

BORING LOG		Boring No.:	B-01																																																																																																																	
Project Name		Page No.:	1 of 1																																																																																																																	
Knapp Airport		File No.:	965-03																																																																																																																	
Berlin, Vermont		Checked By:	KEW/AMH																																																																																																																	
<p><b>GEODESIGN INCORPORATED</b>            Geotechnical Engineers-Environmental Consultants-Construction Engineers            P.O. Box 699 Windsor, VT 05089 Phone: 802-674-2033 Fax: 802-674-5943            1233 Shelburne Rd, Suite 300 South Burlington, VT 05403 Phone: 802-652-5140</p>																																																																																																																				
Boring Company: Specialty Drilling & Investigation Foreman: Chris Aldrich GeoDesign Rep.: Don Howey Date Started: July 12, 2006 Date Finished: July 12, 2006 N. Coordinate: E. Coordinate: Ground Surface Elevation (feet): Station: Offset: ft		Casting: H.S.A. SS Sampler: 2.25 in. 1.38 in. Date: 7/12/06, 0:00 Notes: None observed Hammer WL: NA 140 lbs Hammer Fall: NA 30 in. Rig Type: Simco 2800 Hammer Type: Safety Hammer																																																																																																																		
<table border="1"> <thead> <tr> <th rowspan="2">Depth (ft)</th> <th rowspan="2">Coring Interval (ft)</th> <th rowspan="2">Type</th> <th rowspan="2">Penetration (lb/in)</th> <th rowspan="2">Recovery (%)</th> <th colspan="5">Blows / 6 inch Interval</th> <th rowspan="2">Coring Time (min./ft)</th> <th rowspan="2">RQD Reading (%)</th> </tr> <tr> <th>0-6</th> <th>6-12</th> <th>12-18</th> <th>18-24</th> <th>24-30</th> </tr> </thead> <tbody> <tr><td>1</td><td>SS 24</td><td>18</td><td>0</td><td>8</td><td>15</td><td>12</td><td>13</td><td></td><td></td><td></td><td></td></tr> <tr><td>2</td><td>SS 24</td><td>17</td><td>2</td><td>17</td><td>12</td><td>21</td><td>22</td><td></td><td></td><td></td><td></td></tr> <tr><td>3</td><td>SS 24</td><td>12</td><td>4</td><td>40</td><td>30</td><td>10</td><td>8</td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>SS 24</td><td>12</td><td>6</td><td>7</td><td>23</td><td>12</td><td>12</td><td></td><td></td><td></td><td></td></tr> <tr><td>5</td><td>SS 24</td><td>12</td><td>8</td><td>8</td><td>9</td><td>8</td><td>9</td><td></td><td></td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>		Depth (ft)	Coring Interval (ft)	Type	Penetration (lb/in)	Recovery (%)	Blows / 6 inch Interval					Coring Time (min./ft)	RQD Reading (%)	0-6	6-12	12-18	18-24	24-30	1	SS 24	18	0	8	15	12	13					2	SS 24	17	2	17	12	21	22					3	SS 24	12	4	40	30	10	8					4	SS 24	12	6	7	23	12	12					5	SS 24	12	8	8	9	8	9					10												15												20												Strata Description: Topsoil, Sandy Silt Symbol: [Symbol] Depth & Elevation (feet): Classification System: Burnister Sample Description: 1 Medium dense, brown SILT, trace fine to coarse Sand, trace fine Gravel, (moist) 2 Dense, brown SILT, some fine to medium Sand, trace fine Gravel, (moist) 3 Dense, brown SILT, some fine to coarse Sand, trace fine Gravel, (moist) 4 Dense, brown SILT, some fine to coarse Sand, little fine to coarse Gravel, (moist) 5 Medium dense, brown SILT, some fine to coarse Sand, trace fine Gravel, (moist) 10 Bottom of Exploration of 10.0 ft	
Depth (ft)	Coring Interval (ft)						Type	Penetration (lb/in)	Recovery (%)	Blows / 6 inch Interval					Coring Time (min./ft)	RQD Reading (%)																																																																																																				
		0-6	6-12	12-18	18-24	24-30																																																																																																														
1	SS 24	18	0	8	15	12	13																																																																																																													
2	SS 24	17	2	17	12	21	22																																																																																																													
3	SS 24	12	4	40	30	10	8																																																																																																													
4	SS 24	12	6	7	23	12	12																																																																																																													
5	SS 24	12	8	8	9	8	9																																																																																																													
10																																																																																																																				
15																																																																																																																				
20																																																																																																																				
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. 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 the fissile planes between approximately 60 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 Centennial Geologic Map of Vermont (dall, 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-ramping 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.																																																																																																																				
Remarks		Boring No.: B-01																																																																																																																		

BORING LOG		Boring No.:	B-02																																																																																																																	
Project Name		Page No.:	1 of 1																																																																																																																	
Knapp Airport		File No.:	965-03																																																																																																																	
Berlin, Vermont		Checked By:	KEW/AMH																																																																																																																	
<p><b>GEODESIGN INCORPORATED</b>            Geotechnical Engineers-Environmental Consultants-Construction Engineers            P.O. Box 699 Windsor, VT 05089 Phone: 802-674-2033 Fax: 802-674-5943            1233 Shelburne Rd, Suite 300 South Burlington, VT 05403 Phone: 802-652-5140</p>																																																																																																																				
Boring Company: Specialty Drilling & Investigation Foreman: Chris Aldrich GeoDesign Rep.: Don Howey Date Started: July 12, 2006 Date Finished: July 12, 2006 N. Coordinate: E. Coordinate: Ground Surface Elevation (feet): Station: Offset: ft		Casting: H.S.A. SS Sampler: 2.25 in. 1.38 in. Date: 7/12/06, 0:00 Notes: None observed Hammer WL: NA 140 lbs Hammer Fall: NA 30 in. Rig Type: Simco 2800 Hammer Type: Safety Hammer																																																																																																																		
<table border="1"> <thead> <tr> <th rowspan="2">Depth (ft)</th> <th rowspan="2">Coring Interval (ft)</th> <th rowspan="2">Type</th> <th rowspan="2">Penetration (lb/in)</th> <th rowspan="2">Recovery (%)</th> <th colspan="5">Blows / 6 inch Interval</th> <th rowspan="2">Coring Time (min./ft)</th> <th rowspan="2">RQD Reading (%)</th> </tr> <tr> <th>0-6</th> <th>6-12</th> <th>12-18</th> <th>18-24</th> <th>24-30</th> </tr> </thead> <tbody> <tr><td>1</td><td>SS 24</td><td>9</td><td>0</td><td>1</td><td>7</td><td>13</td><td>12</td><td></td><td></td><td></td><td></td></tr> <tr><td>2</td><td>SS 24</td><td>16</td><td>2</td><td>9</td><td>11</td><td>12</td><td>12</td><td></td><td></td><td></td><td></td></tr> <tr><td>3</td><td>SS 24</td><td>12</td><td>4</td><td>93</td><td>21</td><td>12</td><td>10</td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>SS 24</td><td>11</td><td>6</td><td>12</td><td>18</td><td>9</td><td>11</td><td></td><td></td><td></td><td></td></tr> <tr><td>5</td><td>SS 24</td><td>NR</td><td>8</td><td>12</td><td>28</td><td>22</td><td>17</td><td></td><td></td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>		Depth (ft)	Coring Interval (ft)	Type	Penetration (lb/in)	Recovery (%)	Blows / 6 inch Interval					Coring Time (min./ft)	RQD Reading (%)	0-6	6-12	12-18	18-24	24-30	1	SS 24	9	0	1	7	13	12					2	SS 24	16	2	9	11	12	12					3	SS 24	12	4	93	21	12	10					4	SS 24	11	6	12	18	9	11					5	SS 24	NR	8	12	28	22	17					10												15												20												Strata Description: Sandy Silt Symbol: [Symbol] Depth & Elevation (feet): Classification System: Burnister Sample Description: 1 Medium dense, brown SILT, little fine to coarse Gravel, trace fine to coarse Sand, trace Root fibers, (moist) 2 Medium dense, brown SILT, some (+) fine Sand, trace fine Gravel, (moist) 3 Possible Weathered Bedrock 4 Dense, gray fine to coarse GRAVEL, some fine to coarse Sand, trace Silt, (fractured Rock fragments) 5 Medium dense, gray to brown, fine to coarse GRAVEL (fractured Rock fragments - possible Shale), some fine to coarse Sand, some Silt, (moist) 6 Dense, gray fine to coarse GRAVEL, some fine to coarse Sand, trace Silt, (fractured Rock fragments) 10 Bottom of Exploration of 10.0 ft	
Depth (ft)	Coring Interval (ft)						Type	Penetration (lb/in)	Recovery (%)	Blows / 6 inch Interval					Coring Time (min./ft)	RQD Reading (%)																																																																																																				
		0-6	6-12	12-18	18-24	24-30																																																																																																														
1	SS 24	9	0	1	7	13	12																																																																																																													
2	SS 24	16	2	9	11	12	12																																																																																																													
3	SS 24	12	4	93	21	12	10																																																																																																													
4	SS 24	11	6	12	18	9	11																																																																																																													
5	SS 24	NR	8	12	28	22	17																																																																																																													
10																																																																																																																				
15																																																																																																																				
20																																																																																																																				
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. 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.																																																																																																																				
Remarks		Boring No.: B-02																																																																																																																		

BORING LOG		Boring No.:	B-03																																																																																																																	
Project Name		Page No.:	1 of 1																																																																																																																	
Knapp Airport		File No.:	965-03																																																																																																																	
Berlin, Vermont		Checked By:	KEW/AMH																																																																																																																	
<p><b>GEODESIGN INCORPORATED</b>            Geotechnical Engineers-Environmental Consultants-Construction Engineers            P.O. Box 699 Windsor, VT 05089 Phone: 802-674-2033 Fax: 802-674-5943            1233 Shelburne Rd, Suite 300 South Burlington, VT 05403 Phone: 802-652-5140</p>																																																																																																																				
Boring Company: Specialty Drilling & Investigation Foreman: Chris Aldrich GeoDesign Rep.: Don Howey Date Started: July 12, 2006 Date Finished: July 12, 2006 N. Coordinate: E. Coordinate: Ground Surface Elevation (feet): Station: Offset: ft		Casting: H.S.A. SS Sampler: 2.25 in. 1.38 in. Date: 7/12/06, 0:00 Notes: None observed Hammer WL: NA 140 lbs Hammer Fall: NA 30 in. Rig Type: Simco 2800 Hammer Type: Safety Hammer																																																																																																																		
<table border="1"> <thead> <tr> <th rowspan="2">Depth (ft)</th> <th rowspan="2">Coring Interval (ft)</th> <th rowspan="2">Type</th> <th rowspan="2">Penetration (lb/in)</th> <th rowspan="2">Recovery (%)</th> <th colspan="5">Blows / 6 inch Interval</th> <th rowspan="2">Coring Time (min./ft)</th> <th rowspan="2">RQD Reading (%)</th> </tr> <tr> <th>0-6</th> <th>6-12</th> <th>12-18</th> <th>18-24</th> <th>24-30</th> </tr> </thead> <tbody> <tr><td>1</td><td>SS 24</td><td>14</td><td>0</td><td>2</td><td>3</td><td>8</td><td>14</td><td></td><td></td><td></td><td></td></tr> <tr><td>2</td><td>SS 24</td><td>16</td><td>2</td><td>4</td><td>6</td><td>12</td><td>22</td><td></td><td></td><td></td><td></td></tr> <tr><td>3</td><td>SS 24</td><td>18</td><td>4</td><td>15</td><td>10</td><td>12</td><td>16</td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>SS 24</td><td>20</td><td>6</td><td>18</td><td>20</td><td>19</td><td>25</td><td></td><td></td><td></td><td></td></tr> <tr><td>5</td><td>SS 24</td><td>14</td><td>8</td><td>23</td><td>25</td><td>29</td><td>37</td><td></td><td></td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>		Depth (ft)	Coring Interval (ft)	Type	Penetration (lb/in)	Recovery (%)	Blows / 6 inch Interval					Coring Time (min./ft)	RQD Reading (%)	0-6	6-12	12-18	18-24	24-30	1	SS 24	14	0	2	3	8	14					2	SS 24	16	2	4	6	12	22					3	SS 24	18	4	15	10	12	16					4	SS 24	20	6	18	20	19	25					5	SS 24	14	8	23	25	29	37					10												15												20												Strata Description: Sandy Silt Symbol: [Symbol] Depth & Elevation (feet): Classification System: Burnister Sample Description: 1 Medium dense, brown SILT, little fine to coarse Gravel, trace (+) fine to coarse Sand, trace Root fibers, (moist) 2 Medium dense, brown SILT, little fine to coarse Gravel, trace (+) fine to coarse Sand, (moist) 3 Medium dense, brownish gray SILT, trace (+) fine to coarse Sand, trace fine to coarse Gravel, (moist) 4 Glacial Till 5 Dense, brown SILT, trace fine to coarse Sand, trace fine to coarse Gravel, (moist) 6 Very dense, brown SILT, trace fine to coarse Sand, trace fine to coarse Gravel, (moist) 10 Bottom of Exploration of 10.0 ft	
Depth (ft)	Coring Interval (ft)						Type	Penetration (lb/in)	Recovery (%)	Blows / 6 inch Interval					Coring Time (min./ft)	RQD Reading (%)																																																																																																				
		0-6	6-12	12-18	18-24	24-30																																																																																																														
1	SS 24	14	0	2	3	8	14																																																																																																													
2	SS 24	16	2	4	6	12	22																																																																																																													
3	SS 24	18	4	15	10	12	16																																																																																																													
4	SS 24	20	6	18	20	19	25																																																																																																													
5	SS 24	14	8	23	25	29	37																																																																																																													
10																																																																																																																				
15																																																																																																																				
20																																																																																																																				
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. 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.																																																																																																																				
Remarks		Boring No.: B-03																																																																																																																		

- 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 the fissile planes between approximately 60 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 Centennial Geologic Map of Vermont (dall, 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-ramping 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.

**Hoyle, Tanner & Associates, Inc.**  
 150 Dow Street  
 Manchester, NH 03101-1227  
 Tel 603-669-5555  
 Fax 603-669-4168  
 Web Page: www.hoyletanner.com  
 Hoyle Tanner & Associates © 2008

PROJECT NAME: E. F. KNAPP STATE AIRPORT  
 A.I.P. 3-50-0001-011-2009  
 PROJECT NUMBER: BERLIN AIR 04-3216  
 FILE NAME: z05h378shf.br 1.dgn  
 PROJECT LEADER: S. FORTNEY  
 DESIGNED BY: S. BOUCHARD  
 BORING LOGS B01-B03  
 PLOT DATE: 11/22/2011  
 DRAWN BY: D. STANDISH  
 CHECKED BY: J. DOWNAR  
 SHEET 155 OF 173