



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

BORING LOG

Clarendon BRO 1443 (48)
Clarendon, VT

Boring No.: B-1
Page No.: 1 of 1
Pin No.: 12J160
Checked By: JFW

Boring Crew: J. Leonhardt (TransTech), J. Gilman (GeoDesign)
Date Started: 3/04/13 Date Finished: 3/05/13
VTSPG NAD83: N 383263 ft E 1501635 ft
Station: 11+50 Offset: 7LT
Ground Elevation: 647 ft

Type: FJ SS
I.D.: 4 in 1.38 in
Hammer Wt: N.A. 140 lb.
Hammer Fall: N.A. 30 in.
Hammer/Rod Type: Manual/Auto/NWJ
Rig: SEE REMARK 3 BELOW

Groundwater Observations

Date	Depth (ft)	Notes
03/04/13	10.0	Wet sample

Depth (ft)	Strata (i)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (ROD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
5	X X X	S1 (0.5'-2.0'): Dense, dark brown fine to coarse SAND, some fine to coarse Gravel, little Silt, moist. Rec. = 0.8 ft (AASHTO M145 Classification: A-1-b.)				18-23-20 (43)	4.9	45.9	43.5	10.6	NP	NP
		S2 (2'-4'): Medium dense, fine to coarse SAND, some Silt, little fine to coarse Gravel, moist. Rec. = 0.9 ft (AASHTO M145 Classification: A-2-4.)				19-11-7-8 (18)	12.0	22.9	49.2	27.9	NP	NP
		S3 (5'-7'): Medium dense, brown fine to coarse SAND, some fine to coarse Gravel, little Silt, moist. Rec. = 1.3 ft (AASHTO M145 Classification: A-1-b.)				5-7-5-8 (12)	8.1	35.2	48.1	16.7	NP	NP
		S4 (7'-9'): Loose, brown fine to medium SAND, some (+) Silt, trace fine Gravel, moist (bottom 5" mottled). Rec. = 1.5 ft (AASHTO M145 Classification: A-2-4.)				6-4-3-3 (7)	19.1	9.0	58.8	32.2	NP	NP
		S5 (10'-12'): Medium dense, brown fine to coarse GRAVEL and fine to coarse SAND, trace Silt, wet. Rec. = 0.5 ft (AASHTO M145 Classification: A-1-a.)				10-6-5-7 (11)	14.8	64.5	27.5	8.0	NP	NP
		S6 (12'-14'): Medium dense, brown fine to coarse GRAVEL and fine to coarse SAND, trace (+) Silt, wet. Rec. = 0.5 ft (AASHTO M145 Classification: A-1-a.)				8-5-11-16 (16)	11.9	64.6	26.5	8.9	NP	NP
		S7 (15'-17'): Medium dense, brown fine to coarse SAND and fine to coarse GRAVEL, little Silt, wet. Rec. = 1.0 ft (AASHTO M145 Classification: A-1-b.)				15-11-17-31 (28)	11.0	46.0	37.0	17.0	NP	NP
		S8 (17'-19'): Very dense, mixed color fine to coarse GRAVEL and fine to coarse SAND, little Silt, wet. Rec. = 1.3 ft (AASHTO M145 Classification: A-1-a.)				75-65-44-50 (100+)	8.4	61.7	24.0	14.3	NP	NP
		S9 (20'-22'): Very dense, gray fine to medium SAND, some fine to coarse Gravel, some Silt, wet. Rec. = 0.6 ft (AASHTO M145 Classification: A-2-4.)				16-20-45-37 (65)	11.6	35.0	44.7	20.3	NP	NP
		S10 (25'-27'): Top 3": Gray fine to medium SAND. Bottom 14": Very dense, gray fine to coarse SAND, some fine to coarse Gravel, some Silt, wet. Rec. = 1.4 ft (AASHTO M145 Classification: A-1-b.)				25-35-42-32 (77)	10.3	41.6	33.8	24.6	NP	NP
S11 (30'-31.7'): Very dense, gray fine to medium SAND and SILT, wet (rock fragments in spoon tip). Rec. = 1.5 ft (AASHTO M145 Classification: A-4.)				28-44-57-100 (3") (100+)	16.8	11.7	32.5	55.8	NP	NP		
C1 (32'-37'): Good quality, hard, fresh to slightly weathered, moderately jointed, white-gray, DOLOSTONE. Reacts to dilute HCl when powdered. Fractures typically 30 to 70 degrees from horizontal.			C1	93.3 (84)	8 5.75 6.25 5.5 5.5							top of Bedrock @ 31.8 ft
C2 (37'-42'): Fair quality, hard, slightly weathered, closely to moderately jointed, white-gray DOLOSTONE. Middle 1.5' tan and more weathered. Reacts to dilute HCl when powdered. Fractures typically 20 to 30 degrees from horizontal.			C2	95 (68)	4 4.5 4.4 6.5 7.5							
45		Remarks: Hole stopped @ 42.0 ft 1) Exploration location taped in the field by GeoDesign. Ground surface elevation, station, and offset shown are estimated from conceptual plans provided by VTrans. 2) Driller used 3.25" ID HSA to advance to 5 feet deep to create pilot hole for FJ casing advance. 3) Upper 22' of borehole (samples S1 through S9) was performed with a CME 45C Skid Rig with a cathead safety hammer and an assumed hammer correction factor of 1.0. Due to drill rig breakdown, the lower 20' (samples S10 through C2) was completed with a CME 75 Track Rig with an automatic hammer and a hammer correction factor of 1.43. 4) Driller noted a temporary decreased rotary bit resistance at approximately 22 feet deep. 5) Visual soil descriptions are per the Burmister system. Lab testing gradations reported 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. CE 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 750-09-10-CLARENDONBRO1443(48).GPJ VERMONT AOT.GDT 4/11/13



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BORING LOG

Clarendon BRO 1443 (48)
 Clarendon, VT

Boring No.: B-2
 Page No.: 1 of 1
 Pin No.: 12J160
 Checked By: JFW

Boring Crew: J. Leonhardt (TransTech), J. Gilman (GeoDesign)
 Date Started: 3/07/13 Date Finished: 3/07/13
 VTSPG NAD83: N 383271 ft E 1501647 ft
 Station: 11+49 Offset: 8RT
 Ground Elevation: 647 ft

Casing: FJ Sampler: SS
 I.D.: 4 in 1.38 in
 Hammer Wt: N.A. 140 lb.
 Hammer Fall: N.A. 30 in.
 Hammer/Rod Type: Auto/NWJ
 Rig: CME 75 TRACK $C_e = 1.43$

Groundwater Observations		
Date	Depth (ft)	Notes
03/07/13	9.0	Wet sample

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (ROD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
0 - 9'	X X	Inferred Sand & Gravel fill.										
9' - 11'		S1 (9'-11'): Loose, brown with oxidized zones, fine to coarse SAND, some fine to coarse Gravel, trace Silt, wet. Rec. = 0.5 ft (AASHTO M145 Classification: A-1-a.)				7-6-2-8 (8)	19.4	54.2	37.2	8.6	NP	NP
19' - 21'		S2 (19'-21'): Very dense, gray fine to medium SAND and SILT, trace fine to coarse Gravel (top 3" only), wet. Rec. = 1.2 ft (AASHTO M145 Classification: A-4.)				17-31-25-31 (56)	17.8	17.7	46.5	35.8	NP	NP
29' - 31'		S3 (29'-31'): Refusal, gray brown fine to coarse SAND and SILT, trace fine Gravel, moist. Rec. = 1.3 ft (AASHTO M145 Classification: A-4.)				45-48-50/3" (100+)	16.2	13.6	36.9	49.5	NP	NP
30.3' - 35.3'		C1 (30.3'-35.3'): Fair quality, hard, slightly weathered with moderately to highly weathered seams, close to moderately jointed, tan to white-gray DOLOSTONE. Reacts to dilute HCl when powdered. Fractures typically 30 degrees from horizontal.	C1	88 (68)	5.5 5.5 7 6.2 6			Top of Bedrock @				30.3 ft
<p>Remarks: Hole stopped @ 35.3 ft</p> <ol style="list-style-type: none"> 1) Exploration location taped in the field by GeoDesign. Ground surface elevation, station, and offset shown are estimated from conceptual plans provided by VTrans. 2) Driller used 3.25" ID HSA to advance to 5 feet deep to create pilot hole for FJ casing advance. 3) Driller noted increased roller bit resistance (near refusal) at approximately 16.5 feet deep. Driller advanced casing to 15 feet deep and was able to continue borehole advance with roller bit. 4) Driller noted difficultly advancing casing from approximately 16.5 to 19 feet deep, and from 22 to 30 feet deep through dense soils. 5) Split spoon, spin casing, and roller bit refusal at 30.3 feet deep. 6) Visual soil descriptions are per the Burmister system. Lab testing gradations reported 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. CE 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.

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BORING LOG

Clarendon BRO 1443 (48)
 Clarendon, VT

Boring No.: B-3
 Page No.: 1 of 1
 Pin No.: 12J160
 Checked By: JFW

Boring Crew: J. Leonhardt (TransTech), J. Gilman (GeoDesign)
 Date Started: 3/06/13 Date Finished: 3/07/13
 VTSPG NAD83: N 383326 ft E 1501592 ft
 Station: 12+25.5 Offset: 7LT
 Ground Elevation: 645 ft

Casing Sampler
 Type: FJ SS
 I.D.: 4 in 1.38 in
 Hammer Wt: N.A. 140 lb.
 Hammer Fall: N.A. 30 in.
 Hammer/Rod Type: Auto/NWJ
 Rig: CME 75 TRACK $C_e = 1.43$

Groundwater Observations

Date	Depth (ft)	Notes
03/06/13	9.0	Wet sample

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (ROD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
0 - 9'	×	Inferred Sand & Gravel fill.										
5	×											
10		S1 (9'-11'): Dense, mixed color fine to coarse GRAVEL, some fine to coarse Sand, trace Silt, wet. Rec. = 0.6 ft (AASHTO M145 Classification: A-1-a.)				17-22-26-25 (48)	7.9	74.8	16.1	9.1	NP	NP
15		S2 (19'-20.3'): Refusal, gray fine to coarse SAND, some Silt, some fine to coarse Gravel, wet.										
20		Rec. = 1.0 ft (AASHTO M145 Classification: A-1-b.)										
20.3		C1 (20.5'-25.5'): Good quality, hard, fresh, closely to moderately jointed, white-gray DOLOSTONE. Reacts to dilute HCl when powdered. Fractures typically 20 to 70 degrees from horizontal.	C1	97 (78)	6.5 6 7 6.3 6.8	55-27-57/3" (100+)	9.6	41.5	36.4	22.1	NP	NP
25		Hole stopped @ 25.5 ft										
30		Remarks: 1) Exploration location taped in the field by GeoDesign. Ground surface elevation, station, and offset shown are estimated from conceptual plans provided by VTTrans. 2) Driller used 3.25" ID HSA to advance to 5 feet deep to create pilot hole for FJ casing advance. 3) Transition between kame terrace and glacial till strata is inferred based on boring B-4. No indication of strata change was noted during borehole advance. 4) Split spoon refusal and roller bit refusal at approximately 20.3 feet deep. Driller advanced casing to approximately 20.5 feet deep prior to coring. 5) Visual soil descriptions are per the Burmister system. Lab testing gradations reported are per AASHTO M145.										
35												
40												
45												

Notes:
 1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
 2. N Values have not been corrected for hammer energy. CE 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.

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BORING LOG

Clarendon BRO 1443 (48)
Clarendon, VT

Boring No.: B-4
Page No.: 1 of 1
Pin No.: 12J160
Checked By: JFW

Boring Crew: J. Leonhardt (TransTech), J. Gilman (GeoDesign)
Date Started: 3/05/13 Date Finished: 3/06/13
VTSPG NAD83: N 383331 ft E 1501609 ft
Station: 12+20 Offset: 10.5RT
Ground Elevation: 645 ft

Type: FJ
I.D.: 4 in
Hammer Wt: N.A.
Hammer Fall: N.A.
Hammer/Rod Type: Auto/NWJ
Rig: CME 75 TRACK
C_e = 1.43

Groundwater Observations

Date	Depth (ft)	Notes
03/05/13	7.0	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	S1 (0.5'-2'): Medium dense, dark brown fine to coarse SAND, some fine to coarse Gravel, little Silt, moist. Rec. = 0.7 ft (AASHTO M145 Classification: A-1-b.)				7-10-10 (20)	7.1	48.4	43.5	8.1	NP	NP
		S2 (2'-4'): Loose, brown fine to coarse SAND, some fine to coarse Gravel, little Silt, moist. Rec. = 0.7 ft (AASHTO M145 Classification: A-1-b.)				6-4-4-5 (8)	7.9	45.8	42.7	11.5	NP	NP
		S3 (5'-7'): Loose, no recovery. Rec. = 0.0 ft				9-5-2-6 (7)						
		S4 (7'-9'): Loose, gray brown fine to coarse SAND, some fine to coarse Gravel, some Silt, wet. Rec. = 0.9 ft (AASHTO M145 Classification: A-2-4.)				7-4-5-10 (9)	16.0	36.9	42.1	21.0	NP	NP
10	X X X	S5 (10'-12'): Dense, brown fine to coarse GRAVEL, some fine to coarse Sand, little Silt, wet. Rec. = 1.0 ft (AASHTO M145 Classification: A-1-a.)				21-15-28-15 (43)	9.3	64.9	22.1	13.0	NP	NP
		S6 (12'-13'): Refusal, brown fine to coarse GRAVEL and fine to coarse SAND, little Silt, wet. Rec. = 0.8 ft (AASHTO M145 Classification: A-1-a.)				25-100 (100+)	9.7	66.1	22.5	11.4	NP	NP
15	X X X	S7 (15'-17'): Very dense, brown fine to coarse SAND, some fine to coarse Gravel, some Silt, wet. Rec. = 1.0 ft (AASHTO M145 Classification: A-1-b.)				47-35-30-37 (65)	9.7	41.1	35.0	23.9	NP	NP
		S8 (17'-19'): Very dense, gray fine to coarse SAND, some fine to coarse Gravel, some Silt, wet. Rec. = 1.3 ft (AASHTO M145 Classification: A-1-b.)				36-70-44-48 (100+)	8.3	43.0	31.8	25.2	NP	NP
		S9 (20'-22'): Very dense, gray fine to coarse SAND, some Silt, some fine to coarse Gravel, wet. Rec. = 1.0 ft (AASHTO M145 Classification: A-2-4.)				28-55-30-36 (85)	9.2	40.3	28.6	31.1	NP	NP
25		C1 (22'-26'): Boulder Fragments.	C1	52 (0)	6.5 3.5 3 4							
30	X X X	C2 (26'-27'): Excellent quality, hard, fresh to slightly weathered, close to moderately jointed, light grayish tan DOLOSTONE. Reacts to dilute HCl when powdered.	C2	100	8							
		C3 (27'-32'): Fair quality, hard, fresh to slightly weathered, moderately jointed, white-gray DOLOSTONE. Reacts to dilute HCl when powdered. Fractures typically 10 to 30 degrees from horizontal.	C3	(100)	8 87 (70)	8 5.8 4.5 4 4.5						
35		Remarks: 1) Hole stopped @ 32.0 ft 2) Exploration location taped in the field by GeoDesign. Ground surface elevation, station, and offset shown are estimated from conceptual plans provided by VTTrans. 3) Driller used 3.25" ID HSA to advance to 5 feet deep to create pilot hole for FJ casing advance. 4) Roller bit refusal at 22 feet deep. Set casing to 22' deep prior to coring C1. 5) Core runs C1 and C2 were performed continuously without removal of the core barrel. Driller telescoped 3" I.D. casing through 4" I.D. casing to 25 feet deep after coring C1/C2, then advanced roller bit to 26 feet deep to clear the borehole of boulder debris prior to coring C3. 6) Visual soil descriptions are per the Burmister system. Lab testing gradations reported are per AASHTO M145.										

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