AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

To: Paul Libby, Project Manager, Highway Safety & Design

From: Eric Denardo, Geotechnical Engineer via Callie Ewald, P.E., Senior Geotechnical Engineer

Date: November 17th, 2014

Subject: Wallingford STP 0138(11) Geotechnical Investigation

1.0 INTRODUCTION

We have completed an additional geotechnical investigation as requested along the south side of VT Route 140 in Wallingford, VT. Two preceding reports have been prepared for this project dated July 17th, and September 3rd, 2014 containing geotechnical recommendations for two sections of the slope north of VT 140 and subsurface information in the roadway throughout the project extents. The geotechnical report dated September 3rd provided asphalt thicknesses for the roadway adjacent to the slope project as well as depth to auger refusal. Auger refusals were found between 1.8 feet to 2.7 feet below pavement. As part of this project, stone fill is proposed to key in and line the slope adjacent to the Roaring Brook and VT Route 140. Proposed stone fill extends to a depth of approximately 9 feet below the pavement elevation. Due to shallow refusal within the roadway, there was a concern of encountering bedrock during excavation for placement of the stone fill. To alleviate this concern, this follow-up investigation was performed. Contained herein are the results of the investigation.

2.0 FIELD INVESTIGATION

The field investigation was conducted between November 5, and November 7, 2014. Five borings were performed to a depth of approximately 10 feet along the area of the proposed stone fill to determine if shallow bedrock was present. A summary of the location of each boring is provided below in Table 2.1. A boring location plan is also attached to this report. The values for Northings and Eastings are based on the Vermont State Plane Grid Coordinate System NAD 83, and were located by a handheld GPS. Elevations, stations, and offsets were then taken off a Green International survey file.

Table 2.1: Boring Locations

Boring #	Station (ft)	Offset (ft)	Northing (ft)	Easting (ft)	Pavement Thickness (ft)	Boring Depth (ft)
B-201	209+62.5	10.5	1527189.79	349878.71	0.42	10.5
B-202	210+37.5	10.3	1527262.57	349896.76	0.42	10.1
B-203	212+45	10.4	1527459.59	349966.50	0.60	10.0
B-204	213+12.5	7.9	1527519.76	349997.19	0.72	11.8
B-205	213+80	7.8	1527580.91	350025.20	0.72	10.0

Borings B-201, B-202, and B-203 were performed with the CME 55 drill rig and borings B-204 and B-205 were performed using the CME 45 skid rig. In each boring, when rock was encountered, NX cores were taken in order to determine if the rock was bedrock, cobbles or large boulders. During drilling, cores were visually inspected and consisted of a granular material with cobbles, stones, and boulders to depth in all of the borings. No bedrock was encountered in any of the borings. Based on the driller notes and boring logs, this material may prove difficult to excavate, however we believe these materials should be replaced and that the stone fill can be constructed as detailed in the plans dated October 1st, 2014. Due to proximity of the stone fill to the roadway, laying the slope back or installing temporary shoring may be necessary to facilitate construction. Driving sheeting through this material should not be considered a feasible option.

3.0 CONCLUSION

If you have any questions, or you would like to discuss this report, please contact us at (802) 828-2561.

Enclosures: Boring Logs (5 pages)
Boring Location Plan

c: Electronic Read File
Project File/CEE
END

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

BORING LOG

WALLINGFORD
STP 0138(11)
VT-140

Boring No.: **B-201**
Page No.: 1 of 1
Pin No.: 12C408
Checked By: END

Boring Crew: JUDKINS, DAIGNEAULT, HOOK
Date Started: 11/07/14 Date Finished: 11/07/14
VTSPG NAD83: N 349878.71 ft E 1527189.79 ft
Station: 209+62.5 Offset: 10.50
Ground Elevation: 1198.76 ft

	Casing	Sampler
Type:	WB	
I.D.:	4 in	
Hammer Wt:	N.A.	N.A.
Hammer Fall:	N.A.	N.A.
Hammer/Rod Type:		
Rig: CME 55 TRACK	C_E =	

Groundwater Observations

Date	Depth (ft)	Notes
11/07/14	3.4	After drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Asphalt Pavement, 0.0 ft - 0.42 ft					
2.5		Field Note:, NXDC, Cobbles & stones					
5.0		Field Note:, NXDC, Cobbles & stones					
7.5							
10.0		Field Note:, NXDC, Cobbles & stones					
		Hole stopped @ 10.5 ft No bedrock to depth.					
12.5		Remarks: Hole collapsed at 4.5 ft.					
15.0							
17.5							
20.0							
22.5							

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 may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WALLINGFORD STP 0138(11).GPJ VERMONT AOT.GDT 11/12/14

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CENTRAL LABORATORY

BORING LOG

WALLINGFORD
STP 0138(11)
VT-140

Boring No.: **B-202**
Page No.: 1 of 1
Pin No.: 12C408
Checked By: END

Boring Crew: JUDKINS, HOOK, NIETO
Date Started: 11/06/14 Date Finished: 11/06/14
VTSPG NAD83: N 349896.76 ft E 1527262.57 ft
Station: 210+37.5 Offset: 10.30
Ground Elevation: 1201.49 ft

	Casing	Sampler
Type:	WB	
I.D.:	4 in	
Hammer Wt:	N.A.	N.A.
Hammer Fall:	N.A.	N.A.
Hammer/Rod Type:		
Rig: CME 55 TRACK	C_E =	

Groundwater Observations

Date	Depth (ft)	Notes
11/06/14	4.0	After drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Asphalt Pavement, 0.0 ft - 0.42 ft					
2.5		NXDC, Cobbles & stones, 2.5 ft - 4.5 ft					
5.0		NXDC, Cobbles & stones, 4.5 ft - 6.5 ft					
7.5		NXDC, Cobbles & stones, 6.5 ft - 8.5 ft					
		NXDC, Cobbles & stones, 8.5 ft - 10.1 ft					
10.0		Hole stopped @ 10.1 ft No bedrock to depth.					
12.5		Remarks: Hole collapsed at 6.2 ft.					
15.0							
17.5							
20.0							
22.5							

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MATERIALS BUREAU
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BORING LOG

WALLINGFORD
STP 0138(11)
VT-140

Boring No.: **B-203**
Page No.: 1 of 1
Pin No.: 12C408
Checked By: END

Boring Crew: JUDKINS, HOOK, NIETO
Date Started: 11/06/14 Date Finished: 11/06/14
VTSPG NAD83: N 349966.50 ft E 1527459.59 ft
Station: 212+45 Offset: 10.40
Ground Elevation: 1208.51 ft

	Casing	Sampler
Type:	WB	
I.D.:	4 in	
Hammer Wt:	N.A.	N.A.
Hammer Fall:	N.A.	N.A.
Hammer/Rod Type:		
Rig: CME 55 TRACK	C_E =	

Groundwater Observations

Date	Depth (ft)	Notes
11/06/14	1.8	After drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Asphalt Pavement, 0.0 ft - 0.6 ft					
		Gravel & Sand, 0.6 ft - 2.5 ft, Cleaned out with roller cone.					
2.5		NXDC, Sand & Cobbles, 3.4 ft - 5.0 ft					
5.0		NXDC, Cobbles & stones, 6.0 ft - 7.8 ft					
7.5		NXDC, Gravel & Sand, 8.2 ft - 10.0 ft					
10.0		Hole stopped @ 10.0 ft No bedrock to depth.					
		Remarks: Hole collapsed at 6.1 ft.					
12.5							
15.0							
17.5							
20.0							
22.5							

Notes:
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MATERIALS BUREAU
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BORING LOG

WALLINGFORD
STP 0138(11)
VT-140

Boring No.: **B-204**
Page No.: 1 of 1
Pin No.: 12C408
Checked By: END

Boring Crew: DAIGNEAULT, JUDKINS, NIETO
Date Started: 11/05/14 Date Finished: 11/06/14
VTSPG NAD83: N 349997.19 ft E 1527519.76 ft
Station: 213+12.5 Offset: 7.90
Ground Elevation: 1213.07 ft

	Casing	Sampler
Type:	WB	
I.D.:	4 in	
Hammer Wt:	N.A.	N.A.
Hammer Fall:	N.A.	N.A.
Hammer/Rod Type:		
Rig: CME 45C SKID	C_E =	

Groundwater Observations

Date	Depth (ft)	Notes
11/06/14	4.9	While drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Asphalt Pavement, 0.0 ft - 0.72 ft					
		NXDC, Appears to be Cobbles, 1.4 ft - 3.0 ft					
2.5							
5.0							
		NXDC, Cobbles, 6.7 ft - 7.8 ft					
7.5							
		NXDC, Boulder, 8.0 ft - 11.8 ft, Broke through boulder at 11.8 ft.					
10.0							
12.5		Hole stopped @ 11.8 ft No bedrock to depth.					
		Remarks: Hole collapsed at 4.7 ft.					
15.0							
17.5							
20.0							
22.5							

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BORING LOG 2 WALLINGFORD STP 0138(11).GPJ VERMONT AOT.GDT 11/12/14

STATE OF VERMONT
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BORING LOG

WALLINGFORD
STP 0138(11)
VT-140

Boring No.: **B-205**
Page No.: 1 of 1
Pin No.: 12C408
Checked By: END

Boring Crew: DAIGNEAULT, HOOK, NIETO
Date Started: 11/05/14 Date Finished: 11/05/14
VTSPG NAD83: N 350025.20 ft E 1527580.91 ft
Station: 213+80 Offset: 7.80
Ground Elevation: 1219.32 ft

	Casing	Sampler
Type:	WB	
I.D.:	4 in	
Hammer Wt:	N.A.	N.A.
Hammer Fall:	N.A.	N.A.
Hammer/Rod Type:		
Rig: CME 45C SKID	C_E =	

Groundwater Observations

Date	Depth (ft)	Notes
11/05/14	5.2	Casing removed.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Asphalt Pavement, 0.0 ft - 0.72 ft					
2.5							
		NXDC, Appears to be Cobbles, 3.8 ft - 5.0 ft					
5.0							
7.5							
		NXDC, Appears to be Cobbles, 8.7 ft - 10.0 ft					
10.0		Hole stopped @ 10.0 ft No bedrock to depth.					
		Remarks: Hole collapsed at 9.5 ft.					
12.5							
15.0							
17.5							
20.0							
22.5							

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BORING LOG 2 WALLINGFORD STP 0138(11).GPJ VERMONT AOT.GDT 11/12/14

N

VT STATE PLANE GRID

PC STA 210+63.20

PT STA 209+58.12

PT STA 212+11.77

PC STA 213+56.17

PT STA 211+37.70

SPEED LIMIT 40

SPEED LIMIT 40

B-201

B-202

B-203

B-204

B-205

1200

1210

1220

1230

210+00

211+00

212+00

213+00

214+00

TOP SLOPE BEGIN STN FILL

BEG ROCK FILL

END ROCK FILL

DITCH

DRA

30"CMP

SPEED40

MAGNAIL

PROJECT NAME:	WALLINGFORD
PROJECT NUMBER:	STP 0138(11)
FILE NAME: z12c408endl.dgn	PLOT DATE: 11-17-14
PROJECT LEADER: E. ATKINS	DRAWN BY:
DESIGNED BY:	CHECKED BY:
BORINGS	SHEET