GEODESIGN INCORPORATED
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Phone: 802-674-2033/Fax: 802-674-5943 — Phone: 802-652-5140

BORING LOG

Project Name: Knapp Airport Taxiway A — Berlin, VT

Boring No.: C-1 | Page No.: 1 of 1 | File No.: 965-03.1 | Checked By: JAG

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: March 31, 2009 — Date Finished: March 31, 2009
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 1158
Station: — Offset: ft

Casing: Type	Casing: Dbl.	Sampler: Type	Sampler: Dbl.
FJ		FJ	
I.D.: 3.0 in.		I.D.: 2.0 in.	
Hammer Wt.: 300 lbs		Hammer Fall: 30 in.	
Rig Type: CME 75 Track		Hammer Type: Auto	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/31/09 12:00			None Observed
▼			
▼			
▼			

Depth (ft)	Casing Blows/ft	Sample Information: Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval: 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	PID Reading (ppm)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System: Burmister
													Overburden Soil (Inferred)		
5													5		
		C1	C	42	42	5						1.9	Cobble 1157.5 Glacial Till 152.6		C1) Top 2": Cobble/Coarse Gravel. Middle 20": Gray SILT and fine SAND, some fine to coarse Gravel (Glacial Till). Bottom 20": Moderately hard, slightly to moderately weathered, dark gray with orange weathering in joints, very closely jointed, very poor quality PHYLLITE (RQD = 0%). Fractured 60-70 degrees from horizontal, gray wash water with dark gray/black graphite staining on the surface of the wash tub water.
							[REC= 100%; RQD= 0%]					3.7	6.8		
													Bedrock 1151.2 (Phyllite)		
												2.7			
		C2	C	36	36	8.5					4/.5' 5/2'				C2) Moderately hard, slightly to moderately weathered, dark gray with orange weathering in joints, very closely jointed, very poor quality PHYLLITE (RQD = 11%). Fractured 60-70 degrees from horizontal, gray wash water with dark gray/black graphite staining on the surface of the wash tub water. Lost an estimated 25 to 30+ gallons of water during core run.
10							[REC= 100%; RQD= 11%]								
												4			
		C3	C	36	28	11.5						3			
							[REC= 78%; RQD= 0%]					2.5			
												8	14.5		
15													Bottom 1143.5 of Exploration at 14.5 ft		C3) Moderately hard to soft, slightly weathered, dark gray with orange weathering in joints, very closely jointed, very poor quality PHYLLITE (RQD = 0%). Fractured 60-70 degrees from horizontal, gray wash water with dark gray/black graphite staining on the surface of the wash tub water. Lost an estimated 30+ gallons of water during core run.
20															
25															
30															

Remarks:
1) Ground surface elevation estimated by GeoDesign from topographic base plan provided by Hoyle Tanner and Associates.
2) Drove casing to 4.5' deep. Borehole advanced to 5' deep using a roller bit prior to coring.
3) Driller noted consistent water loss beginning at 9' deep.
4) Began to observe occasional complete loss of water return while advancing core barrel from 13.5' to 14.5'.
5) Driller terminated core runs C1, C2, and C3 to retrieve core samples due to a blocked core barrel.

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
2) Sample Type Coding: A = Auger; C = Core; D = Driven; G = Grab; PS = Piston Sample; SS = Split Barrel (Split Spoon); ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) Stratification lines represent approximate boundary between material types, transitions may be gradual.

Boring No.: C-1

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BORING LOG

Project Name: Knapp Airport Taxiway A — Berlin, VT

Boring No.: C-2 | Page No.: 1 of 1 | File No.: 965-03.1 | Checked By: JAG

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: March 31, 2009 — Date Finished: March 31, 2009
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 1164
Station: — Offset: ft

Casing: Type	Casing: Dbl.	Sampler: Type	Sampler: Dbl.
FJ		FJ	
I.D.: 3.0 in.		I.D.: 2.0 in.	
Hammer Wt.: 300 lbs		Hammer Fall: 30 in.	
Rig Type: CME 75 Track		Hammer Type: Auto	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/31/09 14:00			None Observed
▼			
▼			
▼			

Depth (ft)	Casing Blows/ft	Sample Information: Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval: 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	PID Reading (ppm)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System: Burmister
													Overburden Soil (Inferred)		
5		C1	C	28	28	4.5						2.9	4.5		
							[REC= 100%; RQD= 0%]						Bedrock 1159.5 (Phyllite)		C1) Moderately hard to soft, moderately weathered, dark gray with orange weathering in joints, very closely jointed, very poor quality PHYLLITE (RQD = 0%). Fractured 60-70 degrees from horizontal (with occasional 80 degree fracture), gray wash water with dark gray/black graphite staining on the surface of the wash tub water.
												2.7			
		C2	C	37	36	6.9					9/4' 2/.5'				C2) Moderately hard to soft, slightly weathered, dark gray with orange weathering in joints, very closely jointed, very poor quality PHYLLITE (RQD = 11%). Fractured 60-70 degrees from horizontal, gray wash water with dark gray/black graphite staining on the surface of the wash tub water.
							[REC= 97%; RQD= 11%]					2.8			
10												3.1			
		C3	C	36	35	10					3/.5	2.3			C3) Moderately hard to soft, slightly weathered, dark gray with orange weathering in joints, very closely jointed, poor quality PHYLLITE (RQD = 44%). Fractured 60-70 degrees from horizontal, gray wash water with dark gray/black graphite staining on the surface of the wash tub water.
							[REC= 97%; RQD= 44%]					2.7			
												3	13		
15													Bottom 1151 of Exploration at 13.0 ft		
20															
25															
30															

Remarks:
1) Ground surface elevation estimated by GeoDesign from topographic base plan provided by Hoyle Tanner and Associates.
2) Drove casing to 4.5'. Advanced borehole to 4.5' deep using a roller bit prior to coring.
3) Driller terminated core runs C1, C2, and C3 to retrieve core samples due to a blocked core barrel.
4) Noted a thicker layer of graphite on the surface of the wash tub water than observed at C-1 or C-3.
5) Driller noted no noticeable water loss during coring operations.

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
2) 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. A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A = Auger; C = Core; D = Driven; G = Grab; PS = Piston Sample; SS = Split Barrel (Split Spoon); ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) Stratification lines represent approximate boundary between material types, transitions may be gradual.

Boring No.: C-2

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BORING LOG

Project Name: Knapp Airport Taxiway A — Berlin, VT

Boring No.: C-3 | Page No.: 1 of 1 | File No.: 965-03.1 | Checked By: JAG

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: March 31, 2009 — Date Finished: March 31, 2009
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 1165
Station: — Offset: ft

Casing: Type	Casing: Dbl.	Sampler: Type	Sampler: Dbl.
FJ		FJ	
I.D.: 3.0 in.		I.D.: 2.0 in.	
Hammer Wt.: 300 lbs		Hammer Fall: 30 in.	
Rig Type: CME 75 Track		Hammer Type: Auto	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/31/09 16:00			None Observed
▼			
▼			
▼			

Depth (ft)	Casing Blows/ft	Sample Information: Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval: 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	PID Reading (ppm)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System: Burmister
													1 Overburden Soil (Inferred) Possible 116.4		
		C1	C	48	48	2.5							2.5 Weathered Rock		
							[REC= 100%; RQD= 13%]						Bedrock 1162.5 (Phyllite)		C1) Moderately hard to soft, slightly to moderately weathered, dark gray with orange weathering in joints, very closely jointed, very poor quality PHYLLITE (RQD = 13%). Fractured 60-70 degrees from horizontal (with occasional 80 degree fracture), gray wash water with dark gray/black graphite staining on the surface of the wash tub water.
5															
		C2	C	60	57	6.5									C2) Moderately hard to soft, slightly weathered, dark gray with orange weathering in joints, very closely jointed, fair quality PHYLLITE (RQD = 55%). Fractured 60-70 degrees from horizontal, gray wash water with dark gray/black graphite staining on the surface of the wash tub water.
							[REC= 95%; RQD= 55%]								
10															
													11.5		
													Bottom 1153.5 of Exploration at 11.5 ft		
15															
20															
25															
30															

Remarks:
1) Ground surface elevation estimated by GeoDesign from topographic base plan provided by Hoyle Tanner and Associates.
2) Drove casing to 2.5'. Advanced borehole to 2.5' deep. Using a roller bit prior to coring.
3) Driller inferred weathered rock from 1' to 1.5' while driving casing/roller bitting. Casing approximately 1' into top of competent bedrock.
4) Driller noted approximately 20+ gallons of water loss throughout both core runs but inferred that water loss was primarily around the outside of the casing on the water return and not through seams in the rock.

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
2) 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. A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A = Auger; C = Core; D = Driven; G = Grab; PS = Piston Sample; SS = Split Barrel (Split Spoon); ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) Stratification lines represent approximate boundary between material types, transitions may be gradual.

Boring No.: C-3

Notes:
1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
2) 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. A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A = Auger; C = Core; D = Driven; G = Grab; PS = Piston Sample; SS = Split Barrel (Split Spoon); ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) Stratification lines represent approximate boundary between material types, transitions may be gradual.
6) Bedrock cores collected at locations c-1, c-2, and c-3 typically consist of gray, soft, moderately weathered phyllite bedrock of very poor to fair quality. the rock was fissile and crumbled with moderate finger pressure. Fractures were typically noted along th efissile planes between approximately 80 and 70 degrees (measures from the horizontal). Rock quality designation (RQD) values ranged between 0 and 55%. The rock type was consistent with mapping data published on the Contennial Geologic Map of Vermoont (doll, 1961) and a rock outcrop located approximately 500 feet north of the site (along Airport Road).
7) Bedrock removal for this project can be accomplished using conventional mechanical equipment. Mechanical removal methods can include excavating, ripping, hoe-ramming and splitting. A alternative method of removal is blasting.
8) The effort and difficulty of rock removal will generally increase with the depth once the upper, more weathered rock has been penetrated (estimated up to between 5 and 10 feet deep).
9) Rock Reuse Potential - the type and condition of rock anticipated for removal will be poor aggregate for use in the base course below new pavements.

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PROJECT NAME: E.F. KNAPP STATE AIRPORT
A.I.P. 3-50-0001-011-2009
PROJECT NUMBER: BERLIN AIR 04-3216

FILE NAME: z05h378sht_br1.dgn — PLOT DATE: 11/22/2011
PROJECT LEADER: S. FORTNEY — DRAWN BY: D. STANDISH
DESIGNED BY: S. BOUCHARD — CHECKED BY: J. DOWNAR
BORING LOGS C-1-C-3 — SHEET 172 OF 173