



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

BORING LOG

BENNINGTON
 BRF 1000(16)S
 TH-7 BR-57

Boring No.: B-101
 Page No.: 1 of 1
 Pin No.: 88J087
 Checked By: NSM

Boring Crew: GARROW, SALISBURY
 Date Started: 11/08/11 Date Finished: 2/29/12
 VTSPG NAD83: N 143977.93 ft E 1452288.69 ft
 Station: 7+40.42 Offset: -22.13
 Ground Elevation: 631.66 ft

Casing: WB Sampler: SS
 I.D.: 4 in 1.5 in
 Hammer Wt: N.A. 140 lb.
 Hammer Fall: N.A. 30 in.
 Hammer/Rod Type: Auto/AWJ
 Rig: CME 45C TRACK CE = 1.34

Groundwater Observations

Date	Depth (ft)	Notes
02/29/12	17.8	AM

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 %
5		A-1-b, SiGrSa, brn, MTD, Rec. = 1.1 ft, Broken red brick or clay tile was within sample.				2-4-7-4 (11)	14.6	34.9	45.0	20.1
		A-1-a, SaGr, brn, MTW, Rec. = 0.8 ft, Some broken rock was within sample.				2-3-1-2 (4)	16.2	56.2	36.9	6.9
10		Field Note:, NXDC, Cobbles				1-3-5-4 (8)				
		Field Note:, No Recovery								
15		Field Note:, NXDC, Cobbles				3-3-8-25 (11)	10.5	72.2	22.7	5.1
		Field Note:, NXDC, Cobbles								
20		Visual Classification, Mostly Broken Rock., brn, Moist, Rec. = 0.6 ft								
		Field Note:, NXDC, Boulder								
25		Field Note:, NXDC, Cobbles								
		A-1-a, SaGr, grn-brn, Moist, Rec. = 0.7 ft, Broken Rock was within sample.								
30		Visual Classification, Mostly Broken Rock., grn-brn, Moist, Rec. = 0.5 ft				11-R@3.5" 62-R@2.5"	10.7	72.9	23.3	3.8
		30.0 ft - 33.0 ft, Gray, Meta-Limestone, Moderately hard, Very slightly weathered, Poor rock, NXMDC, Fair recovery and very poor RQD. RMR = 39	1 (10)	83 (0)	9					
35		33.0 ft - 36.0 ft, Gray, Meta-Limestone, Moderately hard, Very slightly weathered, Poor rock, NXMDC, Closely spaced jointing.	2 (10)	80 (8)	3	4	3			
		36.0 ft - 38.0 ft, Gray, Medium grained Quartzite, Hard, Very slightly weathered, Poor rock, Very poor RQD. RMR = 39			3	3				
40		Hole stopped @ 38.0 ft								

Remarks:
 1. Stopped drilling on 11/08/12 and returned on 02/28/12 to complete hole.

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.

BORING LOG 2 BENNINGTON BRF 1000(16)S.GPJ VERMONT AOT.GDT 5/2/12



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BORING LOG

BENNINGTON
 BRF 1000(16)S
 TH-7 BR-57

Boring No.: B-101A

Page No.: 1 of 1

Pin No.: 88J087

Checked By: NSM

Boring Crew: GARROW, SALISBURY
 Date Started: 11/09/11 Date Finished: 11/09/11
 VTSPG NAD83: N 144021.21 ft E 1452273.94 ft
 Station: 7+86.10 Offset: -24.59
 Ground Elevation: 610.39 ft

Casing Sampler
 Type: WB SS
 I.D.: 4 in 1.5 in
 Hammer Wt: N.A. 140 lb.
 Hammer Fall: N.A. 30 in.
 Hammer/Rod Type: Auto/AWJ
 Rig: CME 45C TRACK CE = 1.34

Groundwater Observations

Date	Depth (ft)	Notes
11/09/11	1.5	PM

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 %
5		A-1-b, GrSa, brn, Moist, Rec. = 0.3 ft, Broken rock/ Wood/ & Roots were within sample. Field Note: NXDC, Cobbles & Boulders				R@3.5"	21.0	32.0	57.3	10.7
10		A-2-4, SaSiGr (Till), gry, Moist, Rec. = 1.3 ft, Roller coned ahead.				5-14-15-25 (29)	7.9	49.4	24.4	26.2
15		A-1-b, SaGr (Till), gry, Moist, Rec. = 1.3 ft				11-15-R@6.0"	9.4	61.6	20.7	17.7
15		14.5 ft - 19.5 ft, Light gray to dark gray, Meta-Limestone, Moderately hard, Very slightly weathered, Good rock, NXMDC, Weathered surface is light orange in color. RMR = 67	1 (65)	82 (72)	7	Top of Bedrock @ 14.5 ft				
20		19.5 ft - 24.5 ft, Dark gray, Meta-Limestone, Moderately hard, Very slightly weathered, Fair rock, NXMDC, Orange staining on weathered surfaces. RMR = 49	2 (65)	100 (44)	4					
25		Hole stopped @ 24.5 ft								

Notes:

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BORING LOG

BENNINGTON
BRF 1000(16)S
TH-7 BR-57

Boring No.: B-102
Page No.: 1 of 1
Pin No.: 88J087
Checked By: NSM

Boring Crew: GARROW, SALISBURY
Date Started: 11/10/11 Date Finished: 11/15/11
VTSPG NAD83: N 144033.71 ft E 1452318.42 ft
Station: 7+86.10 Offset: 21.61
Ground Elevation: 613.98 ft

Casing Type: WB
Sampler Type: SS
I.D.: 4 in 1.5 in
Hammer Wt: N.A. 140 lb.
Hammer Fall: N.A. 30 in.
Hammer/Rod Type: Auto/AWJ
Rig: CME 45C TRACK CE = 1.34

Groundwater Observations		
Date	Depth (ft)	Notes
11/15/11	0.4	AM
11/16/11	0.0	AM

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (ROD %)	Drill Rate minutes/ft	Groundwater Observations								
						Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %				
		Field Note:, NXDC, Boulder												
		A-1-a, Gr, brn, Moist, Rec. = 0.5 ft				3-8-8-8 (16)	7.3	82.2	15.2	2.6				
		Field Note:, NXDC, Cobbles & Gravel												
10		A-1-b, SaGr, brn, Wet, Rec. = 0.5 ft				8-15-18-12 (33)	26.1	47.9	43.9	8.2				
		Field Note:, NXDC, Cobbles & Gravel												
		A-2-4, SaSiGr, brn, Moist, Rec. = 0.8 ft				7-8-10-7 (18)	15.3	41.0	23.6	35.4				
20		A-4, SaSi, brn, Moist, Rec. = 0.9 ft				7-10-10-7 (20)	22.7	5.9	26.7	67.4				
		A-3, SaGrSi, brn, Moist, Rec. = 1.3 ft, Started mud drilling at 24.0 ft.				17-28-19-22 (47)	16.0	31.9	29.3	38.8				
30		Field Note:, No Recovery. Rock in end of sampler				18-15-8-10 (23)								
		A-1-a, SaGr, brn, Moist, Rec. = 0.5 ft, Broken rock was within sample.				12-8-9-8 (17)	8.2	66.3	21.4	12.3				
		Field Note:, NXDC, Cobbles												
40		A-1-a, SiSaGr, red-brn, Moist, Rec. = 0.7 ft, Weathered rock was within sample.				4-R@3.5"	9.4	44.1	34.3	21.6				
		Field Note:, NXDC, Possible soft weathered rock												
		40.0 ft - 45.0 ft, Light gray, Meta-Limestone, Moderately hard, Moderately severe weathered, Very poor rock, NXMDC, Weathered surface is light orange and brown. RMR = 19	1 (-)	90 (0)	3									
		45.0 ft - 48.0 ft, Light gray, Meta-Limestone, Medium hard, Severely to moderately weathered, Very poor rock, NXMDC, Orange stained clay coating at 46.3 ft on rock surface (may be karst solution feature). RMR = 19	2 (-)	40 (0)	3									
50		48.0 ft - 53.0 ft, Dark gray, Limestone, and Phyllite. Medium to soft, Moderately severe weathered, Very poor rock, NXMDC, Rock is coated with thick orange/brown clay coating (may be karst solution feature). RMR = 19	3 (-)	74 (0)	3									
		Hole stopped @ 53.0 ft			2									

BORING LOG 2 BENNINGTON BRF 1000(16)S.GPJ VERMONT AOT.GDT 5/2/12

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BORING LOG

BENNINGTON
BRF 1000(16)S
TH-7 BR-57

Boring No.: B-103
Page No.: 1 of 1
Pin No.: 88J087
Checked By: NSM

Boring Crew: GARROW, SALISBURY
Date Started: 11/16/11 Date Finished: 11/17/11
VTSPG NAD83: N 144050.74 ft E 1452313.75 ft
Station: 8+03.70 Offset: 21.73
Ground Elevation: 613.93 ft

Casing Type: WB Sampler: SS
I.D.: 4 in 1.5 in
Hammer Wt: N.A. 140 lb.
Hammer Fall: N.A. 30 in.
Hammer/Rod Type: Auto/AWJ
Rig: CME 45C TRACK CE = 1.34

Groundwater Observations		
Date	Depth (ft)	Notes
11/17/11	0.6	AM

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 %
10		Field Note:, NXDC, Boulder								
		Field Note:, No Recovery, Stone in end of sampler				4-5-12-13 (17)				
		Field Note:, NXDC, Cobbles & Gravel								
		A-1-b, GrSa, brn, Moist, Rec. = 0.8 ft				7-7-7-28 (14)	14.3	34.7	50.5	14.8
		Field Note:, NXDC, Cobbles & Gravel								
		A-4, SaGrSi, gry, Moist, Rec. = 1.2 ft				7-8-10-12 (18)	17.3	26.0	21.8	52.2
20		Field Note:, NXDC, Cobbles & Gravel								
		A-4, SaGrSi, gry, Moist, Rec. = 0.8 ft				3-7-10-17 (17)	11.3	32.7	28.6	38.7
		A-1-b, SaGr, gry, Moist, Rec. = 1.0 ft				8-18-16-13 (34)	10.5	49.1	33.9	17.0
30		Field Note:, NXDC, Boulder								
		Field Note:, No Recovery								
		Field Note:, NXDC, Cobbles								
40		A-4, SaGrSi, gry, Moist, Rec. = 0.6 ft, Weathered rock was within sample.				3-4-12-R@3.5"	19.1	34.5	25.0	40.5
		Field Note:, NXDC, Cobbles								
50		44.8 ft - 46.4 ft, Light gray, Phyllite, and meta-limestone. Moderately hard, Slightly weathered, Poor rock, NXMDC, RMR = 22	1 (65)	100 (6)	5					
		46.4 ft - 49.8 ft, Orange and light brown stained gray Phyllite, (may be karst solution feature). Very soft, Moderately severe weathered, Poor rock, RMR = 22			3					
		49.8 ft - 54.8 ft, Light gray, Phyllite and Meta-Limestone, Moderately hard, Slightly weathered, Good rock, NXMDC, Light orange staining on weathered surfaces. RMR = 67	2 (65)	96 (54)	2					
		Hole stopped @ 54.8 ft			3					

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BORING LOG

BENNINGTON
 BRF 1000(16)S
 TH-7 BR-57

Boring No.: B-104

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Pin No.: 88J087

Checked By: NSM

Boring Crew: GARROW, SALISBURY
 Date Started: 2/25/12 Date Finished: 2/27/12
 VTSPG NAD83: N 144151.71 ft E 1452236.77 ft
 Station: 9+21.77 Offset: -25.06
 Ground Elevation: 614.6 ft

Casing Type: WB
 Sampler: SS
 I.D.: 4 in 1.5 in
 Hammer Wt: N.A. 140 lb.
 Hammer Fall: N.A. 30 in.
 Hammer/Rod Type: Auto/AWJ
 Rig: CME 45C TRACK CE = 1.34

Groundwater Observations

Date	Depth (ft)	Notes
02/27/12	2.0	While drilling.

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 %
5		Field Class., NXDC, Cobbles				5-11-5-15 (16)				
		Field Class., GrSa								
		Field Class., NXDC, Cobbles								
10		8.0 ft - 13.0 ft, Gray to light gray, Meta-Limestone, Moderately hard, Very slightly weathered, Poor rock, NXMDC, Very poor RQD. Closely spaced jointing. Some joint surfaces contain iron staining. RMR = 39	1 (10)	100 (16)	10					
					3					
					3					
					4					
					5					
15		13.0 ft - 18.0 ft, Light gray, Meta-Limestone, Moderately hard, Very slightly weathered, Poor rock, NXMDC, Fair recovery and very poor RQD. Closely spaced jointing. Some joint surfaces contain iron staining. RMR = 39	2 (10)	60 (12)	4					
					4					
					3					
					3					
20		Hole stopped @ 18.0 ft								
25										

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BORING LOG

BENNINGTON
BRF 1000(16)S
TH-7 BR-57

Boring No.: B-105

Page No.: 1 of 1

Pin No.: 88J087

Checked By: NSM

Boring Crew: GARROW, SALISBURY
Date Started: 3/01/12 Date Finished: 3/08/12
VTSPG NAD83: N 144224.37 ft E 1452261.86 ft
Station: 9+84.93 Offset: 18.75
Ground Elevation: 630.61 ft

Casing: WB Sampler: SS
I.D.: 4 in 1.5 in
Hammer Wt: N.A. 140 lb.
Hammer Fall: N.A. 30 in.
Hammer/Rod Type: Auto/AWJ
Rig: CME 45C TRACK CE = 1.34

Groundwater Observations

Date	Depth (ft)	Notes
03/07/12	20.4	AM

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 %
5	[Wavy pattern]	Lab Note, SaGr Mostly Broken Rock, brn, Moist, Rec. = 0.4 ft, NXDC 2.5'-3.0' Gravel.				4-5-20-20 (25)	8.1	69.3	22.3	8.4
		Lab Note, SaGr Mostly Broken Rock, brn, Moist, Rec. = 0.7 ft				8-23-18-18 (41)	11.0	68.3	23.7	8.0
	[Circular pattern]	Field Note:, NXDC, Cobbles, Boulder								
10	[Wavy pattern]	Lab Note, Mostly Broken Rock, brn, Moist, Rec. = 0.3 ft, NXDC 8'-9' Gravel.				8-8-6-32 (14)	9.7	66.1	25.8	8.1
		A-1-a, SaGr, brn, Moist, Rec. = 0.6 ft				7-44-6-4 (50)	13.9	51.9	35.7	12.4
15	[Wavy pattern]	Visual Classification, Broken Rock, brn, Moist, Rec. = 0.2 ft, Insufficient sample for testing.				6-3-2-2 (5)				
		A-1-b, SiGrSa, brn, Moist, Rec. = 0.8 ft, NXDC 14.2'-15.0' Gravel.				2-2-1-2 (3)	17.0	37.5	38.7	23.8
		Field Note:, No Recovery.				6-5-5-5 (10)				
		A-1-b, SiGrSa, brn, Moist, Rec. = 0.9 ft, NXDC 18.2'-19.0' Gravel.				5-15-8-4 (23)	18.0	27.9	51.6	20.5
20	[Circular pattern]	Visual Classification, SiGrSa, brn, Moist, Rec. = 0.1 ft				10-R@3.5"				
		Field Note:, NXDC, Cobbles								
25	[Wavy pattern]	Lab Note, SaGr Mostly Broken Rock, brn, Moist, Rec. = 0.9 ft, NXDC 22'-23' Gravel.				16-41-36-41 (77)	9.7	69.9	20.6	9.5
		Lab Note, SaGr Mostly Broken Rock, brn, Moist, Rec. = 0.7 ft				10-9-9-4 (18)	10.8	70.4	26.5	3.1
		Visual Classification, GrSa, red-brn, Moist, Insufficient sample for testing. NXDC 26.5'-27.0' Gravel.				8-2-1-3 (3)				
		A-1-b, SaSiGr with Broken Rock, brn, Moist, Rec. = 1.0 ft				12-18-40-R@5.0"	9.7	51.5	23.2	25.3
30	[Cross-hatch pattern]	Field Note:, NXDC, 29'-32', Top of Incompetent Bedrock.								
		Field Note:, Sleaved casing to 3.0" and advanced with BXDC, 32'-34.5', Incompetent Bedrock.								
35	[Brick pattern]	34.5 ft - 39.5 ft, Gray to light gray, Meta-Limestone, Moderately hard, Very slightly weathered, Poor rock, BWG, Closely spaced jointing. Very poor RQD. RMR = 39	1	90	6	Top of Bedrock @ 34.5 ft				
			(10)	(14)	4					
					3					
					3					
40	[Brick pattern]	39.5 ft - 44.5 ft, Light gray, Meta-Limestone, Moderately hard, Very slightly weathered, Poor rock, BWG, Closely spaced jointing. Very poor RQD. RMR = 39	2	90	3					
			(10)	(8)	3					
					3					
					3					
45		Hole stopped @ 44.5 ft								

Notes:

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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.

BORING LOG 2 BENNINGTON BRF 1000(16)S.GPJ VERMONT AOT.GDT 5/2/12



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BORING LOG

BENNINGTON
BRF 1000(16)S
TH-7 BR-57

Boring No.: B-106
Page No.: 1 of 1
Pin No.: 88J087
Checked By: NSM

Boring Crew: GARROW, SALISBURY
Date Started: 3/08/12 Date Finished: 3/20/12
VTSPG NAD83: N 144245.32 ft E 1452208.57 ft
Station: 10+25 Offset: -26.77
Ground Elevation: 630.3 ft

Casing Type: WB Sampler: SS
I.D.: 4 in 1.5 in
Hammer Wt: N.A. 140 lb.
Hammer Fall: N.A. 30 in.
Hammer/Rod Type: Auto/AWJ
Rig: CME 45C TRACK CE = 1.34

Groundwater Observations

Date	Depth (ft)	Notes
03/20/12	21.9	AM

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 %
5		Field Class:, SiGr								
		Field Class:, Cobbles								
		Field Class:, Sa								
		Field Class:, Cobbles, Lost water at 5.0 ft.								
		Field Class:, Gr NXDC								
10		Field Class:, GrSa NXDC, Old ground at 15.0 ft.								
20		Field Class:, Gr NXDC								
		Field Class:, NXDC, Cobbles								
		Field Class:, Gr NXDC								
		Field Class:, NXDC, Cobbles								
		Field Class:, Gr								
25		Field Class:, Cobbles								
		Field Class:, Gr								
		Field Note:, Badly fractured rock. Unable to core., Competent rock at 29.0 ft.								
30		29.0 ft - 34.0 ft, Gray to light gray, Meta-Limestone, Moderately hard, Very slightly weathered, Fair rock, NXMDC, Closely spaced jointing. RMR = 44	1 (10)	100 (26)	5	Top of Bedrock @ 29.0 ft				
					6					
					4					
					3					
35		34.0 ft - 39.0 ft, Light gray, Meta-Limestone, Moderately hard, Very slightly weathered, Fair rock, NXMDC, Closely spaced jointing. RMR = 49	2 (10)	86 (70)	4					
					4					
					5					
					6					
40					8					
45		Hole stopped @ 39.0 ft								

Notes:

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