22/23



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-103**

Page No.: 1 of 2

Pin No.: 12a574

Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign

Date Started: 4/25/23 Date Finished: 4/26/23

VTSPG NAD83: N 279458.7 ft E 1658218.8 ft

Station: 12200+84.3 Offset: 26.6' L

Ground Elevation: 340.0 ft

Casing FJ Sampler SS
Type: I.D.: 4 in 1.5 in
Hammer Wt: 140 lb. 140 lb.
Hammer Fall: 30 in. 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
04/25/23	15.0	Wet sample

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
5	X X X	2" Pavement				4-3-9-11 (12)						
	X X X	S1 (0' - 2'): Medium dense, brown fine to coarse SAND, little Silt, trace fine Gravel, moist. Rec. = 0.5 ft				14-11-8-11 (19)		5.7	83.4	10.9	NP	NP
	X X X	S2 (2' - 4'): Medium dense, light brown fine to medium SAND, little Silt, trace fine Gravel, moist. Rec. = 0.8 ft (A-2-4.)										
	X X X	S3 (5' - 7'): Medium dense, brown and gray fine to coarse SAND, some Silt, trace fine Gravel, moist. Rec. = 0.7 ft				5-7-12-8 (19)						
10		S4 (7' - 9'): Loose, olive gray SILT, some fine Sand, moist. Rec. = 0.5 ft				5-4-4-4 (8)						
		S5 (10' - 12'): Medium dense, brownish gray SILT, trace fine to medium Sand, moist. Rec. = 1.3 ft (A-4.)				7-6-7-9 (13)			2.0	98.0	NP	NP
15		S6 (15' - 17'): Medium dense, brownish gray SILT and fine SAND, wet. Rec. = 1.1 ft				6-7-5-7 (12)						
20		S7 (20' - 22'): Loose, gray SILT, some fine Sand, trace fine Gravel, wet. Rec. = 1.6 ft				4-4-5-8 (9)						
25		S8 (25' - 27'): Loose, olive-gray SILT and fine SAND, wet. Rec. = 1.4 ft				4-4-5-7 (9)						
30		S9 (30' - 32'): Loose, olive-gray SILT, trace fine to coarse Sand, wet. Rec. = 1.2 ft (A-4.)				3-5-6-9 (11)		0.4	1.0	98.6	NP	NP
35		S10 (35' - 37'): Loose, gray SILT, little fine Sand, wet. Rec. = 1.4 ft				4-4-4-7 (8)						

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-103**
Page No.: 2 of 2
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 4/25/23 Date Finished: 4/26/23
VTSPG NAD83: N 279458.7 ft E 1658218.8 ft
Station: 12200+84.3 Offset: 26.6' L
Ground Elevation: 340.0 ft

Type:	Casing	Sampler	Groundwater Observations		
	FJ	SS	Date	Depth (ft)	Notes
I.D.:	4 in	1.5 in	04/25/23	15.0	Wet sample
Hammer Wt:	140 lb.	140 lb.			
Hammer Fall:	30 in.	30 in.			
Hammer/Rod Type:	Auto				
Rig:	Diedrich D-50 Track				
		$C_E = 1.52$			

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
		S11 (40' - 42'): Medium dense, gray SILT, little fine Sand, wet. Rec. = 1.7 ft				4-6-5-4 (11)						
45		S12 (45' - 47'): Loose, gray SILT, little fine Sand, wet. Rec. = 1.7 ft				4-3-4-4 (7)						
50		S13 (50' - 52'): Dense, SILT and fine to coarse SAND, trace fine Gravel, moist. Rec. = 1.6 ft (A-4.)				8-12-18-18 (30)		13.9	37.0	49.1	NP	NP
55												
		S14 (57' - 59'): Very dense, fine to coarse GRAVEL and fine to coarse SAND, some Silt, wet. Rec. = 1.5 ft				34-25-28-35 (53)						
60		60.0 ft to 65.0 ft, C1: Good Quality, moderately hard, slightly weathered, very closely to closely jointed, dark gray, PHYLLITE, fracturing +/- 30-45 degrees. NQ2	C1	95 (77)	1							
					2							
					2							
					3							
65		65.0 ft to 66.0 ft, C2: Poor Quality, moderately hard, slightly weathered, very closely to closely jointed, dark gray, PHYLLITE, fracturing +/-30-45 degrees. NQ2	C2	66 (33)	2							
		66.0 ft to 70.0 ft, C3: Poor Quality, moderately hard, slightly to moderately weathered, shattered to very closely jointed, dark gray, PHYLLITE, fracturing +/-30-45 degrees. With white quartz seam. NQ2	C3	94 (25)	1							
					2							
					2							
70		Hole stopped @ 70.0 ft			4							
75		Remarks: 1) 2" Asphalt at top of boring. 2) Driller noted hard drilling at 48.5'. 3) Assumed boulder at 55', roller bit advanced to 57' prior to rock coring. 4) Driller noted hard drilling at 59.5'. 5) Thick gray metallic film over wash water beginning at 62'. 6) Visual descriptions are based on Modified Burmister system. Laboratory gradations (% gravel, sand, and silt as applicable) are per AASHTO M145.										

Notes: 1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GEODESIGN BORING LOG SPRINGFIELD IM 091-1(83).GPJ VERMONT AOT.GDT 7/13/23



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-104**
Page No.: 1 of 3
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 4/26/23 Date Finished: 4/27/23
VTSPG NAD83: N 279494.7 ft E 1658421.7 ft
Station: 22201+68.1 Offset: 38.7' R
Ground Elevation: 339.4 ft

Type:	Casing	Sampler	Groundwater Observations		
	FJ	SS	Date	Depth (ft)	Notes
I.D.:	4 in	1.5 in	04/26/23	15.0	Wet sample
Hammer Wt:	140 lb.	140 lb.			
Hammer Fall:	30 in.	30 in.			
Hammer/Rod Type:	Auto				
Rig:	Diedrich D-50 Track	C _E = 1.52			

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
5	X X X	3" Pavement (A-1-a.)				7-11-12-14 (23)		67.8	24.8	7.4	NP	NP
	X X X	S1 (0' - 2'): Medium dense, gray fine to coarse GRAVEL, some fine to coarse Sand, trace Silt, moist. Rec. = 0.7 ft				14-12-8-9 (20)						
	X X X	S2 (2' - 4'): Medium dense, gray fine to coarse SAND and fine to coarse GRAVEL, some Silt, moist. Rec. = 0.7 ft				7-7-7-9 (14)						
	X X X	S3 (5' - 7'): Medium dense, brown fine to coarse SAND, little Silt, trace fine Gravel, moist. (bottom 1.5" and tip gray Silt transition to assumed natural soil) Rec. = 1.3 ft				7-6-7-9 (13)			3.0	97.0	NP	NP
10		S4 (7' - 9): Medium dense, gray SILT, trace fine SAND, moist. Rec. = 1.3 ft (A-4.)				4-4-4-5 (8)						
		S5 (10' - 12'): Loose, gray SILT and fine SAND, moist. Rec. = 1.4 ft										
15		S6 (15' - 17'): Loose, olive-gray SILT, some fine Sand, wet. Rec. = 1.3 ft				4-5-4-7 (9)						
20		S7 (20' - 22'): Medium dense, gray SILT and fine Sand, wet. Rec. = 1.3 ft				4-5-6-6 (11)						
25		S8 (25' - 27'): Loose, gray SILT, some fine Sand, wet. Rec. = 1.5 ft				4-4-3-5 (7)						
30		S9 (30' - 32'): Loose, gray SILT, little fine Sand, wet. Rec. = 1.5 ft				4-3-3-3 (6)						
35		S10 (35' - 37'): Loose, gray SILT, trace fine Sand, wet. Rec. = 1.7 ft (A-4.)				3-3-3-3 (6)			8.4	91.6	NP	NP

Notes:

- Stratification lines represent approximate boundary between material types. Transition may be gradual.
- N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
- Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
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BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-104**

Page No.: 2 of 3

Pin No.: 12a574

Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign

Date Started: 4/26/23 Date Finished: 4/27/23

VTSPG NAD83: N 279494.7 ft E 1658421.7 ft

Station: 22201+68.1 Offset: 38.7' R

Ground Elevation: 339.4 ft

Type:	Casing	Sampler	Groundwater Observations		
	FJ	SS	Date	Depth (ft)	Notes
I.D.:	4 in	1.5 in	04/26/23	15.0	Wet sample
Hammer Wt:	140 lb.	140 lb.			
Hammer Fall:	30 in.	30 in.			
Hammer/Rod Type:	Auto				
Rig:	Diedrich D-50 Track	C _E = 1.52			

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
		S11 (40' - 42'): Medium dense, gray SILT, little fine Sand, wet. Rec. = 1.6 ft				3-6-6-8 (12)						
45		S12 (45' - 47'): Medium dense, gray SILT, some fine Sand, wet. Rec. = 1.4 ft				4-5-5-7 (10)						
50		S13 (50' - 52'): Loose, gray SILT, little fine Sand, wet. Rec. = 1.6 ft				4-4-4-5 (8)						
55		S14 (55' - 57'): Medium dense SILT, trace fine Sand, wet. Rec. = 1.6 ft (A-4.)				5-5-6-7 (11)		0.4	5.9	93.7	NP	NP
60		S15 (60' - 62'): Dense, gray fine to coarse Gravel and SILT, little fine to coarse Sand, moist. Rec. = 0.6 ft				8-9-21-24 (30)						
		Top of Bedrock @ 62.8 ft										
65		64.0 ft to 67.1 ft, C1: Good Quality, gray, fresh, moderately hard, closely to moderately jointed, PHYLLITE, fracturing +/- 45-60 degrees. NQ2	C1	92 (85)	2							
		67.1 ft to 71.1 ft, C2: Excellent Quality, gray, fresh, moderately hard, closely to moderately jointed, PHYLLITE, fractures +/- 45-60 degrees. NQ2	C2	95 (92)	1							
70		71.1 ft to 74.1 ft, C3: Excellent Quality, gray, fresh, moderately hard, closely to moderately jointed, PHYLLITE, fractures +/- 45-60 degrees. NQ2	C3	100 (100)	2							
75		Hole stopped @ 74.1 ft										
		Remarks: 1) 3" Asphalt at top of boring. 2) Rig chatter at 58'. 3) Hard drilling at 62.8'. Roller bit advanced to 64' prior to rock coring.										

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-104**
Page No.: 3 of 3
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 4/26/23 Date Finished: 4/27/23
VTSPG NAD83: N 279494.7 ft E 1658421.7 ft
Station: 22201+68.1 Offset: 38.7' R
Ground Elevation: 339.4 ft

	Casing	Sampler
Type:	FJ	SS
I.D.:	4 in	1.5 in
Hammer Wt:	140 lb.	140 lb.
Hammer Fall:	30 in.	30 in.
Hammer/Rod Type:	Auto	
Rig:	Diedrich D-50 Track	C _E = 1.52

Groundwater Observations

Date	Depth (ft)	Notes
04/26/23	15.0	Wet sample

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
85		4) Core barrel plugged at 67.1' and 71.1' during coring. 5) Visual descriptions are based on Modified Burmister system. Laboratory gradations (% gravel, sand, and silt as applicable) are per AASHTO M145.										
90												
95												
100												
105												
110												
115												

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-105**

Page No.: 1 of 3

Pin No.: 12a574

Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign

Date Started: 4/17/23 Date Finished: 4/19/23

VTSPG NAD83: N 279568 ft E 1658214.4 ft

Station: 12201+97.1 Offset: 23.9' L

Ground Elevation: 363.2 ft

Type:	Casing	Sampler	Groundwater Observations		
	FJ	SS	Date	Depth (ft)	Notes
I.D.:	4 in	1.5 in	04/17/23	20.1	In open hole
Hammer Wt:	140 lb.	140 lb.	04/17/23	21.3	Wet Sample
Hammer Fall:	30 in.	30 in.			
Hammer/Rod Type:	Auto	Auto			
Rig:	Diedrich D-50 Track	C _E = 1.52			

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
5	× × ×	S1 (0' - 2'): Very loose, tan fine to medium SAND, some Silt, trace Organics, moist. Rec. = 1.3 ft				1-1-1-3 (2)						
	× × ×					4-4-5-4 (9)						
	× × ×	S2 (2' - 4'): Loose, tan fine to coarse SAND, some Silt, trace fine Gravel, trace Organics, moist. Rec. = 1.7 ft										
	× × ×											
10	× × ×	S3 (5' - 7'): Medium dense, tan to light brown fine to medium SAND, little Silt, trace fine Gravel, moist. Rec. = 2.0 ft (A-3.)				7-6-7-9 (13)		9.8	80.1	10.1	NP	NP
	× × ×					8-7-7-7 (14)		30.6	62.9	6.5	NP	NP
	× × ×	S4 (7' - 9'): Medium dense, tan to light brown fine to coarse SAND, little fine Gravel, trace Silt, moist. Rec. = 1.2 ft (A-1-b.)										
	× × ×											
15	× × ×	S5 (10' - 12'): Medium dense, tan to light brown fine to coarse SAND, little Silt, little fine to coarse Gravel, moist. Rec. = 0.7 ft				8-8-10-10 (18)						
	× × ×											
	× × ×											
	× × ×											
20	× × ×	S6 (15' - 17'): Medium dense, tan to light brown fine to coarse SAND and SILT, little fine Gravel, moist. Rec. = 1.3 ft				9-11-8-7 (19)						
	× × ×											
	× × ×											
	× × ×											
25	× × ×	S7 (20' - 22'): Medium dense, light brown fine to medium SAND and SILT, moist (bottom 8" wet). Rec. = 1.5 ft				7-7-7-8 (14)						
	× × ×											
	× × ×											
	× × ×											
30	× × ×	S8 (25' - 27'): Loose, olive-tan SILT, some fine Sand, wet. Rec. = 1.8 ft				3-4-4-4 (8)						
	× × ×											
	× × ×											
	× × ×											
35	× × ×	S9 (30' - 32'): Medium dense, olive-gray SILT, some fine to medium Sand, wet. Rec. = 1.3 ft				5-4-6-8 (10)						
	× × ×											
	× × ×											
	× × ×											
40	× × ×	S10 (35' - 37'): Medium dense, gray SILT, trace fine Sand, wet. Rec. = 1.6 ft (A-4.)				5-5-6-10 (11)		0.3	2.2	97.5	NP	NP
	× × ×											
	× × ×											
	× × ×											

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-105**
Page No.: 2 of 3
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 4/17/23 Date Finished: 4/19/23
VTSPG NAD83: N 279568 ft E 1658214.4 ft
Station: 12201+97.1 Offset: 23.9' L
Ground Elevation: 363.2 ft

Casing Sampler
Type: FJ SS
I.D.: 4 in 1.5 in
Hammer Wt: 140 lb. 140 lb.
Hammer Fall: 30 in. 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
04/17/23	20.1	In open hole
04/17/23	21.3	Wet Sample

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
		S11 (40' - 42'): Medium dense, gray SILT, little fine Gravel, wet. Rec. = 1.8 ft				8-8-10-12 (18)						
45		S12 (45' - 47'): Medium dense, gray SILT, little fine Sand, wet. Rec. = 1.5 ft				5-6-8-11 (14)						
50		S13 (50' - 52'): Loose gray Clayey SILT, trace fine Sand, wet. Rec. = 1.8 ft				3-4-5-6 (9)						
55		S14 (55' - 57'): Loose, gray SILT, some fine Sand, wet. Rec. = 1.3 ft (A-4.)				5-4-5-8 (9)			21.7	78.3	NP	NP
60		S15 (60' - 62'): Loose, gray SILT, little fine Sand, wet. Rec. = 2.0 ft				3-4-4-5 (8)						
65		S16 (65' - 67'): Medium dense, gray Clayey SILT, some fine Sand, wet. Rec. = 1.5 ft				5-9-11-12 (20)						
70		S17 (70' - 72'): Medium dense, gray SILT and fine SAND, wet. Rec. = 1.5 ft				6-6-7-12 (13)						
75		S18 (75' - 77'): Very dense, gray SILT and fine to coarse SAND, some fine to coarse Gravel (fractured), moist. Rec. = 1.4 ft				50-26-28-50 (54)						

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
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STATE OF VERMONT
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CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-105**
Page No.: 3 of 3
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 4/17/23 Date Finished: 4/19/23
VTSPG NAD83: N 279568 ft E 1658214.4 ft
Station: 12201+97.1 Offset: 23.9' L
Ground Elevation: 363.2 ft

Casing Sampler
Type: FJ SS
I.D.: 4 in 1.5 in
Hammer Wt: 140 lb. 140 lb.
Hammer Fall: 30 in. 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
04/17/23	20.1	In open hole
04/17/23	21.3	Wet Sample

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/ft (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
		S19 (80' - 81.4'): Very dense, gray with brown/tan mottling SILT and fine to coarse SAND, some fine to coarse Gravel (fractured), moist. Rec. = 0.8 ft				19-53-50/5" (R)						
85		84.0 ft to 86.5 ft, C1: Fair Quality, gray, fresh, moderately hard, closely jointed, PHYLLITE, fracturing +/- 30-45 degrees. NQ2	C1	67 (67)	1							
		86.5 ft to 87.9 ft, C2: Very poor Quality, gray, fresh, moderately hard, shattered to very closely jointed, PHYLLITE, fracturing +/- 30-45 degrees. NQ2	C2	47 (0)	1							
		87.9 ft to 90.0 ft, C3: Very poor Quality, gray, fresh, moderately hard, shattered to closely jointed, PHYLLITE, fracturing +/- 30-45 degrees. NQ2	C3	64 (0)	3							
90		90.0 ft to 91.0 ft, C4: Very poor Quality, gray, fresh, moderately hard, shattered to very closely jointed, PHYLLITE, fracturing +/- 30-45 degrees. NQ2	C4	83 (0)	2							
		91.0 ft to 94.0 ft, C5: Very poor Quality, gray, fresh, moderately hard, shattered to closely jointed, PHYLLITE, fracturing +/- 30-45 degrees. NQ2	C5	89 (22)	2							
95		Hole stopped @ 94.0 ft										
100		Remarks: 1) Boring advanced using hollow stem auger until 27' before switching to drive and wash methods; sample moisture description may be influenced by drilling method. 2) Boring advanced in open hole past depth of ~50'. 3) Drill rig chatter at ~73' deep, bit refusal at 74'. 4) Core at 74' aborted, apparent boulder with bottom at ~74.7'. 5) Roller bit refusal at ~84', telescope 3" casing through 4" casing down to 84'. 6) Boring located approximately 4' north of markout. 7) Visual descriptions are based on Modified Burmister system. Laboratory gradations (% gravel, sand, and silt as applicable) are per AASHTO M145.										
105												
110												
115												
Notes:		1. Stratification lines represent approximate boundary between material types. Transition may be gradual. 2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor. 3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.										



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-106**

Page No.: 1 of 3

Pin No.: 12a574

Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign

Date Started: 4/24/23 Date Finished: 4/25/23

VTSPG NAD83: N 279595.1 ft E 1658364.6 ft

Station: 22202+64.1 Offset: 25.3' L

Ground Elevation: 359.9 ft

Casing FJ Sampler SS
Type: FJ
I.D.: 4 in 1.5 in
Hammer Wt: 140 lb. 140 lb.
Hammer Fall: 30 in. 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
04/26/23		Dry cave-in at ~37'. No water

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
0	XXXX	S1 (0' - 2'): Loose; S1A (top 3"): TOPSOIL with Organics. Rec. = 1.3 ft S1B (bottom 12"): olive-brown fine to medium SAND, little SILT, trace fine to coarse Gravel.				1-2-2-1 (4)						
5	XXXX	S2 (5' - 7'): Loose, olive SILT and fine SAND, moist. Rec. = 1.5 ft (A-4.)				2-3-3-4 (6)		1.2	42.1	56.7	NP	NP
10	XXXX	S3 (10' - 12'): Loose, olive-brown fine to coarse SAND, little Silt, trace fine to coarse Gravel, moist. Rec. = 1.2 ft				3-3-3-3 (6)						
15												
20	XXXX	S4 (20' - 22'): Medium dense, olive-brown fine to medium SAND and SILT, wet. Rec. = 0.8 ft (A-4.)				6-7-9-9 (16)		6.8	50.1	43.1	NP	NP
25												
30	XXXX	S5 (30' - 32'): Medium dense, gray SILT, some fine Sand, wet. Rec. = 1.6 ft				8-7-7-8 (14)						
35												

Notes:

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BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-106**
Page No.: 2 of 3
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 4/24/23 Date Finished: 4/25/23
VTSPG NAD83: N 279595.1 ft E 1658364.6 ft
Station: 22202+64.1 Offset: 25.3' L
Ground Elevation: 359.9 ft

Type:	Casing	Sampler	Groundwater Observations		
			Date	Depth (ft)	Notes
I.D.: 4 in	FJ	SS	04/26/23		Dry cave-in at ~37'. No water
Hammer Wt: 140 lb.		1.5 in			
Hammer Fall: 30 in.		140 lb.			
Hammer/Rod Type: Auto		30 in.			
Rig: Diedrich D-50 Track		$C_E = 1.52$			

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
45		S6 (40' - 42'): Medium dense, gray SILT, trace fine Sand, moist. Rec. = 1.6 ft (A-4.)				4-5-5-6 (10)		0.5	3.6	95.9	NP	NP
50		S7 (50' - 52'): Loose, gray SILT and fine Sand, wet. Rec. = 1.5 ft				4-4-5-8 (9)						
55												
60		S8 (60' - 62'): Loose, gray SILT, some fine Sand, wet. Rec. = 1.6 ft				4-4-5-5 (9)						
65												
70		S9 (70' - 70.1'): Very dense, gray fine GRAVEL and fine to coarse SAND, some Silt, wet. Rec. = 0.1 ft (A-1-b.)				50/1" (R)		50.1	25.3	24.6	NP	NP
75		72.0 ft to 75.5 ft, C1: Fair Quality, gray, slightly weathered, moderately hard, shattered to very closely jointed, PHYLLITE, fracturing +/- 30-45 degrees. NQ2	C1	71 (55)	1							
					2							
					2							
		75.5 ft to 79.5 ft, C2: Fair Quality, gray, slightly weathered, moderately hard, closely jointed, PHYLLITE, fracturing +/- 30-45 degrees. NQ2	C2	98 (67)	1							
					2							
					2							
					1							

Notes: 1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GEODESIGN BORING LOG SPRINGFIELD IM 091-1(83).GPJ VERMONT AOT.GDT 6/22/23



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-106**
Page No.: 3 of 3
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 4/24/23 Date Finished: 4/25/23
VTSPG NAD83: N 279595.1 ft E 1658364.6 ft
Station: 22202+64.1 Offset: 25.3' L
Ground Elevation: 359.9 ft

Casing Sampler
Type: FJ SS
I.D.: 4 in 1.5 in
Hammer Wt: 140 lb. 140 lb.
Hammer Fall: 30 in. 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
04/26/23		Dry cave-in at ~37'. No water

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/ft (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
		79.5 ft to 82.0 ft, C3: Excellent Quality, gray, slightly weathered, moderately hard, closely jointed, PHYLLITE, fracturing +/- 30-45 degrees. NQ2	C3	100 (100)	1 2							
		Hole stopped @ 82.0 ft			1							
85		Remarks: 1) Boring advanced using drive and wash methods; sample moisture description may be influenced by drilling method. 2) Water color from wash turned gray at ~27.5'. 3) Driller noted hard drilling at ~68.5'. 4) Roller bit to 72', 4" casing at 30', 3" casing telescoped through 4" casing to 72' to core C1. 5) Metallic/mica sheen on wash water at ~73'. 6) Water lost while coring at ~75'. 7) Cave in at ~37'(noted during water level measurement attempt). 8) Visual descriptions are based on Modified Burmister system. Laboratory gradations (% gravel, sand, and silt as applicable) are per AASHTO M145.										
90												
95												
100												
105												
110												
115												

Notes:

- Stratification lines represent approximate boundary between material types. Transition may be gradual.
- N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
- Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-107**
Page No.: 1 of 1
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 2/09/23 Date Finished: 2/09/23
VTSPG NAD83: N 279700.2 ft E 1658547.3 ft
Station: 302+10.0 Offset: 4.3' R
Ground Elevation: 312.0 ft

Type:	Casing	Sampler	Groundwater Observations		
	FJ	SS	Date	Depth (ft)	Notes
I.D.:	4 in	1.5 in	02/09/23	1.5	In open hole
Hammer Wt:	140 lb.	140 lb.			
Hammer Fall:	30 in.	30 in.			
Hammer/Rod Type:	Auto				
Rig:	Diedrich D-50 Track	C _E = 1.52			

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. (% RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
5	X X X X X X X X X X X X	S1 (0' - 2'): Medium dense; S1A (top 3"): brown fine SAND, some Silt with Organics/roots, moist. Rec. = 0.5 ft				4-5-7-11 (12)						
		S1B (bottom 3"): gray fine to coarse SAND, some fine to coarse Gravel, little Silt, moist.				11-7-5-2 (12)						
		S2 (2' - 4'): Medium dense, gray and brown fine to coarse GRAVEL, some fine to coarse SAND, some Silt, wet. Rec. = 0.3 ft				2-2-1-1 (3)	21.1	9.4	40.1	50.5	NP	NP
		S3 (4' - 6'): Very loose, brown SILT and fine to coarse SAND, trace fine Gravel, wet. Rec. = 0.8 ft (A-4.)				1-1-1-1 (2)						
10		S4 (6' - 8'): Very loose, brownish gray SILT and fine to coarse SAND, trace fine Gravel, wet. Rec. = 0.5 ft				1-2-2-1 (4)	26.1	0.9	45.3	53.8	NP	NP
		S5 (8' - 10'): Loose, grayish brown SILT and fine to medium SAND, trace fine Gravel, wet. Rec. = 0.8 ft (A-4.)				1-1-2-2 (3)						
		S6 (10' - 12'): Very loose, grayish brown SILT and fine to coarse SAND, wet. Rec. = 0.7 ft										
15		S7 (15' - 17'): Loose, gray SILT, some fine to medium Sand, trace fine Gravel, wet. Sandy gravel in tip. Rec. = 0.8 ft (A-4.)				2-2-2-4 (4)	29.8	2.8	23.4	73.8	NP	NP
20		S8 (20' - 22'): Very dense, gray SILT, some fine to coarse Sand, little fine to coarse Gravel, wet. Rec. = 0.3 ft				6-50/2" (R)						
25		22.0 ft to 27.0 ft, C1: Poor Quality, hard, slightly weathered, shattered to closely jointed, gray PHYLLITE, with Quartz banding toward top of core. NQ2	C1	70 (26)	3							
					2							
					3							
					3							
					4							
Hole stopped @ 27.0 ft												
30		Remarks: 1) Boring located approximately 16' from stream (Spencer Brook). 2) Boring advanced using drive and wash methods; sample moisture description may be influenced by drilling method. 3) Noted rig chatter at ~17.5' deep. 4) Casing refusal at ~21.5' deep. 5) Wash water return during coring C1 dark gray with mica sheen on surface. 6) Visual descriptions are based on Modified Burmister system. Laboratory gradations (% gravel, sand, and silt as applicable) are per AASHTO M145.										
35												

Notes: 1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GEODESIGN BORING LOG SPRINGFIELD IM 091-1(83).GPJ VERMONT AOT.GDT 6/22/23



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-108**

Page No.: 1 of 1

Pin No.: 12a574

Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign

Date Started: 2/08/23 Date Finished: 2/08/23

VTSPG NAD83: N 279445.7 ft E 1658614.9 ft

Station: 211+62.6 Offset: 55.9' R

Ground Elevation: 334.2 ft

Casing FJ Sampler SS
Type: FJ I.D.: 4 in
Hammer Wt: 140 lb. Hammer Fall: 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
02/08/23		Not encountered

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
0		S1 (0' - 2'): Loose; S1A (top 6"): brown SILT, little fine to coarse Sand, trace coarse Gravel, trace Organics, moist. Rec. = 1.3 ft				1-3-6-9 (9)						
2		S1B (bottom 9"): orange-brown fine to coarse SAND, trace Silt, trace fine Gravel, moist.				6-10-9-9 (10)	16.1	9.4	79.8	10.8	NP	NP
4		S2 (2' - 4'): Medium dense, orange-brown fine to medium SAND, little Silt, trace fine to coarse Gravel, moist. Rec. = 1.1 ft (A-2-4.)				7-8-9-9 (17)	20.7	0.5	88.7	10.8	NP	NP
6		S3 (4' - 6'): Medium dense SILT, little fine Sand, trace fine Gravel, moist. Rec. = 0.9 ft (A-2-4.)				9-9-8-9 (17)						
8		S4 (6' - 8'): Medium dense SILT, little fine Sand, moist. Rec. = 1.2 ft				8-10-10-11 (20)	23.9	0.3	10.7	89.0	NP	NP
10		S5 (8' - 10'): Medium dense, gray SILT, little fine Sand, trace fine Gravel, moist. Rec. = 1.2 ft (A-4.)				8-10-50/3" (R)						
12		S6 (10' - 12'): Very dense, gray/brown SILT, little fine Sand, moist. Rec. = 0.1 ft										
12.0		12.0 ft to 17.0 ft, C1: Excellent Quality, moderately hard, slightly weathered, closely to moderately jointed, dark gray, PHYLLITE, fracturing +/- 70 degrees. NQ2	C1	100 (92)	2							
15					2							
					3							
					2							
					2							
20		Hole stopped @ 17.0 ft										
25		Remarks: 1) Boring advanced using drive and wash methods; sample moisture description may be influenced by drilling method. 2) Visual descriptions are based on Modified Burmister system. Laboratory gradations (% gravel, sand, and silt as applicable) are per AASHTO M145.										
30												
35												

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-109 (OW)**

Page No.: 1 of 2

Pin No.: 12a574

Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign

Date Started: 2/10/23 Date Finished: 2/10/23

VTSPG NAD83: N 279145.8 ft E 1658482.6 ft

Station: 208+47.6 Offset: 4.5' R

Ground Elevation: 370.7 ft

Type:	Casing	Sampler	Groundwater Observations		
	FJ	SS	Date	Depth (ft)	Notes
I.D.:	4 in	1.5 in			
Hammer Wt:	140 lb.	140 lb.	02/11/23	30.6	Well reading
Hammer Fall:	30 in.	30 in.	02/22/23	33.9	Well reading
Hammer/Rod Type:	Auto		03/09/23	35.3	Well reading
Rig:	Diedrich D-50 Track				
		$C_E = 1.52$			

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Well Diagram	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
5	× × ×	S1 (0' - 2'): Loose, gray to light brown SILT, little fine Sand, trace fine Gravel, moist. Rec. = 0.8 ft (A-4.)		1-2-2-2 (4)	25.0	2.0	14.0	84.0	NP	NP
	× × ×	S2 (2' - 4'): Loose;		2-2-3-3 (5)						
	× × ×	S2A (top 6"): gray SILT, little fine Sand, trace Organics, moist.		3-3-4-4 (7)	17.5		45.2	54.8	NP	NP
	× × ×	S2B (bottom 9"): brown SILT, little fine Sand, trace Organics, moist. Rec. = 1.3 ft		4-4-5-5 (9)						
	× × ×	S3 (4' - 6'): Loose, light brown SILT and fine SAND, moist. Rec. = 0.9 ft (A-4.)		6-7-8-7 (15)	3.8	31.1	62.1	6.8	NP	NP
10	× × ×	S4 (6' - 8'): Loose, light brown fine SAND, little Silt, moist. Rec. = 1.4 ft		7-9-9-9 (18)						
	× × ×	S5 (8' - 10'): Medium dense, brown and light gray fine to coarse SAND, little fine Gravel, trace Silt, moist. Rec. = 0.8 ft (A-1-b.)								
	× × ×	S6 (10' - 12'): Medium dense, brown and light gray fine to coarse SAND, little fine Gravel, trace Silt, moist. Rec. = 1.2 ft								
15	× × ×	S7 (15' - 17'): Medium dense, brown and light gray fine to coarse SAND, little Silt, little fine to coarse Gravel, moist. (Silt not homogenous, in small pieces) Rec. = 1.4 ft (A-2-4.)		7-7-8-10 (15)	6.7	22.3	58.0	19.7	NP	NP
	× × ×									
20		S8 (20' - 22'): Medium dense, brown SILT, little fine Sand, moist. Rec. = 0.8 ft		19-12-12-12 (24)						
25		S9 (25' - 27'): Stiff, gray SILT, trace fine to medium Sand, wet. (10" seam of brown fine sand washout observed in spoon, ~10" above tip to 20" above tip. Silt identified at top and bottom) Rec. = 1.2 ft (A-4.)		3-4-5-5 (9)	38.1		2.6	97.4	NP	NP
30		S10 (30' - 32'): Stiff, gray SILT, trace fine Sand, moist. Rec. = 0.7 ft		4-6-5-9 (11)						
35		S11 (35' - 37'): Stiff;		4-6-5-5 (11)						
		S11A (top 4"): gray SILT, moist. S11B (middle 3"): fine SAND washout. S11C (bottom 5"): gray SILT, little fine Sand, wet. Rec. = 1.0 ft								

Notes: 1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GEODESIGN BORING LOG SPRINGFIELD IM 091-1(83).GPJ VERMONT AOT.GDT 6/22/23



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-109 (OW)**

Page No.: 2 of 2

Pin No.: 12a574

Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign

Date Started: 2/10/23 Date Finished: 2/10/23

VTSPG NAD83: N 279145.8 ft E 1658482.6 ft

Station: 208+47.6 Offset: 4.5' R

Ground Elevation: 370.7 ft

Casing Sampler
Type: FJ SS
I.D.: 4 in 1.5 in
Hammer Wt: 140 lb. 140 lb.
Hammer Fall: 30 in. 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
02/11/23	30.6	Well reading
02/22/23	33.9	Well reading
03/09/23	35.3	Well reading

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Well Diagram	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
		S12 (40' - 42'): Medium; S12A (top 13"): gray SILT, trace fine Sand, trace fine Gravel, wet. S12B (bottom 5"): gray SILT, little fine Sand, wet. Rec. = 1.5 ft (A-4.)		4-4-5-5 (9)	34.9	0.5	2.2	97.3	NP	NP
45		S13 (45' - 47'): Medium dense; S13A (top 6"): gray SILT, trace fine Sand, wet. Rec. = 1.0 ft S13B (bottom 6"): gray fine SAND, little Silt, wet.		12-12-7-14 (19)						
		Hole stopped @ 47.0 ft								
50		Remarks: 1) Boring advanced using drive and wash methods; sample moisture description may be influenced by drilling method. 2) Driller noted softer drilling at at ~23' deep. 3) Visual descriptions are based on Modified Burmister system. Laboratory gradations (% gravel, sand, and silt as applicable) are per AASHTO M145.								
55										
60										
65										
70										
75										

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-110**
Page No.: 1 of 1
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 2/08/23 Date Finished: 2/08/23
VTSPG NAD83: N 279276.8 ft E 1657951.7 ft
Station: n/a Offset: n/a
Ground Elevation: 334.2 ft

Type:	Casing	Sampler	Groundwater Observations		
	FJ	SS	Date	Depth (ft)	Notes
I.D.:	4 in	1.5 in	02/08/23	5.7	Open hole no casing
Hammer Wt:	140 lb.	140 lb.			
Hammer Fall:	30 in.	30 in.			
Hammer/Rod Type:	Auto				
Rig:	Diedrich D-50 Track	C _E = 1.52			

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %									
5		S1 (0' - 2'): Medium dense;				3-6-12-14 (18)	5.4	63.4	19.0	17.6	NP	NP									
		S1A (top 6"): light brown to dark brown fine to coarse SAND, little Silt, little fine to coarse Gravel, trace Roots, moist. Rec. = 1.0 ft (A-1-b.)				24-20-14-7 (34)	8.0	70.1	23.6	6.3	NP	NP									
		S1B (bottom 6"): gray fine to coarse GRAVEL, some fine to coarse Sand, little Silt, moist. Inferred weathered rock.				12-15-18-50/2" (R)															
		S2 (2' - 4'): Dense, gray fine to coarse GRAVEL and fine to coarse SAND, trace Silt. Rec. = 0.8 ft																			
10		S3 (4' - 6'): Dense, gray fine to coarse GRAVEL and fine to coarse SAND, trace Silt. Rec. = 0.7 ft (A-1-a.)	C1	41 (41)	2																
		7.5 ft to 10.3 ft, C1: Poor Quality, moderately hard, slightly weathered, closely jointed, dark gray, PHYLLITE, fracturing +/- 50-80 degrees. NQ2																			
		10.3 ft to 12.5 ft, C2: Poor Quality, moderately hard, slightly weathered, shattered to closely jointed, dark gray, PHYLLITE, fracturing +/- 50-80 degrees. NQ2											C2	100 (38)	2						
Hole stopped @ 12.5 ft																					
15		Remarks: 1) Boring advanced using drive and wash methods; sample moisture description may be influenced by drilling method. 2) Spoon refusal at 5.7' deep, roller bit to 7.5' for core. 3) Water loss at ~0.5 feet into coring. 4) Water return dark gray with mica during coring. 5) Visual descriptions are based on Modified Burmister system. Laboratory gradations (% gravel, sand, and silt as applicable) are per AASHTO M145.																			
20																					
25																					
30																					
35																					

Top of Bedrock @ 6.5 ft

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
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STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-111**
Page No.: 1 of 1
Pin No.: 12a574
Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign
Date Started: 2/09/23 Date Finished: 2/09/23
VTSPG NAD83: N 279528.8 ft E 1658969.4 ft
Station: n/a Offset: n/a
Ground Elevation: 327.9 ft

Casing Sampler
Type: FJ SS
I.D.: 4 in 1.5 in
Hammer Wt: 140 lb. 140 lb.
Hammer Fall: 30 in. 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
02/09/23	5.0	Open hole

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
5	x x x	S1 (0' - 2'): Medium dense; S1A (top 8"): gray fine to coarse GRAVEL and fine to coarse SAND, little Silt, trace Organics, moist. Rec. = 1.1 ft	4-12-5-5 (17)	16.4	3.4	35.1	61.5	NP	NP
		S1B (bottom 5"): brown to light brown SILT, little fine Sand, trace Organics, moist.	3-2-3-3 (5)						
		S2 (2' - 4'): Loose, brown SILT and fine SAND, trace fine gravel, trace Organics, moist. Rec. = 1.8 ft	4-5-9-9 (14)						
		S3 (4' - 6'): Medium dense, brown and gray SILT and fine to medium SAND, trace fine Gravel, moist. Rec. = 1.6 ft (A-4.)	12-12-12-12 (24)						
		S4 (6' - 8'): Medium dense, brown fine SAND, little Silt, moist. Rec. = 1.2 ft	12-14-14-15 (28)						
10	x x x	S5 (8' - 10'): Medium dense, light gray SILT, trace fine Sand, moist. Rec. = 2.0 ft	14-17-19-19 (36)	18.5	3.8	22.5	73.7	NP	NP
		S6 (10' - 12'): Dense, light gray SILT, some fine to medium Sand, trace fine Gravel, moist. Rec. = 1.2 ft (A-4.)							
15	x x x	S7 (15' - 17'): Dense, brown and gray SILT and fine SAND, trace fine Gravel, moist. Rec. = 1.3 ft	15-17-16-17 (33)						
20	x x x	S8 (20' - 22'): Medium dense, gray/brown SILT, little fine Sand, trace black Organics, moist. Organic odor. Rec. = 1.0 ft	12-14-15-17 (29)						
25	x x x	S9 (25' - 27'): Medium dense, brown SILT and fine to medium SAND, trace fine Gravel, moist. Rec. = 0.8 ft (A-4.)	10-11-15-17 (26)	23.4	4.1	43.2	52.7	NP	NP
30	x x x	S10 (30' - 32'): Medium dense, brown SILT and fine SAND, trace fine Gravel, trace (-) Organics, moist. Faint organic odor. Rec. = 1.2 ft	5-9-8-6 (17)						
35		Hole stopped @ 32.0 ft							
		Remarks: 1) Boring advanced using drive and wash methods; sample moisture description may be influenced by drilling method. 2) Visual descriptions are based on Modified Burmister system. Laboratory gradations (% gravel, sand, and silt as applicable) are per AASHTO M145.							

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-112**

Page No.: 1 of 2

Pin No.: 12a574

Checked By: JAG

Boring Crew: M. Nadeau NTB, B. Andrews, GEODesign

Date Started: 2/10/23 Date Finished: 2/11/23

VTSPG NAD83: N 278723.4 ft E 1658245.2 ft

Station: 203+63.5 Offset: 9.5' L

Ground Elevation: 332.4 ft

Casing Sampler
Type: FJ SS
I.D.: 4 in 1.5 in
Hammer Wt: 140 lb. 140 lb.
Hammer Fall: 30 in. 30 in.
Hammer/Rod Type: Auto
Rig: Diedrich D-50 Track $C_E = 1.52$

Groundwater Observations

Date	Depth (ft)	Notes
02/10/23	11.5	Wet sample

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
5	× × ×	S1 (0' - 2'): Medium dense; S1A (top 2"): brown fine to coarse SAND, some fine Gravel, little Silt. Rec. = 1.4 ft S1B (middle 12"): Gray SILT, trace fine to coarse Sand, moist. S1C (bot 3"): Brown fine to coarse SAND, little fine Gravel, trace Silt, moist.				16-15-14-12 (29) 7-10-12-11 (22) 5-4-4-4 (8)						
10	× × ×	S2 (2' - 4'): Medium dense, brown SILT and fine SAND, trace fine Gravel, moist. Rec. = 1.8 ft (A-4.) S3 (4' - 6'): Medium dense; S3A (top 8"): Light gray-brown SILT, some fine Sand, trace fine Gravel, trace Organics. Rec. = 1.3 ft S3B (bottom 7"): Brown fine to coarse SAND, trace fine Gravel, trace Silt, moist.				5-5-5-5 (10) 5-6-7-7 (13)	2.3	13.1	82.2	4.7	NP	NP
15	× × ×	S4 (6' - 8'): Medium dense, brown and light gray fine to coarse SAND, trace Silt, trace fine Gravel, moist. Rec. = 1.0 ft (A-1-b.) S5 (8' - 10'): Medium dense, light gray and brown, fine to coarse SAND, trace Silt, trace fine Gravel. With top 1.5": brown SILT, little fine Sand, trace fine Gravel. Rec. = 1.4 ft S6 (10' - 12'): Loose; S6A (top 14"): Brown and light gray fine to coarse SAND, trace fine Gravel, trace Silt, moist. Rec. = 1.4 ft S6B (bottom 3"): Grayish brown SILT, moist. (with 2" wet zone above the silt layer)				3-3-2-3 (5) 35.8	29.8 35.8	0.5 3.7	2.3 9.0	97.2 87.3	NP NP	NP NP
20	× × ×	S7 (15' - 17'): Medium, gray SILT. (Note: Gray SILT, trace fine to coarse Sand, trace fine Gravel in spoon tip. Sample separated and both portions tested in lab). Rec. = 1.4 ft (A-4 upper portion; A-4 spoon tip).				3-3-6-5 (9)						
25	× × ×	S8 (20' - 22'): Loose; S8A (top 12"): gray fine SILT, trace fine Sand, wet. S8B (bottom 5"): gray-brown SILT, little fine Sand, moist. Rec. = 1.4 ft S9 (25' - 27'): Medium dense, gray-brown SILT, little fine Sand, wet. Rec. = 1.2 ft (A-4.)				7-9-9-10 (18)	33.7		15.0	85.0	NP	NP
30	× × ×	S10 (30' - 32'): Medium dense, SILT, little fine Sand, wet. Rec. = 0.3 ft				6-6-7-7 (13)						
35	× × ×	S11 (35' - 37'): Medium, brownish-gray SILT, trace fine Sand, trace fine Gravel wet. Rec. = 1.2 ft (A-4.)				3-3-4-4 (7)	33.2	2.1	6.4	91.5	NP	NP

Notes:

1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GEODESIGN BORING LOG SPRINGFIELD IM 091-1(83).GPJ VERMONT AOT.GDT 7/13/23



STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND MATERIALS
BUREAU CENTRAL LABORATORY

BORING LOG

Springfield IM 091-1(83)
Bridge 28 N&S, Ramps, & Culvert 28N-1
Springfield, VT GEODesign #0750-12.18

Boring No.: **B-112**
Page No.: **2 of 2**
Pin No.: **12a574**
Checked By: **JAG**

Boring Crew: **M. Nadeau NTB, B. Andrews, GEODesign**
Date Started: **2/10/23** Date Finished: **2/11/23**
VTSPG NAD83: **N 278723.4 ft E 1658245.2 ft**
Station: **203+63.5** Offset: **9.5' L**
Ground Elevation: **332.4 ft**

Type:	Casing	Sampler	Groundwater Observations		
	FJ	SS	Date	Depth (ft)	Notes
I.D.:	4 in	1.5 in	02/10/23	11.5	Wet sample
Hammer Wt:	140 lb.	140 lb.			
Hammer Fall:	30 in.	30 in.			
Hammer/Rod Type:	Auto				
Rig:	Diedrich D-50 Track	C _E = 1.52			

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
		S12 (40' - 42'): Medium, gray SILT, wet. Rec. = 1.6 ft				4-4-5-5 (9)						
45		S13 (45' - 47'): Stiff, gray SILT, trace fine Sand, trace fine Gravel, wet. Rec. = 1.5 ft (A-4.)				5-6-7-9 (13)	34.6	0.9	4.6	94.5	NP	NP
50		S14 (50' - 52'): Medium dense, gray SILT, trace fine Sand, wet. Rec. = 1.3 ft				10-10-12-14 (22)						
55		S15 (55' - 57'): Dense, brown SILT and fine SAND, wet. (Note: Gray SILT, trace fine SAND in spoon tip. Sample separated and both portions tested in the lab). Rec. = 1.2 ft (A-4 upper portion; A-4 spoon tip).				10-21-27-33 (48)	6.8 29.1		36.2 7.5	63.8 90.4	NP NP	NP NP
65		S16 (65' - 65.4'): Very dense, gray fine to coarse SAND, some fine to coarse Gravel, little Silt, wet. Inferred weathered rock. Rec. = 0.3 ft	C1	82 (27)	5	50/5" (R)	Top of Bedrock @ 66.0 ft					
		66.0 ft to 69.7 ft, C1: Poor Quality, moderately hard, slightly weathered, shattered to closely jointed, gray, PHYLLITE, fracturing approximately 45 degrees. NQ2			4							
70		69.7 ft to 70.7 ft, C2: No recovery.	C2	0 (0)	4							
		NQ2										
		Hole stopped @ 70.7 ft										
75		Remarks: 1) Boring advanced using drive and wash methods; sample moisture description may be influenced by drilling method. 2) Rig chatter at 58.5' deep. 3) Hard drilling 60.5', black rock chips in wash water. 4) Soft drilling at ~64' deep; hard drilling 65'-66'. 5) C1 core plugged at 69.7' deep. 6) C2 core plugged at 70.7' deep. 7) Visual descriptions are based on Modified Burmister system. Laboratory gradations (% gravel, sand, and silt as applicable) are per AASHTO M145.										

Notes: 1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

APPENDIX C
LABORATORY RESULTS



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B107/S3

Report on Soil Sample

Lab Number: E21 34 Report Date: 3/22/2023
Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher
Date Sampled: 2 / 9 / 23 Date Received: 3 / 1 / 2023 Date Tested: 3 / 6 / 2023
Station: 0 + 0 Offset: 0 Hole: B-107 Depth: 4 ft to: 6 ft Examined For: Class
Field Description: Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		386.7		
75mm	3in	0.0	386.7	100.0
37.5mm	1.5in	0.0	386.7	100.0
19mm	3/4in	0.0	386.7	100.0
9.5mm	3/8in	3.9	382.8	99.0
4.75mm	No.4	15.2	367.6	95.1
Reduced	4.75mm	200.5		
2.00mm	No.10	9.4	191.1	90.6
850um	No.20	14.4	176.7	83.8
425um	No.40	23.1	153.6	72.8
250um	No.60	18.7	134.9	64.0
150um	No.100	11.8	123.1	58.4
75um	No.200	16.6	106.5	50.5
<75um	<No.200			

Mass of can and WET SOIL: 739.78 g
Mass of can and DRY SOIL: 658.36 g
Mass of can: 271.66 g
Moisture content: 21.1 %

T-90 PL = PI = 0

T-89 LL =

Gr: 9.4 %

Sa: 40.1 %

Si: 50.5 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: SaSi

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B107/S5

Report on Soil Sample

Lab Number: E21 35 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 9 / 2023 Date Received: 3 / 1 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-107 Depth: 8 ft to: 10 ft Examined For: Class

Field Description: Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		327.3		
75mm	3in	0.0	327.3	100.0
37.5mm	1.5in	0.0	327.3	100.0
19mm	3/4in	0.0	327.3	100.0
9.5mm	3/8in	0.0	327.3	100.0
4.75mm	No.4	1.4	325.9	99.6
Reduced	4.75mm	171.0		
2.00mm	No.10	0.8	170.2	99.1
850um	No.20	2.3	167.9	97.8
425um	No.40	6.4	161.5	94.0
250um	No.60	10.5	151.0	87.9
150um	No.100	20.7	130.3	75.9
75um	No.200	37.9	92.4	53.8
<75um	<No.200			

Mass of can and WET SOIL: 683.82 g
Mass of can and DRY SOIL: 598.52 g
Mass of can: 271.22 g
Moisture content: 26.1 %

T-90 PL = PI = 0

T-89 LL =

Gr: 0.9 %

Sa: 45.3 %

Si: 53.8 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: SaSi

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B107/S7

Report on Soil Sample

Lab Number: E21 36 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 9 / 23 Date Received: 3 / 1 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-107 Depth: 15 ft to: 17 ft Examined For: Class

Field Description: Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		245.4		
75mm	3in	0.0	245.4	100.0
37.5mm	1.5in	0.0	245.4	100.0
19mm	3/4in	0.0	245.4	100.0
9.5mm	3/8in	0.0	245.4	100.0
4.75mm	No.4	3.8	241.6	98.5
Reduced	4.75mm	238.4		
2.00mm	No.10	3.0	235.4	97.2
850um	No.20	4.1	231.3	95.5
425um	No.40	4.1	227.2	93.8
250um	No.60	5.1	222.1	91.7
150um	No.100	9.2	212.9	87.9
75um	No.200	34.3	178.6	73.8
<75um	<No.200			

Mass of can and WET SOIL: 590.15 g
Mass of can and DRY SOIL: 517.00 g
Mass of can: 271.61 g
Moisture content: 29.8 %

T-90 PL = PI = 0
T-89 LL =

Gr: 2.8 %
Sa: 23.5 %
Si: 73.8 %
100.0 %

M145: AASHTO Class: A-4
D2487: Soil Description: SaSi

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B108/S2

Report on Soil Sample

Lab Number: E21 37 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 8 / 2023 Date Received: 3 / 1 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-108 Depth: 2 ft to: 4 ft Examined For: Class

Field Description: Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		478.0		
75mm	3in	0.0	478.0	100.0
37.5mm	1.5in	0.0	478.0	100.0
19mm	3/4in	13.2	464.8	97.2
9.5mm	3/8in	0.0	464.8	97.2
4.75mm	No.4	13.7	451.1	94.4
Reduced	4.75mm	251.4		
2.00mm	No.10	10.0	241.4	90.6
850um	No.20	21.2	220.2	82.7
425um	No.40	48.3	171.9	64.5
250um	No.60	51.7	120.2	45.1
150um	No.100	59.0	61.2	23.0
75um	No.200	32.5	28.7	10.8
<75um	<No.200			

Mass of can and WET SOIL: 826.66 g
Mass of can and DRY SOIL: 749.75 g
Mass of can: 271.71 g
Moisture content: 16.1 %

T-90 PL = PI = 0

T-89 LL =

Gr: 9.4 %

Sa: 79.8 %

Si: 10.8 %

100.0 %

M145: AASHTO Class: A-2-4

D2487: Soil Description: Sa

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B108/S3

Report on Soil Sample

Lab Number: E21 38

Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site:

Tested By: B. Fletcher

Date Sampled: 2 / 8 / 2023

Date Received: 2 / 22 / 2023

Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-108

Depth: 4 ft to: 6 ft Examined For: Class

Field Description: Silt/Sand

Submitted By: GD

Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		389.5		
75mm	3in	0.0	389.5	100.0
37.5mm	1.5in	0.0	389.5	100.0
19mm	3/4in	0.0	389.5	100.0
9.5mm	3/8in	0.0	389.5	100.0
4.75mm	No.4	1.8	387.7	99.5
Reduced	4.75mm	209.9		
2.00mm	No.10	0.3	209.6	99.4
850um	No.20	0.5	209.1	99.2
425um	No.40	0.7	208.4	98.8
250um	No.60	0.8	207.6	98.4
150um	No.100	1.7	205.9	97.6
75um	No.200	30.9	175.0	83.0
<75um	<No.200			

Mass of can and WET SOIL:	740.64	g
Mass of can and DRY SOIL:	659.95	g
Mass of can:	270.41	g
Moisture content:	20.7	%

T-90 PL = PI = 0

T-89 LL =

Gr: 0.6 %

Sa: 16.4 %

Si: 83.0 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: Si

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B108/S5

Report on Soil Sample

Lab Number: E21 39 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 8 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-108 Depth: 8 ft to: 10 ft Examined For: Class

Field Description: Silt Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		459.8		
75mm	3in	0.0	459.8	100.0
37.5mm	1.5in	0.0	459.8	100.0
19mm	3/4in	0.0	459.8	100.0
9.5mm	3/8in	0.0	459.8	100.0
4.75mm	No.4	0.3	459.5	99.9
Reduced	4.75mm	250.9		
2.00mm	No.10	0.7	250.2	99.7
850um	No.20	0.4	249.8	99.5
425um	No.40	0.6	249.2	99.3
250um	No.60	1.1	248.1	98.8
150um	No.100	1.9	246.2	98.1
75um	No.200	22.8	223.4	89.0
<75um	<No.200			

Mass of can and WET SOIL: 842.81 g
Mass of can and DRY SOIL: 733.03 g
Mass of can: 273.26 g
Moisture content: 23.9 %

T-90 PL = PI = 0
T-89 LL =

Gr: 0.3 %
Sa: 10.7 %
Si: 89.0 %
100.0 %

M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B109/S1

Report on Soil Sample

Lab Number: E21 40 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-109 Depth: 0 ft to: 2 ft Examined For: Class

Field Description: Sand/Silt Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		354.4		
75mm	3in	0.0	354.4	100.0
37.5mm	1.5in	0.0	354.4	100.0
19mm	3/4in	0.0	354.4	100.0
9.5mm	3/8in	5.0	349.4	98.6
4.75mm	No.4	0.2	349.2	98.5
Reduced	4.75mm	175.1		
2.00mm	No.10	0.9	174.2	98.0
850um	No.20	0.7	173.5	97.6
425um	No.40	1.0	172.5	97.1
250um	No.60	2.1	170.4	95.9
150um	No.100	6.6	163.8	92.2
75um	No.200	14.5	149.3	84.0
<75um	<No.200			

Mass of can and WET SOIL: 714.35 g
Mass of can and DRY SOIL: 625.63 g
Mass of can: 271.22 g
Moisture content: 25 %

T-90 PL = PI = 0
T-89 LL =

Gr: 2.0 %
Sa: 14.0 %
Si: 84.0 %
100.0 %

M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B109/S3

Report on Soil Sample

Lab Number: E21 41 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-109 Depth: 4 ft to: 6 ft Examined For: Class

Field Description: Silty Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		401.2		
75mm	3in	0.0	401.2	100.0
37.5mm	1.5in	0.0	401.2	100.0
19mm	3/4in	0.0	401.2	100.0
9.5mm	3/8in	0.0	401.2	100.0
4.75mm	No.4	0.0	401.2	100.0
Reduced	4.75mm	213.0		
2.00mm	No.10	0.1	212.9	100.0
850um	No.20	0.2	212.7	99.9
425um	No.40	0.5	212.2	99.6
250um	No.60	1.6	210.6	98.9
150um	No.100	7.3	203.3	95.4
75um	No.200	86.5	116.8	54.8
<75um	<No.200			

Mass of can and WET SOIL: 743.38 g
Mass of can and DRY SOIL: 673.31 g
Mass of can: 272.09 g
Moisture content: 17.5 %

T-90 PL = PI = 0

T-89 LL =

Gr: 0.0 %

Sa: 45.1 %

Si: 54.8 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: SaSi

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B109/S5

Report on Soil Sample

Lab Number: E21 42 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-109 Depth: 8 ft to: 10 ft Examined For: Class

Field Description: Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		520.9		
75mm	3in	0.0	520.9	100.0
37.5mm	1.5in	0.0	520.9	100.0
19mm	3/4in	0.0	520.9	100.0
9.5mm	3/8in	49.8	471.1	90.4
4.75mm	No.4	52.6	418.5	80.3
Reduced	4.75mm	242.4		
2.00mm	No.10	34.6	207.8	68.9
850um	No.20	49.7	158.1	52.4
425um	No.40	64.8	93.3	30.9
250um	No.60	38.0	55.3	18.3
150um	No.100	18.7	36.6	12.1
75um	No.200	16.0	20.6	6.8
<75um	<No.200			

Mass of can and WET SOIL: 813.17 g
Mass of can and DRY SOIL: 793.42 g
Mass of can: 272.51 g
Moisture content: 3.8 %

T-90 PL = PI = 0

T-89 LL =

Gr: 31.1 %

Sa: 62.0 %

Si: 6.8 %

100.0 %

M145: AASHTO Class: A-1-b

D2487: Soil Description: GrSa

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
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Central Laboratory

B109/S7

Report on Soil Sample

Lab Number: E21 43 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-109 Depth: 15 ft to: 17 ft Examined For: Class

Field Description: Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		768.4		
75mm	3in	0.0	768.4	100.0
37.5mm	1.5in	0.0	768.4	100.0
19mm	3/4in	17.5	750.9	97.7
9.5mm	3/8in	33.7	717.2	93.3
4.75mm	No.4	72.7	644.5	83.9
Reduced	4.75mm	267.2		
2.00mm	No.10	19.8	247.4	77.7
850um	No.20	30.1	217.3	68.2
425um	No.40	45.8	171.5	53.8
250um	No.60	38.0	133.5	41.9
150um	No.100	36.1	97.4	30.6
75um	No.200	34.7	62.7	19.7
<75um	<No.200			

Mass of can and WET SOIL: 1092.05 g
Mass of can and DRY SOIL: 1040.77 g
Mass of can: 272.40 g
Moisture content: 6.7 %

T-90 PL = PI = 0

T-89 LL =

Gr: 22.3 %

Sa: 58.0 %

Si: 19.7 %

100.0 %

M145: AASHTO Class: A-2-4

D2487: Soil Description: GrSa

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
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Central Laboratory

B109/S9

Report on Soil Sample

Lab Number: E21 44 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-109 Depth: 25 ft to: 27 ft Examined For: Class

Field Description: Silt Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		257.8		
75mm	3in	0.0	257.8	100.0
37.5mm	1.5in	0.0	257.8	100.0
19mm	3/4in	0.0	257.8	100.0
9.5mm	3/8in	0.0	257.8	100.0
4.75mm	No.4	0.0	257.8	100.0
Reduced	4.75mm	253.7		
2.00mm	No.10	0.0	253.7	100.0
850um	No.20	0.1	253.6	100.0
425um	No.40	1.0	252.6	99.6
250um	No.60	1.7	250.9	98.9
150um	No.100	1.8	249.1	98.2
75um	No.200	2.0	247.1	97.4
<75um	<No.200			

Mass of can and WET SOIL: 625.82 g
Mass of can and DRY SOIL: 527.66 g
Mass of can: 269.91 g
Moisture content: 38.1 %

T-90 PL = PI = 0

T-89 LL =

Gr: 0.0 %

Sa: 2.6 %

Si: 97.4 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: Si

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B109/S12A

Report on Soil Sample

Lab Number: E21 45 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-109 Depth: 40 ft to: 42 ft Examined For: Class

Field Description: Silt Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		440.6		
75mm	3in	0.0	440.6	100.0
37.5mm	1.5in	0.0	440.6	100.0
19mm	3/4in	0.0	440.6	100.0
9.5mm	3/8in	1.2	439.4	99.7
4.75mm	No.4	0.7	438.7	99.6
Reduced	4.75mm	249.2		
2.00mm	No.10	0.1	249.1	99.5
850um	No.20	0.1	249.0	99.5
425um	No.40	0.3	248.7	99.4
250um	No.60	0.8	247.9	99.0
150um	No.100	1.1	246.8	98.6
75um	No.200	3.3	243.5	97.3
<75um	<No.200			

Mass of can and WET SOIL: 863.50 g
Mass of can and DRY SOIL: 709.93 g
Mass of can: 269.33 g
Moisture content: 34.9 %

T-90 PL = PI = 0
T-89 LL =

Gr: 0.5 %
Sa: 2.2 %
Si: 97.3 %
100.0 %

M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B110/S1B

Report on Soil Sample

Lab Number: E21 46 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 8 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-110 Depth: 0 ft to: 2 ft Examined For: Class

Field Description: Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		302.4		
75mm	3in	0.0	302.4	100.0
37.5mm	1.5in	0.0	302.4	100.0
19mm	3/4in	53.6	248.8	82.3
9.5mm	3/8in	71.9	176.9	58.5
4.75mm	No.4	39.2	137.7	45.5
Reduced	4.75mm	137.0		
2.00mm	No.10	26.8	110.2	36.6
850um	No.20	22.3	87.9	29.2
425um	No.40	12.9	75.0	24.9
250um	No.60	7.5	67.5	22.4
150um	No.100	6.0	61.5	20.4
75um	No.200	8.6	52.9	17.6
<75um	<No.200			

Mass of can and WET SOIL: 589.62 g
Mass of can and DRY SOIL: 573.26 g
Mass of can: 270.90 g
Moisture content: 5.4 %

T-90 PL = PI = 0

T-89 LL =

Gr: 63.4 %

Sa: 19.0 %

Si: 17.6 %

100.0 %

M145: AASHTO Class: A-1-b

D2487: Soil Description: Gr

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B110/S3

Report on Soil Sample

Lab Number: E21 47

Report Date: 3/22/2023

Project: Springfield IM 091-1(83)

Site:

Tested By: B. Fletcher

Date Sampled: 2 / 8 / 2023

Date Received: 2 / 22 / 2023

Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-110

Depth: 4 ft to: 6 ft Examined For: Class

Field Description: Gravel

Submitted By: GD

Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		382.8		
75mm	3in	0.0	382.8	100.0
37.5mm	1.5in	0.0	382.8	100.0
19mm	3/4in	87.5	295.3	77.1
9.5mm	3/8in	88.9	206.4	53.9
4.75mm	No.4	48.1	158.3	41.4
Reduced	4.75mm	157.0		
2.00mm	No.10	43.5	113.5	29.9
850um	No.20	37.0	76.5	20.1
425um	No.40	23.1	53.4	14.1
250um	No.60	13.4	40.0	10.5
150um	No.100	8.1	31.9	8.4
75um	No.200	7.8	24.1	6.3
<75um	<No.200			

Mass of can and WET SOIL:	682.77	g
Mass of can and DRY SOIL:	652.29	g
Mass of can:	269.49	g
Moisture content:	8	%

T-90 PL = PI = 0

T-89 LL =

Gr: 70.1 %

Sa: 23.5 %

Si: 6.3 %

100.0 %

M145: AASHTO Class: A-1-a

D2487: Soil Description: SaGr

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B111/S3

Report on Soil Sample

Lab Number: E21 48 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 9 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-111 Depth: 4 ft to: 6 ft Examined For: Class

Field Description: Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		523.0		
75mm	3in	0.0	523.0	100.0
37.5mm	1.5in	0.0	523.0	100.0
19mm	3/4in	0.0	523.0	100.0
9.5mm	3/8in	0.0	523.0	100.0
4.75mm	No.4	11.3	511.7	97.8
Reduced	4.75mm	260.6		
2.00mm	No.10	3.2	257.4	96.6
850um	No.20	8.2	249.2	93.6
425um	No.40	13.1	236.1	88.6
250um	No.60	10.6	225.5	84.7
150um	No.100	16.1	209.4	78.6
75um	No.200	45.7	163.7	61.5
<75um	<No.200			

Mass of can and WET SOIL: 720.00 g
Mass of can and DRY SOIL: 634.08 g
Mass of can: 111.08 g
Moisture content: 16.4 %

T-90 PL = PI = 0

T-89 LL =

Gr: 3.4 %

Sa: 35.2 %

Si: 61.5 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: SaSi

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B111/S6

Report on Soil Sample

Lab Number: E21 49

Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site:

Tested By: B. Fletcher

Date Sampled: 2 / 9 / 2023

Date Received: 2 / 22 / 2023

Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-111

Depth: 10 ft to: 12 ft Examined For: Class

Field Description: Sand/Silt

Submitted By: GD

Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		443.5		
75mm	3in	0.0	443.5	100.0
37.5mm	1.5in	0.0	443.5	100.0
19mm	3/4in	0.0	443.5	100.0
9.5mm	3/8in	0.7	442.8	99.8
4.75mm	No.4	7.5	435.3	98.2
Reduced	4.75mm	229.2		
2.00mm	No.10	4.5	224.7	96.2
850um	No.20	4.2	220.5	94.4
425um	No.40	4.7	215.8	92.4
250um	No.60	4.0	211.8	90.7
150um	No.100	4.6	207.2	88.7
75um	No.200	35.2	172.0	73.7
<75um	<No.200			

Mass of can and WET SOIL:	634.84	g
Mass of can and DRY SOIL:	552.72	g
Mass of can:	109.26	g
Moisture content:	18.5	%

T-90 PL = PI = 0

T-89 LL =

Gr: 3.8 %

Sa: 22.6 %

Si: 73.7 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: SaSi

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B111/S9

Report on Soil Sample

Lab Number: E21 50 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 9 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-111 Depth: 25 ft to: 27 ft Examined For: Class

Field Description: Silty Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		348.7		
75mm	3in	0.0	348.7	100.0
37.5mm	1.5in	0.0	348.7	100.0
19mm	3/4in	0.0	348.7	100.0
9.5mm	3/8in	0.0	348.7	100.0
4.75mm	No.4	7.5	341.2	97.8
Reduced	4.75mm	340.2		
2.00mm	No.10	6.8	333.4	95.9
850um	No.20	10.2	323.2	93.0
425um	No.40	12.3	310.9	89.4
250um	No.60	8.0	302.9	87.1
150um	No.100	7.3	295.6	85.0
75um	No.200	112.2	183.4	52.7
<75um	<No.200			

Mass of can and WET SOIL: 540.09 g
Mass of can and DRY SOIL: 458.51 g
Mass of can: 109.80 g
Moisture content: 23.4 %

T-90 PL = PI = 0

T-89 LL =

Gr: 4.1 %

Sa: 43.1 %

Si: 52.7 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: SaSi

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B112/S4

Report on Soil Sample

Lab Number: E21 51 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-112 Depth: 6 ft to: 8 ft Examined For: Class

Field Description: Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		488.2		
75mm	3in	0.0	488.2	100.0
37.5mm	1.5in	0.0	488.2	100.0
19mm	3/4in	0.0	488.2	100.0
9.5mm	3/8in	3.2	485.0	99.3
4.75mm	No.4	16.9	468.1	95.9
Reduced	4.75mm	267.9		
2.00mm	No.10	25.0	242.9	86.9
850um	No.20	85.3	157.6	56.4
425um	No.40	84.9	72.7	26.0
250um	No.60	35.5	37.2	13.3
150um	No.100	14.0	23.2	8.3
75um	No.200	10.2	13.0	4.7
<75um	<No.200			

Mass of can and WET SOIL: 610.91 g
Mass of can and DRY SOIL: 599.60 g
Mass of can: 111.42 g
Moisture content: 2.3 %

T-90 PL = PI = 0

T-89 LL =

Gr: 13.1 %

Sa: 82.3 %

Si: 4.7 %

100.0 %

M145: AASHTO Class: A-1-b

D2487: Soil Description: Sa

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B112/S2

Report on Soil Sample

Lab Number: E21 52 Report Date: 3/22/2023
Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher
Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023
Station: 0 + 0 Offset: 0 Hole: B-112 Depth: 2 ft to: 4 ft Examined For: Class
Field Description: Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		661.6		
75mm	3in	0.0	661.6	100.0
37.5mm	1.5in	0.0	661.6	100.0
19mm	3/4in	0.0	661.6	100.0
9.5mm	3/8in	0.0	661.6	100.0
4.75mm	No.4	2.3	659.3	99.7
Reduced	4.75mm	297.6		
2.00mm	No.10	0.6	297.0	99.5
850um	No.20	2.5	294.5	98.6
425um	No.40	3.9	290.6	97.3
250um	No.60	1.7	288.9	96.7
150um	No.100	14.4	274.5	91.9
75um	No.200	104.0	170.5	57.1
<75um	<No.200			

Mass of can and WET SOIL: 912.49 g
Mass of can and DRY SOIL: 775.20 g
Mass of can: 113.62 g
Moisture content: 20.8 %

T-90 PL = PI = 0

T-89 LL =

Gr: 0.5 %

Sa: 42.4 %

Si: 57.1 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: SaSi

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B112/S7

Report on Soil Sample

Lab Number: E21 53-A Report Date: 3/22/2023
Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher
Date Sampled: 2 / 9 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023
Station: 0 + 0 Offset: 0 Hole: B-112 Depth: 15 ft to: 17 ft Examined For: Class
Field Description: Silt (Big Bag) Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		576.9		
75mm	3in	0.0	576.9	100.0
37.5mm	1.5in	0.0	576.9	100.0
19mm	3/4in	0.0	576.9	100.0
9.5mm	3/8in	0.0	576.9	100.0
4.75mm	No.4	1.0	575.9	99.8
Reduced	4.75mm	246.7		
2.00mm	No.10	0.9	245.8	99.5
850um	No.20	0.5	245.3	99.3
425um	No.40	0.3	245.0	99.1
250um	No.60	0.4	244.6	99.0
150um	No.100	0.7	243.9	98.7
75um	No.200	3.6	240.3	97.2
<75um	<No.200			

Mass of can and WET SOIL: 859.76 g
Mass of can and DRY SOIL: 687.76 g
Mass of can: 110.89 g
Moisture content: 29.8 %
T-90 PL = PI = 0
T-89 LL =
Gr: 0.5 %
Sa: 2.2 %
Si: 97.2 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



**State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory**

B112/S7(Tip)

Report on Soil Sample

Lab Number: E21 53-B **Report Date:** 3/22/2023
Project: Springfield IM 091-1(83) **Site:** **Tested By:** B. Fletcher
Date Sampled: 2 / 9 / 2023 **Date Received:** 2 / 22 / 2023 **Date Tested:** 3 / 6 / 2023
Station: 0 + 0 **Offset:** 0 **Hole:** B-112 **Depth:** 15 ft to: 17 ft **Examined For:** Class
Field Description: Silt (Small Bag) **Submitted By:** GD **Sample Type:** SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		70.9		
75mm	3in	0.0	70.9	100.0
37.5mm	1.5in	0.0	70.9	100.0
19mm	3/4in	0.0	70.9	100.0
9.5mm	3/8in	0.0	70.9	100.0
4.75mm	No.4	0.0	70.9	100.0
Reduced	4.75mm	70.9		
2.00mm	No.10	2.6	68.3	96.3
850um	No.20	3.4	64.9	91.5
425um	No.40	0.9	64.0	90.3
250um	No.60	0.4	63.6	89.7
150um	No.100	0.6	63.0	88.9
75um	No.200	1.1	61.9	87.3
<75um	<No.200			

Mass of can and WET SOIL: 211.53 g
Mass of can and DRY SOIL: 186.12 g
Mass of can: 115.22 g
Moisture content: 35.8 %

T-90 PL = **PI =** 0

T-89 LL =

Gr: 3.7 %

Sa: 9.0 %

Si: 87.3 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: Si

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
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Central Laboratory

B112/S9

Report on Soil Sample

Lab Number: E21 54 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-112 Depth: 25 ft to: 27 ft Examined For: Class

Field Description: Sand Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		449.9		
75mm	3in	0.0	449.9	100.0
37.5mm	1.5in	0.0	449.9	100.0
19mm	3/4in	0.0	449.9	100.0
9.5mm	3/8in	0.0	449.9	100.0
4.75mm	No.4	0.0	449.9	100.0
Reduced	4.75mm	249.3		
2.00mm	No.10	0.0	249.3	100.0
850um	No.20	0.2	249.1	99.9
425um	No.40	0.2	248.9	99.8
250um	No.60	0.1	248.8	99.8
150um	No.100	0.3	248.5	99.7
75um	No.200	36.7	211.8	85.0
<75um	<No.200			

Mass of can and WET SOIL: 711.58 g
Mass of can and DRY SOIL: 560.12 g
Mass of can: 110.18 g
Moisture content: 33.7 %

T-90 PL = PI = 0

T-89 LL =

Gr: 0.0 %

Sa: 15.0 %

Si: 85.0 %
100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: Si

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
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B112/S11

Report on Soil Sample

Lab Number: E21 55

Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-112 Depth: 35 ft to: 37 ft Examined For: Class

Field Description: Silt Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		460.6		
75mm	3in	0.0	460.6	100.0
37.5mm	1.5in	0.0	460.6	100.0
19mm	3/4in	0.0	460.6	100.0
9.5mm	3/8in	7.7	452.9	98.3
4.75mm	No.4	1.7	451.2	98.0
Reduced	4.75mm	247.6		
2.00mm	No.10	0.1	247.5	97.9
850um	No.20	0.0	247.5	97.9
425um	No.40	0.0	247.5	97.9
250um	No.60	0.1	247.4	97.9
150um	No.100	0.1	247.3	97.8
75um	No.200	15.9	231.4	91.5
<75um	<No.200			

Mass of can and WET SOIL: 723.66 g
Mass of can and DRY SOIL: 570.65 g
Mass of can: 110.08 g
Moisture content: 33.2 %

T-90 PL = PI = 0

T-89 LL =

Gr: 2.1 %

Sa: 6.4 %

Si: 91.5 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: Si

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B112/S13

Report on Soil Sample

Lab Number: E21 56 Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-112 Depth: 45 ft to: 47 ft Examined For: Class

Field Description: Silt Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		653.5		
75mm	3in	0.0	653.5	100.0
37.5mm	1.5in	0.0	653.5	100.0
19mm	3/4in	0.0	653.5	100.0
9.5mm	3/8in	3.0	650.5	99.5
4.75mm	No.4	2.2	648.3	99.2
Reduced	4.75mm	297.6		
2.00mm	No.10	0.4	297.2	99.1
850um	No.20	0.2	297.0	99.0
425um	No.40	0.1	296.9	99.0
250um	No.60	0.1	296.8	98.9
150um	No.100	0.1	296.7	98.9
75um	No.200	13.3	283.4	94.5
<75um	<No.200			

Mass of can and WET SOIL: 988.48 g
Mass of can and DRY SOIL: 762.31 g
Mass of can: 108.77 g
Moisture content: 34.6 %

T-90 PL = PI = 0

T-89 LL =

Gr: 0.9 %

Sa: 4.6 %

Si: 94.5 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: Si

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B112/S15

Report on Soil Sample

Lab Number: E21 57-A Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-112 Depth: 55 ft to: 57 ft Examined For: Class

Field Description: Sand (Big Bag) Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		473.4		
75mm	3in	0.0	473.4	100.0
37.5mm	1.5in	0.0	473.4	100.0
19mm	3/4in	0.0	473.4	100.0
9.5mm	3/8in	0.0	473.4	100.0
4.75mm	No.4	0.0	473.4	100.0
Reduced	4.75mm	259.2		
2.00mm	No.10	0.1	259.1	100.0
850um	No.20	0.1	259.0	99.9
425um	No.40	0.8	258.2	99.6
250um	No.60	0.3	257.9	99.5
150um	No.100	6.3	251.6	97.1
75um	No.200	86.3	165.3	63.8
<75um	<No.200			

Mass of can and WET SOIL: 614.49 g
Mass of can and DRY SOIL: 582.43 g
Mass of can: 109.08 g
Moisture content: 6.8 %

T-90 PL = PI = 0

T-89 LL =

Gr: 0.0 %

Sa: 36.2 %

Si: 63.8 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: SaSi

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B112/S15 (Tip)

Report on Soil Sample

Lab Number: E21 57-B Report Date: 3/22/2023

Project: Springfield IM 091-1(83) Site: Tested By: B. Fletcher

Date Sampled: 2 / 10 / 2023 Date Received: 2 / 22 / 2023 Date Tested: 3 / 6 / 2023

Station: 0 + 0 Offset: 0 Hole: B-112 Depth: 55 ft to: 57 ft Examined For: Class

Field Description: Sand (Small Bag) Submitted By: GD Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		28.2		
75mm	3in	0.0	28.2	100.0
37.5mm	1.5in	0.0	28.2	100.0
19mm	3/4in	0.0	28.2	100.0
9.5mm	3/8in	0.0	28.2	100.0
4.75mm	No.4	0.0	28.2	100.0
Reduced	4.75mm	28.2		
2.00mm	No.10	0.6	27.6	97.9
850um	No.20	0.8	26.8	95.0
425um	No.40	0.1	26.7	94.7
250um	No.60	0.1	26.6	94.3
150um	No.100	0.1	26.5	94.0
75um	No.200	1.0	25.5	90.4
<75um	<No.200			

Mass of can and WET SOIL: 307.73 g
Mass of can and DRY SOIL: 299.53 g
Mass of can: 271.36 g
Moisture content: 29.1 %

T-90 PL = PI = 0

T-89 LL =

Gr: 2.1 %

Sa: 7.5 %

Si: 90.4 %

100.0 %

M145: AASHTO Class: A-4

D2487: Soil Description: Si

Comments: 0

Reviewed By: August Arles, Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B101/S2

Report on Soil Sample

Lab Number: E21 168 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 19 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-101 Depth: 2 ft to: 4 ft Examined For: Class
Field Description: Sand Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		315.5		
75mm	3in	0.0	315.5	100.0
37.5mm	1.5in	0.0	315.5	100.0
19mm	3/4in	0.0	315.5	100.0
9.5mm	3/8in	0.0	315.5	100.0
4.75mm	No.4	1.6	313.9	99.5
Reduced	4.75mm	202.8		
2.00mm	No.10	1.1	201.7	99.0
850um	No.20	3.2	198.5	97.4
425um	No.40	11.0	187.5	92.0
250um	No.60	14.8	172.7	84.7
150um	No.100	27.2	145.5	71.4
75um	No.200	91.0	54.5	26.7
<75um	<No.200			

Mass of can and WET SOIL: 618.78 g
Mass of can and DRY SOIL: 586.82 g
Mass of can: 271.36 g
Moisture content: 10.1 %
T-90 PL = PI = 0
T-89 LL =
Gr: 1.0 %
Sa: 72.2 %
Si: 26.7 %
100.0 %
M145: AASHTO Class: A-2-4
D2487: Soil Description: SiSa

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B101/S6

Report on Soil Sample

Lab Number: E21 169 Report Date: 5/18/2023

Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo

Date Sampled: 4 / 19 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23

Station: 0 + 0 Offset: 0 Hole: B-101 Depth: 15 ft to: 17 ft Examined For: Class

Field Description: Sand and Silt Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		340.6		
75mm	3in	0.0	340.6	100.0
37.5mm	1.5in	0.0	340.6	100.0
19mm	3/4in	0.0	340.6	100.0
9.5mm	3/8in	0.0	340.6	100.0
4.75mm	No.4	0.0	340.6	100.0
Reduced	4.75mm	202.9		
2.00mm	No.10	0.0	202.9	100.0
850um	No.20	0.1	202.8	100.0
425um	No.40	0.1	202.7	99.9
250um	No.60	0.2	202.5	99.8
150um	No.100	0.6	201.9	99.5
75um	No.200	22.1	179.8	88.6
<75um	<No.200			

Mass of can and WET SOIL: 717.02 g
 Mass of can and DRY SOIL: 609.99 g
 Mass of can: 269.36 g
 Moisture content: 31.4 %

T-90 PL = PI = 0
 T-89 LL =

Gr: 0.0 %
 Sa: 11.4 %
 Si: 88.6 %
 100.0 %

M145: AASHTO Class: A-4
 D2487: Soil Description: Si

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



State of Vermont
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B101/S9

Report on Soil Sample

Lab Number: E21 170 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 19 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-101 Depth: 30 ft to: 32 ft Examined For: Class
Field Description: Sand and Silt Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		162.9		
75mm	3in	0.0	162.9	100.0
37.5mm	1.5in	0.0	162.9	100.0
19mm	3/4in	0.0	162.9	100.0
9.5mm	3/8in	0.0	162.9	100.0
4.75mm	No.4	0.0	162.9	100.0
Reduced	4.75mm	0.0		
2.00mm	No.10	0.0	162.9	100.0
850um	No.20	0.0	162.9	100.0
425um	No.40	0.1	162.8	99.9
250um	No.60	0.0	162.8	99.9
150um	No.100	0.1	162.7	99.9
75um	No.200	1.9	160.8	98.7
<75um	<No.200			

Mass of can and WET SOIL: 487.33 g
Mass of can and DRY SOIL: 435.16 g
Mass of can: 272.31 g
Moisture content: 32 %
T-90 PL = PI = 0
T-89 LL =
Gr: 0.0 %
Sa: 1.3 %
Si: 98.7 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



State of Vermont
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B101/S18

Report on Soil Sample

Lab Number: E21 171 Report Date: 5/18/2023
Project: Springfield IM 091-I(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 19 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-101 Depth: 75 ft to: 77 ft Examined For: Class
Field Description: silty clay Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		356.5		
75mm	3in	0.0	356.5	100.0
37.5mm	1.5in	0.0	356.5	100.0
19mm	3/4in	0.0	356.5	100.0
9.5mm	3/8in	17.5	339.0	95.1
4.75mm	No.4	24.3	314.7	88.3
Reduced	4.75mm	206.1		
2.00mm	No.10	17.0	189.1	81.0
850um	No.20	14.9	174.2	74.6
425um	No.40	11.2	163.0	69.8
250um	No.60	10.6	152.4	65.3
150um	No.100	14.6	137.8	59.0
75um	No.200	22.0	115.8	49.6
<75um	<No.200			

Mass of can and WET SOIL: 660.80 g
Mass of can and DRY SOIL: 626.49 g
Mass of can: 269.95 g
Moisture content: 9.6 %
T-90 PL = PI = 0
T-89 LL =
Gr: 19.0 %
Sa: 31.4 %
Si: 49.6 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: SaSi

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



State of Vermont
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B102/S2

Report on Soil Sample

Lab Number: E21 172 Report Date: 5/18/2023

Project: Springfield IM 091-I(83) Site: Tested By: E. Denardo

Date Sampled: 4 / 21 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23

Station: 0 + 0 Offset: 0 Hole: B-102 Depth: 2 ft to: 4 ft Examined For: Class

Field Description: Sand Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		470.1		
75mm	3in	0.0	470.1	100.0
37.5mm	1.5in	0.0	470.1	100.0
19mm	3/4in	0.0	470.1	100.0
9.5mm	3/8in	23.6	446.5	95.0
4.75mm	No.4	25.6	420.9	89.5
Reduced	4.75mm	225.8		
2.00mm	No.10	34.6	191.2	75.8
850um	No.20	48.9	142.3	56.4
425um	No.40	56.3	86.0	34.1
250um	No.60	35.6	50.4	20.0
150um	No.100	19.5	30.9	12.3
75um	No.200	13.8	17.1	6.8
<75um	<No.200			

Mass of can and WET SOIL: 756.91 g
 Mass of can and DRY SOIL: 739.59 g
 Mass of can: 269.53 g
 Moisture content: 3.7 %

T-90 PL = PI = 0
 T-89 LL =

Gr: 24.2 %
 Sa: 69.0 %
 Si: 6.8 %
 100.0 %

M145: AASHTO Class: A-1-b
 D2487: Soil Description: GrSa

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



State of Vermont
Agency of Transportation
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B102/S6

Report on Soil Sample

Lab Number: E21 173 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 21 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-102 Depth: 15 ft to: 17 ft Examined For: Class
Field Description: Sand Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		243.5		
75mm	3in	0.0	243.5	100.0
37.5mm	1.5in	0.0	243.5	100.0
19mm	3/4in	0.0	243.5	100.0
9.5mm	3/8in	0.0	243.5	100.0
4.75mm	No.4	0.0	243.5	100.0
Reduced	4.75mm	0.0		
2.00mm	No.10	0.0	243.5	100.0
850um	No.20	0.0	243.5	100.0
425um	No.40	0.1	243.4	100.0
250um	No.60	0.0	243.4	100.0
150um	No.100	1.3	242.1	99.4
75um	No.200	42.7	199.4	81.9
<75um	<No.200			

Mass of can and WET SOIL: 586.45 g
Mass of can and DRY SOIL: 515.52 g
Mass of can: 272.05 g
Moisture content: 29.1 %
T-90 PL = PI = 0
T-89 LL =
Gr: 0.0 %
Sa: 18.1 %
Si: 81.9 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B102/S11

Report on Soil Sample

Lab Number: E21 174 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 21 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-102 Depth: 40 ft to: 42 ft Examined For: Class
Field Description: Sand and Silt Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		364.2		
75mm	3in	0.0	364.2	100.0
37.5mm	1.5in	0.0	364.2	100.0
19mm	3/4in	0.0	364.2	100.0
9.5mm	3/8in	0.0	364.2	100.0
4.75mm	No.4	0.6	363.6	99.8
Reduced	4.75mm	215.6		
2.00mm	No.10	0.0	215.6	99.8
850um	No.20	0.1	215.5	99.8
425um	No.40	0.2	215.3	99.7
250um	No.60	0.3	215.0	99.6
150um	No.100	0.9	214.1	99.1
75um	No.200	12.1	202.0	93.5
<75um	<No.200			

Mass of can and WET SOIL: 750.22 g
Mass of can and DRY SOIL: 635.09 g
Mass of can: 270.86 g
Moisture content: 31.6 %
T-90 PL = PI = 0
T-89 LL =
Gr: 0.2 %
Sa: 6.3 %
Si: 93.5 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



State of Vermont
Agency of Transportation
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B102/S19

Report on Soil Sample

Lab Number: E21 175 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 21 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-102 Depth: 80 ft to: 82 ft Examined For: Class
Field Description: Sand and Silt Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		338.6		
75mm	3in	0.0	338.6	100.0
37.5mm	1.5in	0.0	338.6	100.0
19mm	3/4in	0.0	338.6	100.0
9.5mm	3/8in	0.0	338.6	100.0
4.75mm	No.4	0.0	338.6	100.0
Reduced	4.75mm	194.1		
2.00mm	No.10	0.0	194.1	100.0
850um	No.20	0.0	194.1	100.0
425um	No.40	0.0	194.1	100.0
250um	No.60	0.0	194.1	100.0
150um	No.100	0.4	193.7	99.8
75um	No.200	25.7	168.0	86.6
<75um	<No.200			

Mass of can and WET SOIL: 682.68 g
Mass of can and DRY SOIL: 611.06 g
Mass of can: 272.42 g
Moisture content: 21.1 %
T-90 PL = PI = 0
T-89 LL =
Gr: 0.0 %
Sa: 13.4 %
Si: 86.6 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



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B103/S2

Report on Soil Sample

Lab Number: E21 176 Report Date: 5/18/2023

Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo

Date Sampled: 4 / 25 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23

Station: 0 + 0 Offset: 0 Hole: B-103 Depth: 2 ft to: 4 ft Examined For: Class

Field Description: Sand Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		282.4		
75mm	3in	0.0	282.4	100.0
37.5mm	1.5in	0.0	282.4	100.0
19mm	3/4in	0.0	282.4	100.0
9.5mm	3/8in	3.2	279.2	98.9
4.75mm	No.4	3.7	275.5	97.6
Reduced	4.75mm	189.5		
2.00mm	No.10	6.3	183.2	94.3
850um	No.20	15.8	167.4	86.2
425um	No.40	33.1	134.3	69.1
250um	No.60	41.9	92.4	47.6
150um	No.100	44.3	48.1	24.8
75um	No.200	26.9	21.2	10.9
<75um	<No.200			

Mass of can and WET SOIL: 565.37 g
 Mass of can and DRY SOIL: 552.33 g
 Mass of can: 269.98 g
 Moisture content: 4.6 %

T-90 PL = PI = 0
 T-89 LL =

Gr: 5.7 %
 Sa: 83.4 %
 Si: 10.9 %
 100.0 %

M145: AASHTO Class: A-2-4
 D2487: Soil Description: Sa

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



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B103/S5

Report on Soil Sample

Lab Number: E21 177 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 25 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-103 Depth: 10 ft to: 12 ft Examined For: Class
Field Description: Silt Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		281.8		
75mm	3in	0.0	281.8	100.0
37.5mm	1.5in	0.0	281.8	100.0
19mm	3/4in	0.0	281.8	100.0
9.5mm	3/8in	0.0	281.8	100.0
4.75mm	No.4	0.0	281.8	100.0
Reduced	4.75mm	188.0		
2.00mm	No.10	0.0	188.0	100.0
850um	No.20	0.0	188.0	100.0
425um	No.40	0.3	187.7	99.8
250um	No.60	0.1	187.6	99.8
150um	No.100	0.2	187.4	99.7
75um	No.200	3.2	184.2	98.0
<75um	<No.200			

Mass of can and WET SOIL: 635.86 g
Mass of can and DRY SOIL: 553.52 g
Mass of can: 271.77 g
Moisture content: 29.2 %
T-90 PL = PI = 0
T-89 LL =
Gr: 0.0 %
Sa: 2.0 %
Si: 98.0 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



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B103/S9

Report on Soil Sample

Lab Number: E21 178 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 25 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-103 Depth: 30 ft to: 32 ft Examined For: Class
Field Description: Silt Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		296.0		
75mm	3in	0.0	296.0	100.0
37.5mm	1.5in	0.0	296.0	100.0
19mm	3/4in	0.0	296.0	100.0
9.5mm	3/8in	0.0	296.0	100.0
4.75mm	No.4	0.0	296.0	100.0
Reduced	4.75mm	213.9		
2.00mm	No.10	0.9	213.0	99.6
850um	No.20	0.4	212.6	99.4
425um	No.40	0.1	212.5	99.3
250um	No.60	0.0	212.5	99.3
150um	No.100	0.0	212.5	99.3
75um	No.200	1.6	210.9	98.6
<75um	<No.200			

Mass of can and WET SOIL: 501.56 g
Mass of can and DRY SOIL: 407.00 g
Mass of can: 111.01 g
Moisture content: 31.9 %
T-90 PL = PI = 0
T-89 LL =
Gr: 0.4 %
Sa: 1.0 %
Si: 98.6 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



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B103/S13

Report on Soil Sample

Lab Number: E21 179 Report Date: 5/18/2023

Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo

Date Sampled: 4 / 25 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23

Station: 0 + 0 Offset: 0 Hole: B-103 Depth: 50 ft to: 52 ft Examined For: Class

Field Description: Till Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		487.5		
75mm	3in	0.0	487.5	100.0
37.5mm	1.5in	0.0	487.5	100.0
19mm	3/4in	0.0	487.5	100.0
9.5mm	3/8in	21.7	465.8	95.5
4.75mm	No.4	22.2	443.6	91.0
Reduced	4.75mm	195.2		
2.00mm	No.10	10.5	184.7	86.1
850um	No.20	10.5	174.2	81.2
425um	No.40	9.5	164.7	76.8
250um	No.60	11.7	153.0	71.3
150um	No.100	19.6	133.4	62.2
75um	No.200	28.1	105.3	49.1
<75um	<No.200			

Mass of can and WET SOIL: 655.54 g
 Mass of can and DRY SOIL: 596.60 g
 Mass of can: 109.12 g
 Moisture content: 12.1 %

T-90 PL = PI = 0
 T-89 LL =

Gr: 13.9 %
 Sa: 37.0 %
 Si: 49.1 %
 100.0 %

M145: AASHTO Class: A-4
 D2487: Soil Description: SaSi

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



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B104/S1

Report on Soil Sample

Lab Number: E21 180 Report Date: 5/18/2023
Project: Springfield IM 091-I(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 26 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-104 Depth: 0 ft to: 2 ft Examined For: Class
Field Description: Sand and Gravel Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		379.4		
75mm	3in	0.0	379.4	100.0
37.5mm	1.5in	0.0	379.4	100.0
19mm	3/4in	80.8	298.6	78.7
9.5mm	3/8in	90.8	207.8	54.8
4.75mm	No.4	54.8	153.0	40.3
Reduced	4.75mm	0.0		
2.00mm	No.10	30.9	122.1	32.2
850um	No.20	25.3	96.8	25.5
425um	No.40	26.1	70.7	18.6
250um	No.60	19.4	51.3	13.5
150um	No.100	11.4	39.9	10.5
75um	No.200	11.8	28.1	7.4
<75um	<No.200			

Mass of can and WET SOIL: 496.02 g
Mass of can and DRY SOIL: 490.86 g
Mass of can: 111.48 g
Moisture content: 1.4 %
T-90 PL = PI = 0
T-89 LL =
Gr: 67.8 %
Sa: 24.8 %
Si: 7.4 %
100.0 %
M145: AASHTO Class: A-1-a
D2487: Soil Description: SaGr

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



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B104/S4

Report on Soil Sample

Lab Number: E21 181 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 26 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-104 Depth: 7 ft to: 9 ft Examined For: Class
Field Description: Silt and sand Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		255.5		
75mm	3in	0.0	255.5	100.0
37.5mm	1.5in	0.0	255.5	100.0
19mm	3/4in	0.0	255.5	100.0
9.5mm	3/8in	0.0	255.5	100.0
4.75mm	No.4	0.0	255.5	100.0
Reduced	4.75mm	191.2		
2.00mm	No.10	0.0	191.2	100.0
850um	No.20	0.1	191.1	99.9
425um	No.40	0.1	191.0	99.9
250um	No.60	0.1	190.9	99.8
150um	No.100	0.5	190.4	99.6
75um	No.200	4.9	185.5	97.0
<75um	<No.200			

Mass of can and WET SOIL: 433.60 g
Mass of can and DRY SOIL: 369.09 g
Mass of can: 113.55 g
Moisture content: 25.2 %
T-90 PL = PI = 0
T-89 LL =
Gr: 0.0 %
Sa: 3.0 %
Si: 97.0 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



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B104/S10

Report on Soil Sample

Lab Number: E21 182 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 26 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-104 Depth: 35 ft to: 37 ft Examined For: Class
Field Description: Silt Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		195.0		
75mm	3in	0.0	195.0	100.0
37.5mm	1.5in	0.0	195.0	100.0
19mm	3/4in	0.0	195.0	100.0
9.5mm	3/8in	0.0	195.0	100.0
4.75mm	No.4	0.0	195.0	100.0
Reduced	4.75mm	0.0		
2.00mm	No.10	0.0	195.0	100.0
850um	No.20	0.0	195.0	100.0
425um	No.40	0.0	195.0	100.0
250um	No.60	0.0	195.0	100.0
150um	No.100	0.0	195.0	100.0
75um	No.200	16.3	178.7	91.6
<75um	<No.200			

Mass of can and WET SOIL: 356.30 g
Mass of can and DRY SOIL: 304.95 g
Mass of can: 109.97 g
Moisture content: 26.3 %
T-90 PL = PI = 0
T-89 LL =
Gr: 0.0 %
Sa: 8.4 %
Si: 91.6 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



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B104/S14

Report on Soil Sample

Lab Number: E21 183 Report Date: 5/18/2023
Project: Springfield IM 091-I(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 26 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-103 Depth: 55 ft to: 57 ft Examined For: Class
Field Description: Silt Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		238.2		
75mm	3in	0.0	238.2	100.0
37.5mm	1.5in	0.0	238.2	100.0
19mm	3/4in	0.0	238.2	100.0
9.5mm	3/8in	0.0	238.2	100.0
4.75mm	No.4	0.6	237.6	99.7
Reduced	4.75mm	195.4		
2.00mm	No.10	0.3	195.1	99.6
850um	No.20	0.3	194.8	99.4
425um	No.40	0.3	194.5	99.3
250um	No.60	0.4	194.1	99.1
150um	No.100	0.7	193.4	98.7
75um	No.200	9.9	183.5	93.7
<75um	<No.200			

Mass of can and WET SOIL: 413.77 g
Mass of can and DRY SOIL: 347.77 g
Mass of can: 109.55 g
Moisture content: 27.7 %

T-90 PL = PI = 0
T-89 LL =

Gr: 0.4 %
Sa: 5.9 %
Si: 93.7 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



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B105/S3

Report on Soil Sample

Lab Number: E21 184 Report Date: 5/18/2023
Project: Springfield IM 091-I(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 17 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-105 Depth: 5 ft to: 7 ft Examined For: Class
Field Description: Sand Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		541.8		
75mm	3in	0.0	541.8	100.0
37.5mm	1.5in	0.0	541.8	100.0
19mm	3/4in	0.0	541.8	100.0
9.5mm	3/8in	8.3	533.5	98.5
4.75mm	No.4	19.1	514.4	94.9
Reduced	4.75mm	236.8		
2.00mm	No.10	11.9	224.9	90.2
850um	No.20	11.0	213.9	85.8
425um	No.40	21.8	192.1	77.0
250um	No.60	43.9	148.2	59.4
150um	No.100	60.2	88.0	35.3
75um	No.200	62.7	25.3	10.1
<75um	<No.200			

Mass of can and WET SOIL: 699.43 g
Mass of can and DRY SOIL: 650.84 g
Mass of can: 109.08 g
Moisture content: 9 %
T-90 PL = PI = 0
T-89 LL =
Gr: 9.8 %
Sa: 80.0 %
Si: 10.1 %
100.0 %
M145: AASHTO Class: A-2-4
D2487: Soil Description: Sa

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



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B105/S4

Report on Soil Sample

Lab Number: E21 185 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 17 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-105 Depth: 7 ft to: 9 ft Examined For: Class
Field Description: 0 Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		500.1		
75mm	3in	0.0	500.1	100.0
37.5mm	1.5in	0.0	500.1	100.0
19mm	3/4in	0.0	500.1	100.0
9.5mm	3/8in	28.8	471.3	94.2
4.75mm	No.4	48.1	423.2	84.6
Reduced	4.75mm	197.8		
2.00mm	No.10	35.6	162.2	69.4
850um	No.20	45.8	116.4	49.8
425um	No.40	45.6	70.8	30.3
250um	No.60	31.2	39.6	16.9
150um	No.100	14.4	25.2	10.8
75um	No.200	9.9	15.3	6.5
<75um	<No.200			

Mass of can and WET SOIL: 628.48 g
Mass of can and DRY SOIL: 610.21 g
Mass of can: 110.09 g
Moisture content: 3.7 %
T-90 PL = PI = 0
T-89 LL =
Gr: 30.6 %
Sa: 62.8 %
Si: 6.5 %
100.0 %
M145: AASHTO Class: A-1-b
D2487: Soil Description: GrSa

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B105/S10

Report on Soil Sample

Lab Number: E21 186 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 17 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-105 Depth: 35 ft to: 37 ft Examined For: Class
Field Description: Silt Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		344.8		
75mm	3in	0.0	344.8	100.0
37.5mm	1.5in	0.0	344.8	100.0
19mm	3/4in	0.0	344.8	100.0
9.5mm	3/8in	0.0	344.8	100.0
4.75mm	No.4	0.0	344.8	100.0
Reduced	4.75mm	191.4		
2.00mm	No.10	0.5	190.9	99.7
850um	No.20	0.1	190.8	99.7
425um	No.40	0.2	190.6	99.6
250um	No.60	0.2	190.4	99.5
150um	No.100	0.4	190.0	99.3
75um	No.200	3.3	186.7	97.5
<75um	<No.200			

Mass of can and WET SOIL: 569.35 g
Mass of can and DRY SOIL: 455.65 g
Mass of can: 110.89 g
Moisture content: 33 %
T-90 PL = PI = 0
T-89 LL =
Gr: 0.3 %
Sa: 2.2 %
Si: 97.5 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



**State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory**

B105/S14

Report on Soil Sample

Lab Number: E21 187 **Report Date:** 5/18/2023

Project: Springfield IM 091-1(83) **Site:** **Tested By:** E. Denardo

Date Sampled: 4 / 17 / 23 **Date Received:** 5 / 8 / 23 **Date Tested:** 5 / 10 / 23

Station: 0 + 0 **Offset:** 0 **Hole:** B-105 **Depth:** 55 ft to: 57 ft **Examined For:** Class

Field Description: Silt **Submitted By:** GeoDesign **Sample Type:** SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		249.4		
75mm	3in	0.0	249.4	100.0
37.5mm	1.5in	0.0	249.4	100.0
19mm	3/4in	0.0	249.4	100.0
9.5mm	3/8in	0.0	249.4	100.0
4.75mm	No.4	0.0	249.4	100.0
Reduced	4.75mm	208.7		
2.00mm	No.10	0.0	208.7	100.0
850um	No.20	0.0	208.7	100.0
425um	No.40	0.0	208.7	100.0
250um	No.60	0.0	208.7	100.0
150um	No.100	14.6	194.1	93.0
75um	No.200	30.7	163.4	78.3
<75um	<No.200			

Mass of can and WET SOIL: 424.12 g
Mass of can and DRY SOIL: 358.12 g
Mass of can: 108.73 g
Moisture content: 26.5 %

T-90 PL = PI = 0

T-89 LL =

Gr: 0.0 %
Sa: 21.7 %
Si: 78.3 %
 100.0 %

M145: AASHTO Class: A-4
D2487: Soil Description: SaSi

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B106/S2

Report on Soil Sample

Lab Number: E21 188 Report Date: 5/18/2023
Project: Springfield IM 091-I(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 24 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-106 Depth: 5 ft to: 7 ft Examined For: Class
Field Description: Sand Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		239.9		
75mm	3in	0.0	239.9	100.0
37.5mm	1.5in	0.0	239.9	100.0
19mm	3/4in	0.0	239.9	100.0
9.5mm	3/8in	1.4	238.5	99.4
4.75mm	No.4	0.5	238.0	99.2
Reduced	4.75mm	0.0		
2.00mm	No.10	1.0	237.0	98.8
850um	No.20	2.3	234.7	97.8
425um	No.40	3.7	231.0	96.3
250um	No.60	5.9	225.1	93.8
150um	No.100	15.4	209.7	87.4
75um	No.200	73.7	136.0	56.7
<75um	<No.200			

Mass of can and WET SOIL: 385.06 g
Mass of can and DRY SOIL: 349.88 g
Mass of can: 109.94 g
Moisture content: 14.7 %

T-90 PL = PI = 0
T-89 LL =

Gr: 1.2 %
Sa: 42.1 %
Si: 56.7 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: SaSi

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B106/S4

Report on Soil Sample

Lab Number: E21 189 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 24 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-106 Depth: 20 ft to: 22 ft Examined For: Class
Field Description: Sand Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		357.7		
75mm	3in	0.0	357.7	100.0
37.5mm	1.5in	0.0	357.7	100.0
19mm	3/4in	0.0	357.7	100.0
9.5mm	3/8in	13.7	344.0	96.2
4.75mm	No.4	3.9	340.1	95.1
Reduced	4.75mm	186.8		
2.00mm	No.10	3.6	183.2	93.2
850um	No.20	5.7	177.5	90.3
425um	No.40	7.2	170.3	86.7
250um	No.60	8.4	161.9	82.4
150um	No.100	20.6	141.3	71.9
75um	No.200	56.6	84.7	43.1
<75um	<No.200			

Mass of can and WET SOIL: 534.90 g
Mass of can and DRY SOIL: 467.35 g
Mass of can: 109.65 g
Moisture content: 18.9 %

T-90 PL = PI = 0
T-89 LL =

Gr: 6.8 %
Sa: 50.1 %
Si: 43.1 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: SaSi

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B106/S6

Report on Soil Sample

Lab Number: E21 190 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 24 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-106 Depth: 40 ft to: 42 ft Examined For: Class
Field Description: Silt Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		163.1		
75mm	3in	0.0	163.1	100.0
37.5mm	1.5in	0.0	163.1	100.0
19mm	3/4in	0.0	163.1	100.0
9.5mm	3/8in	0.0	163.1	100.0
4.75mm	No.4	0.0	163.1	100.0
Reduced	4.75mm	0.0		
2.00mm	No.10	0.8	162.3	99.5
850um	No.20	0.2	162.1	99.4
425um	No.40	0.0	162.1	99.4
250um	No.60	0.0	162.1	99.4
150um	No.100	0.0	162.1	99.4
75um	No.200	5.7	156.4	95.9
<75um	<No.200			

Mass of can and WET SOIL: 318.55 g
Mass of can and DRY SOIL: 272.84 g
Mass of can: 109.77 g
Moisture content: 28 %
T-90 PL = PI = 0
T-89 LL =
Gr: 0.5 %
Sa: 3.6 %
Si: 95.9 %
100.0 %
M145: AASHTO Class: A-4
D2487: Soil Description: Si

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer



State of Vermont
Agency of Transportation
Construction and Materials Bureau
Central Laboratory

B106/S9

Report on Soil Sample

Lab Number: E21 191 Report Date: 5/18/2023
Project: Springfield IM 091-1(83) Site: Tested By: E. Denardo
Date Sampled: 4 / 24 / 23 Date Received: 5 / 8 / 23 Date Tested: 5 / 10 / 23
Station: 0 + 0 Offset: 0 Hole: B-105 Depth: 70 ft to: 72 ft Examined For: Class
Field Description: Till Submitted By: GeoDesign Sample Type: SS

Test Results

T-88 Sieve Analysis

T-265 Moisture Content

	TOTAL:	Wt Retained	Wt Passing	% Passing
		77.1		
75mm	3in	0.0	77.1	100.0
37.5mm	1.5in	0.0	77.1	100.0
19mm	3/4in	0.0	77.1	100.0
9.5mm	3/8in	12.9	64.2	83.3
4.75mm	No.4	18.6	45.6	59.1
Reduced	4.75mm	0.0		
2.00mm	No.10	7.1	38.5	49.9
850um	No.20	6.4	32.1	41.6
425um	No.40	4.5	27.6	35.8
250um	No.60	3.0	24.6	31.9
150um	No.100	2.5	22.1	28.7
75um	No.200	3.1	19.0	24.6
<75um	<No.200			

Mass of can and WET SOIL: 191.71 g
Mass of can and DRY SOIL: 185.24 g
Mass of can: 108.14 g
Moisture content: 8.4 %
T-90 PL = PI = 0
T-89 LL =
Gr: 50.1 %
Sa: 25.3 %
Si: 24.6 %
100.0 %
M145: AASHTO Class: A-1-b
D2487: Soil Description: SiSaGr

Comments: 0

Reviewed By: Eric Denardo, P.E., Geotechnical Engineer

APPENDIX D

LIMITATIONS



GEODesign, Inc.
85 Granite Shed Lane
Unit #1
Montpelier, VT 05602
(802) 674-2033

Geotechnical Limitations

Explorations

1. The analyses and recommendations submitted in this report are based in part upon the data obtained from widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more erratic. For specific information, refer to the boring logs.
3. Water level readings and moisture conditions have been made in the explorations, and from the samples at times and under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater and moisture condition may occur due to variations in rainfall, temperature, and other factors occurring since the time measurements were made.

Review

4. In the event that any changes in the nature, design or location of the proposed structures is planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by GEODesign, Inc. We recommend that we be provided the opportunity to review and comment on the finalized project design and relevant construction specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications.

Use of Report

5. This report has been prepared for the exclusive use of **VTrans**, for specific application to the **Springfield IM 091-1(83)** project, as described in GEODesign's scope of services/ contract and related documents, in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made.
6. This report has been prepared for this specific project by GEODesign, Inc. This report is for design purposes only and is not sufficient to prepare an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to design considerations only, unless otherwise specified in the report.
7. Unless otherwise noted, the scope of our services did not include environmental assessment or investigation for the presence of hazardous or toxic materials in the soil, surface water, groundwater or air, on, below, or around this site.