# APPENDIX 'A'

# GEOTECHNICAL REPORT

# 2011 Residential Street Renewal
## Garrioch Avenue, Camden Place, and Ridley Street
## Sub-Surface Investigation

Sub-Surface Investigation Report
May 2011

TREK GEOTECHNICAL Quality Engineering | Valued Relationships

# 2011 Residential Street Renewal
## Garrioch Avenue, Camden Place, and Ridley Street
## Sub-Surface Investigation

Sub-Surface Investigation Report
May 2011

Prepared for:

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APEGM
Certificate of Authorization
Trek Geotechnical Inc.
No. 4877 Date: May 04, 2011

**TREK Geotechnical Inc.**
Per:

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May 04, 2011
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# 1.0 Introduction

This report summarizes the results of the sub-surface investigation complete for the propsed 2011 Residential Street Renewals of Garrioch Avenue, Camden Place, and Ridley Street in Winnipeg. The project consists of reconstruction of the existing streets. Information regarding the concrete, asphalt, road base for the existing road, and the soil stratigraphy beneath the existing road is provided.

# 2.0 Sub-Surface Investigation and Laboratory Program

A total of 20 test holes were drilled on Garrioch Avenue (TH11-01 to 10), Camden Place (TH11-11 to 16), and Ridley Street (TH11-17 to 20) at the locations shown on Figures 01 to 03. The test holes were drilled in order to determine sub-surface conditions at the three sites for reconstruction of the existing streets.

The sub-surface investigation was conducted on March 28 and 29, 2011. The test holes were drilled to a depth of 3.1 m below road surface by Paddock Drilling Ltd. using their Brat 22 truck mounted drill rig equipped with 125 mm diameter solid stem augers. The pavement structure (asphalt or concrete) was cored by Quality Coring using a portable coring press equipped with a hollow 150 mm diameter diamond core drill bit. The sub-surface conditions were observed during drilling and visually classified by Stephen Renner of TREK. Other pertinent information such as ground water and drilling conditions were also recorded during the drilling investigation. Disturbed (auger cuttings) samples retrieved during the sub-surface investigation were transported to TREK's material testing laboratory for further testing. Core samples were also retrieved and logged at TREK's material testing laboratory.

The laboratory testing program consisted of moisture content determination, Atterberg limits, and hydrometer tests. The laboratory information has been included on the test hole logs and a summary table of the laboratory testing results has been included in Appendix A. Photos of the concrete and asphalt cores are included in Appendix B.

Test hole locations noted on the test hole logs and shown on Figure 01 to 03 are based on measured distances from the nearest curb and associated house number.

# Figures

Test Hole Location Plans

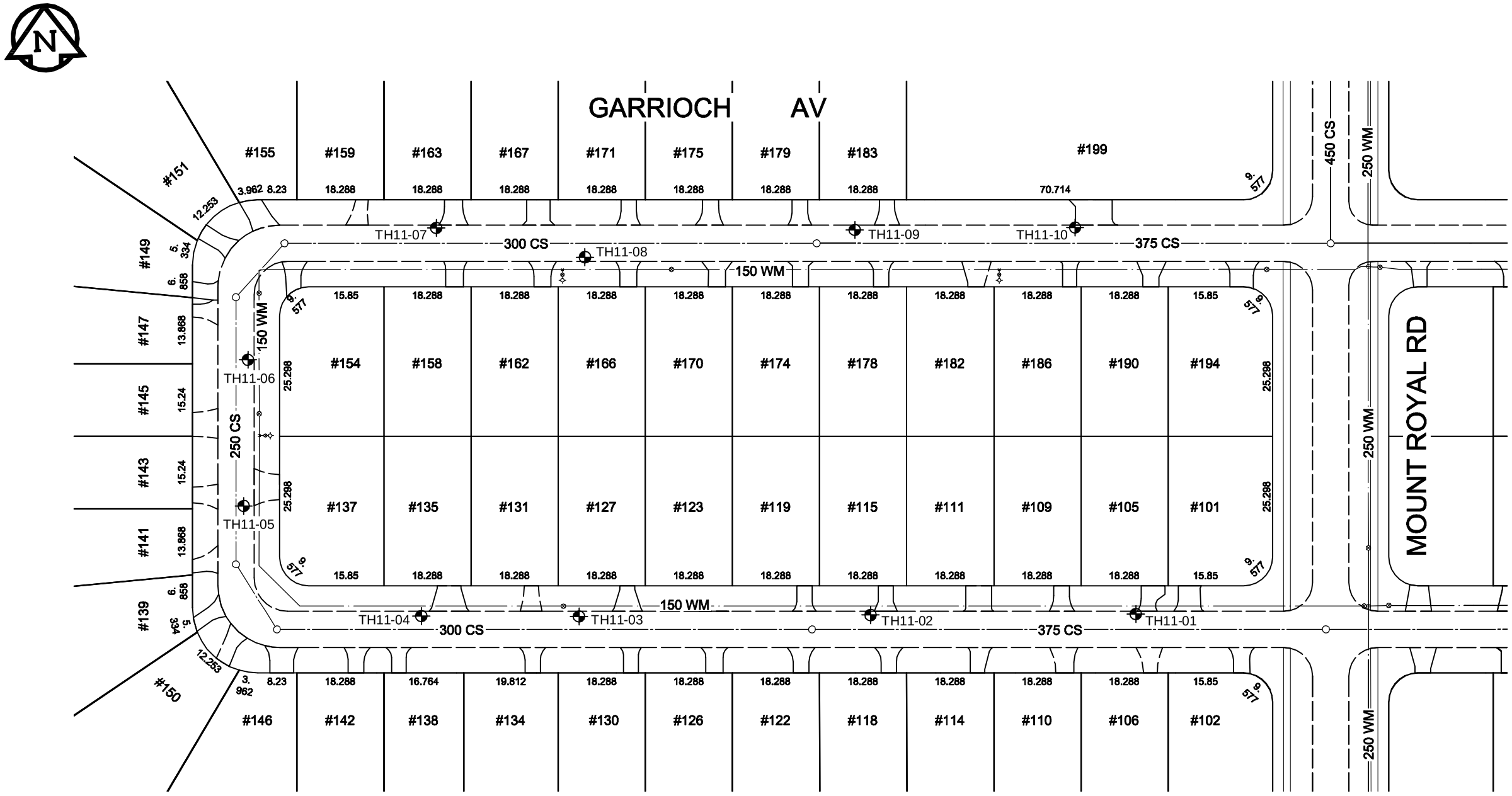
TREK GEOTECHNICAL

**City of Winnipeg**
2011 Residential Streets
0035-001-00

11" x 17"

PLOT: 4/28/2011 8:27:26 PM

FILE NAME: 0035-001-00_01_X.dwg




0 10 20 30 40m
SCALE 1:1000

## Figure 01
Test Hole Location Plan
Garrioch Avenue

TREK GEOTECHNICAL

**City of Winnipeg**
2011 Residential Streets
0035-001-00

11" x 17"

PLOT: 4/28/2011 8:24:53 PM

FILE NAME: 0035-001-00_02_X.dwg

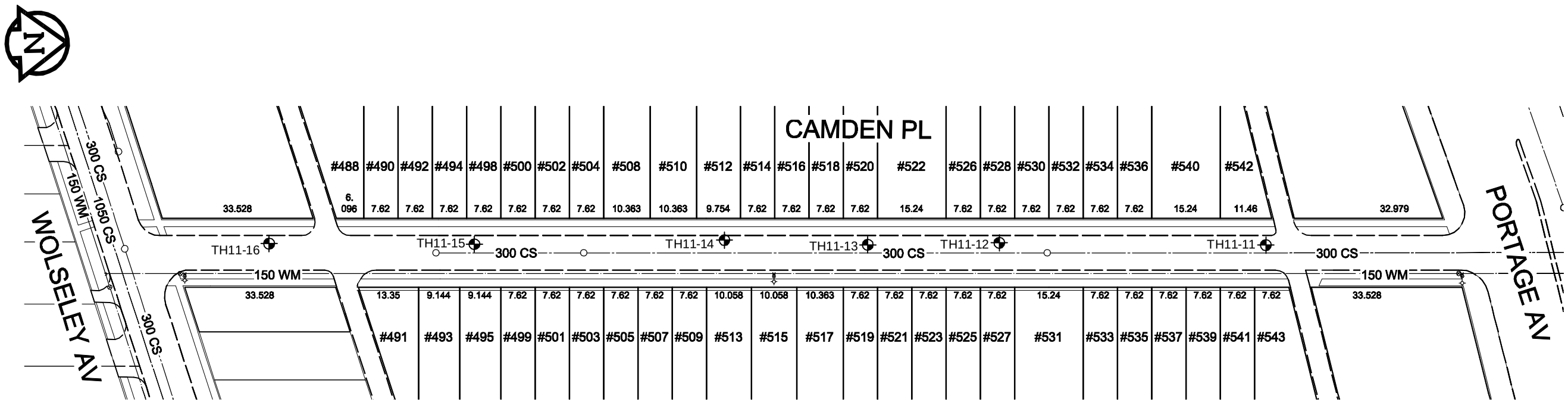



Figure 02
Test Hole Location Plan
Camden Place

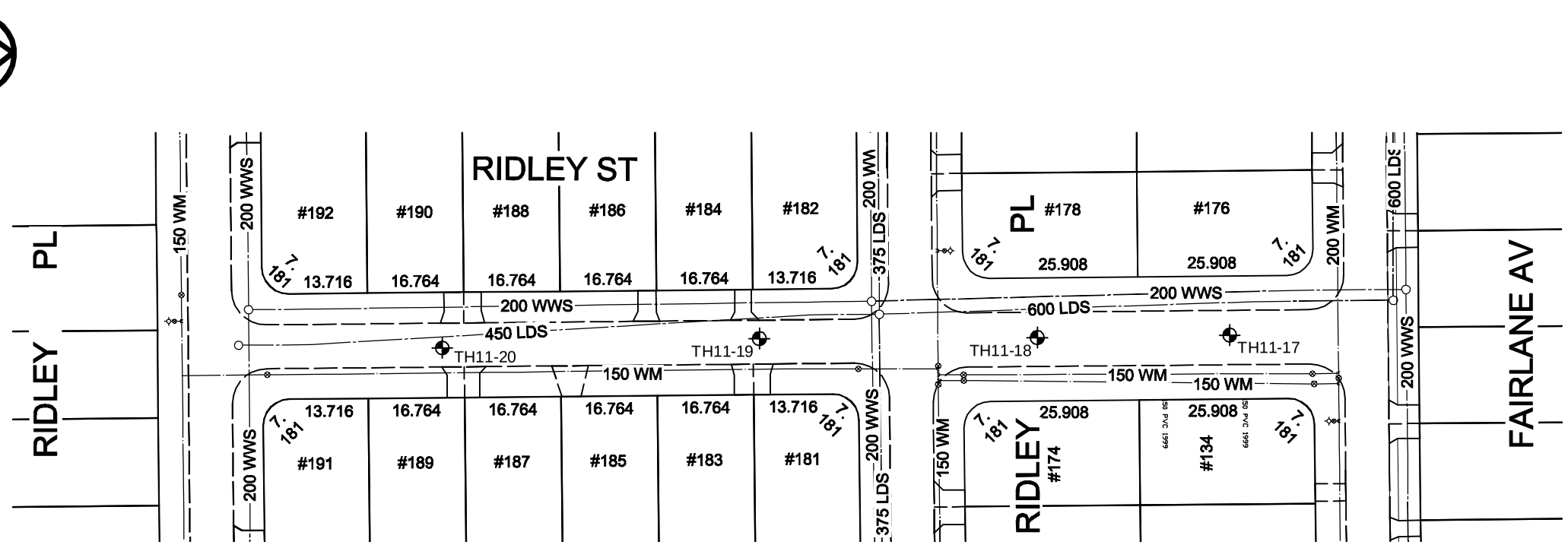
TREK GEOTECHNICAL

**City of Winnipeg**
2011 Residential Streets
0035-001-00

11" x 17"

PLOT: 4/28/2011 8:29:11 PM

FILE NAME: 0035-001-00_03_X.dwg




0 10 20 30 40m
SCALE 1:1000

Figure 03
Test Hole Location Plan
Ridley Street

# Appendix A

Laboratory Testing Results Summary and Test Hole Logs

**City of Winnipeg**
**2011 Residential Street Renwal**
**Sub-Surface Investigation**

| Test Hole No. | Test Hole Location (Street Name) | House No. | Pavement Surface | | Pavement Structure Material | | Subgrade Description | Sample Depth (m) | Moisture Content (%) | Hydrometer Analysis | | | | Atterberg Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Type | Thickness (mm) | Type | Thickness (mm) | | | | Gravel (%) | Sand (%)` | Silt (%) | Clay (%) | Plastic | Liquid | Plasticity Index |
| TH11-01 | Garrioch Avenue | 105 | Asphalt | 38 | Concrete | 165 | | | | | | | | | | |
| | | | | | | | Clay | 0.2 | 45 | | | | | | | |
| | | | | | | | Clay | 0.5 | 38 | | | | | | | |
| | | | | | | | Clay | 0.8 | 24 | | | | | | | |
| | | | | | | | Clay | 1.1 | 34 | | | | | | | |
| | | | | | | | Clay | 1.4 | 34 | | | | | | | |
| | | | | | | | Clay | 1.7 | 41 | | | | | | | |
| | | | | | | | Clay | 2.0 | 38 | | | | | | | |
| | | | | | | | Clay | 2.3 | 38 | | | | | | | |
| | | | | | | | Clay | 2.9 | 53 | | | | | | | |
| TH11-02 | Garrioch Avenue | 115 | Asphalt | 38 | Concrete | 165 | | | | | | | | | | |
| | | | | | | | Clay | 0.2 | 36 | | | | | | | |
| | | | | | | | Clay | 0.5 | 32 | | | | | | | |
| | | | | | | | Clay | 0.8 | 28 | 0 | 19 | 24 | 57 | 17 | 62 | 45 |
| | | | | | | | Clay | 1.1 | 33 | | | | | | | |
| | | | | | | | Clay | 1.4 | 31 | | | | | | | |
| | | | | | | | Clay | 1.7 | 36 | | | | | | | |
| | | | | | | | Clay | 2.0 | 41 | | | | | | | |
| | | | | | | | Clay | 2.3 | 45 | | | | | | | |
| | | | | | | | Clay | 2.9 | 35 | | | | | | | |
| TH11-03 | Garrioch Avenue | 127 | Asphalt | 64 | Concrete | 165 | | | | | | | | | | |
| | | | | | | | Clay | 0.2 | 55 | | | | | | | |
| | | | | | | | Clay | 0.5 | 66 | | | | | | | |
| | | | | | | | Clay | 0.8 | 38 | | | | | | | |
| | | | | | | | Clay | 1.1 | 35 | | | | | | | |
| | | | | | | | Clay | 1.4 | 35 | | | | | | | |
| | | | | | | | Clay | 1.7 | 38 | | | | | | | |
| | | | | | | | Clay | 2.3 | 43 | | | | | | | |
| | | | | | | | Clay | 2.9 | 37 | | | | | | | |
| TH11-04 | Garrioch Avenue | 135 | Asphalt | 25 | Concrete | 165 | | | | | | | | | | |
| | | | | | | | Clay | 0.2 | 43 | | | | | | | |
| | | | | | | | Clay | 0.5 | 38 | | | | | | | |
| | | | | | | | Clay | 0.8 | 32 | | | | | | | |
| | | | | | | | Silt | 1.1 | 25 | 0 | 0 | 62 | 31 | 12 | 29 | 17 |
| | | | | | | | Silt | 1.4 | 24 | | | | | | | |
| | | | | | | | Clay | 1.7 | 34 | | | | | | | |
| | | | | | | | Clay | 2.3 | 36 | | | | | | | |
| | | | | | | | Clay | 2.9 | 32 | | | | | | | |
| TH11-05 | Garrioch Avenue | 143 | Asphalt | 32 | Concrete | 171 | | | | | | | | | | |
| | | | | | | | Clay | 0.2 | 48 | | | | | | | |
| | | | | | | | Clay | 0.5 | 29 | | | | | | | |
| | | | | | | | Clay | 0.8 | 30 | | | | | | | |
| | | | | | | | Clay | 1.1 | 31 | | | | | | | |
| | | | | | | | Clay | 1.4 | 36 | | | | | | | |
| | | | | | | | Clay | 1.7 | 39 | | | | | | | |
| | | | | | | | Clay | 2.3 | 39 | | | | | | | |
| | | | | | | | Clay | 2.9 | 36 | | | | | | | |

**City of Winnipeg**
**2011 Residential Street Renwal**
**Sub-Surface Investigation**

| Test Hole No. | Test Hole Location (Street Name) | House No. | Pavement Surface | | Pavement Structure Material | | Subgrade Description | Sample Depth (m) | Moisture Content (%) | Hydrometer Analysis | | | | Atterberg Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Type | Thickness (mm) | Type | Thickness (mm) | | | | Gravel (%) | Sand (%)` | Silt (%) | Clay (%) | Plastic | Liquid | Plasticity Index |
| | Garrioch Avenue | 145 | Asphalt | 57 | Concrete | 146 | | | | | | | | | | |
| | | | | | | | Clay | 0.2 | 30 | | | | | | | |
| | | | | | | | Clay | 0.5 | 21 | | | | | | | |
| | | | | | | | Clay | 0.8 | 31 | 0 | 14 | 38 | 49 | 14 | 47 | 33 |
| TH11-06 | | | | | | | Clay | 1.1 | 40 | | | | | | | |
| | | | | | | | Clay | 1.4 | 37 | | | | | | | |
| | | | | | | | Clay | 1.7 | 37 | | | | | | | |
| | | | | | | | Clay | 2.3 | 41 | | | | | | | |
| | | | | | | | Clay | 2.9 | 44 | | | | | | | |
| | Garrioch Avenue | 163 | Asphalt | 57 | Concrete | 146 | | | | | | | | | | |
| | | | | | | | Clay | 0.2 | 37 | | | | | | | |
| | | | | | | | Clay | 0.5 | 32 | | | | | | | |
| | | | | | | | Clay | 0.8 | 37 | | | | | | | |
| TH11-07 | | | | | | | Clay | 1.1 | 35 | | | | | | | |
| | | | | | | | Clay | 1.4 | 30 | | | | | | | |
| | | | | | | | Clay | 1.7 | 33 | | | | | | | |
| | | | | | | | Clay | 2.3 | 34 | | | | | | | |
| | | | | | | | Clay | 2.9 | 42 | | | | | | | |
| | Garrioch Avenue | 171 | Asphalt | 38 | Concrete | 165 | | | | | | | | | | |
| | | | | | | | Clay | 0.2 | 39 | | | | | | | |
| | | | | | | | Clay | 0.5 | 40 | | | | | | | |
| | | | | | | | Clay | 0.8 | 42 | | | | | | | |
| TH11-08 | | | | | | | Clay | 1.1 | 27 | | | | | | | |
| | | | | | | | Clay | 1.4 | 27 | | | | | | | |
| | | | | | | | Clay | 1.7 | 40 | | | | | | | |
| | | | | | | | Clay | 2.3 | 37 | | | | | | | |
| | | | | | | | Clay | 2.9 | 45 | | | | | | | |
| | Garrioch Avenue | 183 | Asphalt | 38 | Concrete | 152 | | | | | | | | | | |
| | | | | | | | Clay | 0.2 | 47 | | | | | | | |
| | | | | | | | Clay | 0.5 | 46 | | | | | | | |
| | | | | | | | Clay | 0.8 | 40 | 0 | 2 | 12 | 86 | 22 | 85 | 63 |
| TH11-09 | | | | | | | Clay | 1.1 | 38 | | | | | | | |
| | | | | | | | Clay | 1.4 | 40 | | | | | | | |
| | | | | | | | Clay | 1.7 | 40 | | | | | | | |
| | | | | | | | Clay | 2.3 | 47 | | | | | | | |
| | | | | | | | Clay | 2.9 | 52 | | | | | | | |
| | Garrioch Avenue | Church | Asphalt | 51 | Concrete | 152 | | | | | | | | | | |
| | | | | | | | Clay | 0.2 | 55 | | | | | | | |
| | | | | | | | Clay | 0.5 | 39 | | | | | | | |
| | | | | | | | Clay | 0.8 | 34 | | | | | | | |
| TH11-10 | | | | | | | Clay | 1.1 | 30 | | | | | | | |
| | | | | | | | Clay | 1.4 | 36 | | | | | | | |
| | | | | | | | Clay | 1.7 | 36 | | | | | | | |
| | | | | | | | Clay | 2.3 | 43 | | | | | | | |
| | | | | | | | Clay | 2.9 | 50 | | | | | | | |

**City of Winnipeg**
**2011 Residential Street Renwal**
**Sub-Surface Investigation**

| Test Hole No. | Test Hole Location (Street Name) | House No. | Pavement Surface | | Pavement Structure Material | | Subgrade Description | Sample Depth (m) | Moisture Content (%) | Hydrometer Analysis | | | | Atterberg Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Type | Thickness (mm) | Type | Thickness (mm) | | | | Gravel (%) | Sand (%)` | Silt (%) | Clay (%) | Plastic | Liquid | Plasticity Index |
| TH11-11 | Camden Place | 542 | Asphalt | 64 | - | - | | | | | | | | | | |
| | | | | | | | Sand (Fill) | 0.1 | 7 | | | | | | | |
| | | | | | | | Clay (Fill) | 0.2 | 29 | | | | | | | |
| | | | | | | | Clay (Fill) | 0.5 | 36 | | | | | | | |
| | | | | | | | Silt | 0.8 | 28 | | | | | | | |
| | | | | | | | Clay | 1.1 | 30 | | | | | | | |
| | | | | | | | Clay | 1.4 | 29 | | | | | | | |
| | | | | | | | Clay | 1.7 | 33 | | | | | | | |
| | | | | | | | Clay | 2.1 | 35 | | | | | | | |
| | | | | | | | Clay | 2.6 | 44 | | | | | | | |
| | | | | | | | Clay | 2.9 | 51 | | | | | | | |
| TH11-12 | Camden Place | 528 | Asphalt | 89 | - | - | | | | | | | | | | |
| | | | | | | | Sand (Fill) | 0.1 | 11 | | | | | | | |
| | | | | | | | Clay (Fill) | 0.2 | 23 | | | | | | | |
| | | | | | | | Silt | 0.5 | 40 | | | | | | | |
| | | | | | | | Silt | 0.8 | 30 | 0 | 7 | 66 | 26 | 14 | 33 | 19 |
| | | | | | | | Clay | 1.1 | 31 | | | | | | | |
| | | | | | | | Silt | 1.4 | 22 | | | | | | | |
| | | | | | | | Silt | 1.7 | 23 | | | | | | | |
| | | | | | | | Clay | 2.1 | 35 | | | | | | | |
| | | | | | | | Clay | 2.6 | 46 | | | | | | | |
| | | | | | | | Clay | 2.9 | 48 | | | | | | | |
| TH11-13 | Camden Place | 520 | Asphalt | 76 | - | - | | | | | | | | | | |
| | | | | | | | Sand (Fill) | 0.1 | 19 | | | | | | | |
| | | | | | | | Clay (Fill) | 0.2 | 41 | | | | | | | |
| | | | | | | | Clay (Fill) | 0.5 | 38 | 0 | 8 | 37 | 55 | 20 | 67 | 47 |
| | | | | | | | Silt | 0.8 | 35 | | | | | | | |
| | | | | | | | Clay | 1.1 | 38 | | | | | | | |
| | | | | | | | Clay | 1.4 | 36 | | | | | | | |
| | | | | | | | Clay | 1.7 | 39 | | | | | | | |
| | | | | | | | Clay | 2.1 | 44 | | | | | | | |
| | | | | | | | Clay | 2.6 | 48 | | | | | | | |
| | | | | | | | Clay | 2.9 | 48 | | | | | | | |
| TH11-14 | Camden Place | 512 | Asphalt | 76 | - | - | | | | | | | | | | |
| | | | | | | | Sand (Fill) | 0.1 | 15 | | | | | | | |
| | | | | | | | Clay | 0.2 | 25 | | | | | | | |
| | | | | | | | Clay | 0.5 | 28 | | | | | | | |
| | | | | | | | Clay | 0.8 | 29 | | | | | | | |
| | | | | | | | Clay | 1.1 | 29 | | | | | | | |
| | | | | | | | Silt | 1.4 | 28 | | | | | | | |
| | | | | | | | Silt | 1.7 | 21 | | | | | | | |
| | | | | | | | Clay | 2.1 | 36 | | | | | | | |
| | | | | | | | Clay | 2.6 | 44 | | | | | | | |
| | | | | | | | Clay | 2.9 | 45 | | | | | | | |

**City of Winnipeg**
**2011 Residential Street Renwal**
**Sub-Surface Investigation**

| Test Hole No. | Test Hole Location (Street Name) | House No. | Pavement Surface | | Pavement Structure Material | | Subgrade Description | Sample Depth (m) | Moisture Content (%) | Hydrometer Analysis | | | | Atterberg Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Type | Thickness (mm) | Type | Thickness (mm) | | | | Gravel (%) | Sand (%)` | Silt (%) | Clay (%) | Plastic | Liquid | Plasticity Index |
| | Camden Place | 498 | Asphalt | 57 | - | - | | | | | | | | | | |
| | | | | | | | Sand (Fill) | 0.1 | 18 | | | | | | | |
| | | | | | | | Clay | 0.2 | 35 | | | | | | | |
| | | | | | | | Clay | 0.5 | 35 | | | | | | | |
| | | | | | | | Silt | 0.8 | 21 | | | | | | | |
| TH11-15 | | | | | | | Silt | 1.1 | 24 | | | | | | | |
| | | | | | | | Clay | 1.4 | 35 | | | | | | | |
| | | | | | | | Clay | 1.7 | 38 | | | | | | | |
| | | | | | | | Clay | 2.1 | 44 | | | | | | | |
| | | | | | | | Clay | 2.6 | 45 | | | | | | | |
| | | | | | | | Clay | 2.9 | 48 | | | | | | | |
| | Camden Place | School | Asphalt | 57 | - | - | | | | | | | | | | |
| | | | | | | | Sand (Fill) | 0.1 | 21 | | | | | | | |
| | | | | | | | Clay | 0.2 | 36 | | | | | | | |
| | | | | | | | Sand | 0.5 | 22 | | | | | | | |
| | | | | | | | Clay | 0.8 | 31 | 0 | 16 | 43 | 41 | 20 | 55 | 35 |
| TH11-16 | | | | | | | Clay | 1.1 | 35 | | | | | | | |
| | | | | | | | Clay | 1.4 | 31 | | | | | | | |
| | | | | | | | Clay | 1.7 | 28 | | | | | | | |
| | | | | | | | Silt | 2.1 | 27 | | | | | | | |
| | | | | | | | Silt | 2.6 | 24 | | | | | | | |
| | | | | | | | Silt | 2.9 | 29 | | | | | | | |
| | Ridley Street | 176 | - | - | Concrete | 165 | | | | | | | | | | |
| | | | | | | | Sand and Gravel (Fill) | 0.1 | 13 | | | | | | | |
| | | | | | | | Clay | 0.2 | 29 | | | | | | | |
| | | | | | | | Clay | 0.5 | 38 | | | | | | | |
| | | | | | | | Clay | 0.8 | 37 | | | | | | | |
| TH11-17 | | | | | | | Clay | 1.1 | 48 | | | | | | | |
| | | | | | | | Clay | 1.4 | 35 | | | | | | | |
| | | | | | | | Clay | 1.7 | 41 | | | | | | | |
| | | | | | | | Clay | 2.1 | 45 | | | | | | | |
| | | | | | | | Clay | 2.6 | 45 | | | | | | | |
| | | | | | | | Clay | 2.9 | 44 | | | | | | | |
| | Ridley Street | 178 | - | - | Concrete | 152 | | | | | | | | | | |
| | | | | | | | Sand and Gravel (Fill) | 0.1 | 10 | | | | | | | |
| | | | | | | | Clay | 0.2 | 24 | | | | | | | |
| | | | | | | | Clay | 0.5 | 36 | | | | | | | |
| | | | | | | | Clay | 0.8 | 36 | 1 | 3 | 23 | 73 | 19 | 74 | 55 |
| TH11-18 | | | | | | | Clay | 1.1 | 34 | | | | | | | |
| | | | | | | | Clay | 1.4 | 37 | | | | | | | |
| | | | | | | | Clay | 1.7 | 40 | | | | | | | |
| | | | | | | | Clay | 2.1 | 43 | | | | | | | |
| | | | | | | | Clay | 2.6 | 45 | | | | | | | |
| | | | | | | | Clay | 2.9 | 49 | | | | | | | |

**City of Winnipeg**
**2011 Residential Street Renwal**
**Sub-Surface Investigation**

| Test Hole No. | Test Hole Location (Street Name) | House No. | Pavement Surface | | Pavement Structure Material | | Subgrade Description | Sample Depth (m) | Moisture Content (%) | Hydrometer Analysis | | | | Atterberg Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Type | Thickness (mm) | Type | Thickness (mm) | | | | Gravel (%) | Sand (%)` | Silt (%) | Clay (%) | Plastic | Liquid | Plasticity Index |
| TH11-19 | Ridley Street | 182 / 184 | - | - | Concrete | 152 | | | | | | | | | | |
| | | | | | | | Sand and Gravel (Fill) | 0.1 | 10 | | | | | | | |
| | | | | | | | Clay | 0.2 | 35 | | | | | | | |
| | | | | | | | Clay | 0.5 | 39 | | | | | | | |
| | | | | | | | Clay | 0.8 | 34 | | | | | | | |
| | | | | | | | Clay | 1.1 | 36 | | | | | | | |
| | | | | | | | Clay | 1.4 | 38 | | | | | | | |
| | | | | | | | Clay | 1.7 | 38 | | | | | | | |
| | | | | | | | Clay | 2.1 | 40 | | | | | | | |
| | | | | | | | Clay | 2.6 | 36 | | | | | | | |
| | | | | | | | Clay | 2.9 | 43 | | | | | | | |
| TH11-20 | Ridley Street | 191 | - | - | Concrete | 152 | | | | | | | | | | |
| | | | | | | | Sand and Gravel (Fill) | 0.1 | 16 | | | | | | | |
| | | | | | | | Clay | 0.2 | 36 | | | | | | | |
| | | | | | | | Clay | 0.5 | 35 | | | | | | | |
| | | | | | | | Clay | 0.8 | 28 | | | | | | | |
| | | | | | | | Clay | 1.1 | 34 | | | | | | | |
| | | | | | | | Clay | 1.4 | 30 | | | | | | | |
| | | | | | | | Clay | 1.7 | 30 | | | | | | | |
| | | | | | | | Clay | 2.1 | 37 | | | | | | | |
| | | | | | | | Clay | 2.6 | 33 | | | | | | | |
| | | | | | | | Clay | 2.9 | 36 | | | | | | | |

# Sub-Surface Log

**Test Hole TH11-01**
1 of 1

| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 105 Garrioch Ave (14 U 626041 E, 5527182 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 28 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number |
|---|---|---|---|---|
| | | ASPHALT (38 mm thick) | | C1 |
| | | CONCRETE (165 mm thick) | | C2 |
| | | CLAY - silty, trace organics<br>- dark brown to black<br>- frozen, moist and soft to firm when thawed<br>- intermediate plasticity | | G3 |
| 0.5 | | | | G4 |
| | | | | G5 |
| 1.0 | | CLAY - silty<br>- brown<br>- frozen to 1.5 m, moist and soft to firm when thawed<br>- high plasticity | | G6 |
| | | | | G7 |
| 1.5 | | - moist below 1.5 m | | |
| | | - firm to stiff below 1.7 m | | G8 |
| | | - trace silt inclustions (<15 mm diam.), firm below 1.8 m | | |
| 2.0 | | | | G9 |
| | | - trace precipitates (<10 mm diam.) | | |
| | | | | G10 |
| 2.5 | | | | |
| | | - soft below 2.7 m | | |
| 3.0 | | | | G11 |

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21

Particle Size (%): 0 20 40 60 80 100

PL MC LL: 0 20 40 60 80 100

Undrained Shear Strength (kPa): 0 50 100 150 200250

△ Torvane △ ✪ Pocket Pen. ✪ ☒ Qu ☒ ○ Field Vane ○

END OF TEST HOLE AT 3.0 m IN CLAY

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-02**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 115 Garrioch Ave (14 U 625984 E, 5527183 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 28 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Material Description | Sample Type | Sample Number |
|---|---|---|---|
| 0 | ASPHALT (38 mm thick) | | C12 |
| | CONCRETE (165 mm thick) | | C13 |
| | CLAY - silty, trace organics<br>- dark brown to black<br>- frozen, moist and soft to firm when thawed<br>- intermediate plasticity | | G14 |
| 0.5 | | | G15 |
| | | | G16 |
| 1.0 | | | G17 |
| | CLAY - silty<br>- brown<br>- frozen to 1.7 m, moist and soft to firm when thawed<br>- high plasticity | | G18 |
| 1.5 | - trace silt inclusions (<10 mm diam.) below 1.5 m<br>- moist, stiff below 1.7 m | | G19 |
| 2.0 | | | G22 |
| | | | G20 |
| 2.5 | - trace silt inclusions (<20 mm diam.), trace oxidation, trace precipitates (<5 mm diam.), mottled brown and grey, firm below 2.4 m | | |
| 3.0 | | | G21 |

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21

Particle Size (%): 0 20 40 60 80 100 — PL MC LL

Undrained Shear Strength (kPa): 0 50 100 150 200 250

△ Torvane △ ✿ Pocket Pen. ✿ ☒ Qu ☒ ○ Field Vane ○

END OF TEST HOLE AT 3.0 m IN CLAY

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

# Sub-Surface Log

**Test Hole TH11-03**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 127 Garrioch Ave (14 U 625922 E, 5527184 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 28 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number | Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL | Undrained Shear Strength (kPa) 0 50 100 150 200250 |
|---|---|---|---|---|---|---|
| | | ASPHALT (64 mm thick) | | C23 | | |
| | | CONCRETE (165 mm thick) | | C24 | | |
| | | CLAY - silty, trace organics<br>- dark brown to black<br>- frozen, wet and very soft when thawed<br>- intermediate plasticity | | G25 | | |
| 0.5 | | - trace organics (rootlets) below 0.5 m | | G26 | | |
| | | | | G27 | | |
| 1.0 | | | | G28 | | |
| | | CLAY - silty<br>- brown<br>- moist, firm<br>- high plasticity | | G29 | | |
| 1.5 | | - stiff below 1.5 m | | G30 | | |
| | | - trace silt inclusions (<20 mm diam.), trace oxidation, mottled brown and grey below 1.8 m | | | | |
| 2.0 | | | | G31 | | |
| 2.5 | | - trace gravel (<5 mm diam.), soft to firm below 2.7 m | | | | |
| | | - trace organics (amorphous) below 2.9 m | | G32 | | |
| 3.0 | | END OF TEST HOLE AT 3.0 m IN CLAY | | | | |

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-04**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 135 Garrioch Ave (14 U 625891 E, 5527184 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 28 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number | Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL | Undrained Shear Strength (kPa) 0 50 100 150 200250 |
|---|---|---|---|---|---|---|
| | | ASPHALT (25 mm thick) | | C33 | | |
| | | CONCRETE (165 mm thick) | | C34 | | |
| | | CLAY - silty, trace organics<br>- dark brown to black<br>- frozen, moist and soft when thawed<br>- intermediate plasticity | | G35 | ● | |
| 0.5 | | | | G36 | ● | |
| | | | | G37 | ● | |
| 1.0 | | SILT - clayey<br>- light brown<br>- frozen, moist and soft when thawed<br>- low to intermediate plasticity | | G38 | ● | |
| | | | | G39 | ● | |
| 1.5 | | CLAY - silty, trace silt inclusions (<20 mm diam.)<br>- brown<br>- moist, stiff<br>- high plasticity | | G40 | ● | △ ✤ |
| 2.0 | | | | | | |
| | | | | G41 | ● | △✤ |
| 2.5 | | | | | | |
| | | | | G42 | ● | ▲✤ |
| 3.0 | | END OF TEST HOLE AT 3.0 m IN CLAY | | | | |

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

# Sub-Surface Log

**Test Hole TH11-05**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 141 Garrioch Ave (14 U 625853 E, 5527209 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 28 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number |
|---|---|---|---|---|
| | | ASPHALT (32 mm thick) | | C43 |
| | | CONCRETE (171 mm thick) | | C44 |
| | | CLAY - silty, trace organics<br>- dark brown to black<br>- frozen, moist and firm when thawed<br>- low to intermediate plasticity | | G45 |
| 0.5 | | | | G46 |
| | | SILT - clayey, light brown, frozen, low to intermediate plasticity | | |
| | | CLAY - silty<br>- brown<br>- frozen to 1.7 m, moist and firm to stiff when thawed<br>- high plasticity | | G47 |
| 1.0 | | | | G48 |
| | | | | G49 |
| 1.5 | | - trace silt inclustions (<20 mm diam.) moist, stiff below 1.7 m | | G50 |
| 2.0 | | | | |
| | | | | G51 |
| 2.5 | | - trace gravel (<20 mm diam.), firm to stiff below 2.4 m | | |
| | | - firm below 2.9 m | | G52 |
| 3.0 | | END OF TEST HOLE AT 3.0 m IN CLAY | | |

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21

Particle Size (%): 0 20 40 60 80 100

PL MC LL

Undrained Shear Strength (kPa): 0 50 100 150 200250

△ Torvane △ ✪ Pocket Pen. ✪ ☒ Qu ☒ ○ Field Vane ○

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-06**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 147 Garrioch Ave (14 U 625855 E, 5527239 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 28 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number |
|---|---|---|---|---|
| | | ASPHALT (57 mm thick) | | C53 |
| | | CONCRETE (146 mm thick) | | C54 |
| | | CLAY - silty, trace organics<br>- dark brown to black<br>- frozen, moist and firm when thawed<br>- low to intermediate plasticity | | G55 |
| 0.5 | | CLAY - silty,<br>- brown<br>- frozen to 1.7 m, moist and firm when thawed<br>- intermediate to high plasticity | | G56 |
| | | - trace coarse grained sand (<5 mm diam.) | | G57 |
| 1.0 | | | | G58 |
| | | | | G59 |
| 1.5 | | - trace silt inclusions (<15 mm diam.), moist, stiff below 1.7 m | | G60 |
| 2.0 | | | | |
| | | - firm below 2.3 m | | G61 |
| 2.5 | | | | |
| | | - firm to stiff below 2.9 m | | G62 |
| 3.0 | | END OF TEST HOLE AT 3.0 m IN CLAY | | |

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21

Particle Size (%): 0 20 40 60 80 100

PL MC LL: 0 20 40 60 80 100

Undrained Shear Strength (kPa): 0 50 100 150 200250

△ Torvane △ ✪ Pocket Pen. ✪ ☒ Qu ☒ ○ Field Vane ○

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-07**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 163 Garrioch Ave (14 U 625899 E, 5527264 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 28 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number | Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL 0 20 40 60 80 100 | Undrained Shear Strength (kPa) △ Torvane △ ✪ Pocket Pen. ✪ ☒ Qu ☒ ○ Field Vane ○ 0 50 100 150 200250 |
|---|---|---|---|---|---|---|
| | | ASPHALT (57 mm thick) | | C63 | | |
| | | CONCRETE (146 mm thick) | | C64 | | |
| | | CLAY - silty, trace organics<br>- dark brown to black<br>- frozen, moist and firm when thawed<br>- intermediate plasticity | | G65 | ● | |
| 0.5 | | | | G66 | ● | |
| | | | | G67 | ● | |
| 1.0 | | | | G68 | ● | |
| | | | | G69 | ● | |
| 1.5 | | CLAY - silty<br>- brown<br>- frozen to 1.7 m, moist and firm when thawed<br>- high plasticity | | G70 | ● | △ ✪ |
| | | - moist, stiff below 1.7 m | | | | |
| 2.0 | | | | | | |
| | | - trace silt inclustions (<10 mm diam.) below 2.3 m | | G71 | ● | △ ✪ |
| 2.5 | | | | | | |
| | | - trace oxidation, firm to stiff below 2.9 m | | G72 | ● | ✪ △ |
| 3.0 | | END OF TEST HOLE AT 3.0 m IN CLAY | | | | |

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

# Sub-Surface Log

**Test Hole TH11-08**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 171 Garrioch Ave (14 U 625929 E, 5527259 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 28 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number | Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL | Undrained Shear Strength (kPa) 0 50 100 150 200250 |
|---|---|---|---|---|---|---|
| | | ASPHALT (38 mm thick) | | C73 | | |
| | | CONCRETE (165 mm thick) | | C74 | | |
| | | CLAY - silty, trace organics<br>- dark grey<br>- frozen to 1.5 m, moist and firm when thawed<br>- intermediate plasticity | | G75 | ● | |
| 0.5 | | | | G76 | ● | |
| | | | | G77 | ● | |
| 1.0 | | | | G78 | ● | |
| | | CLAY - silty<br>- dark brown<br>- frozen to 1.5 m, moist and firm when thawed<br>- high plasticity | | G79 | ● | |
| 1.5 | | - moist, firm below 1.5 m<br>- trace coarse grained sand, stiff below 1.7 m | | G80 | ● | △✜ |
| 2.0 | | | | | | |
| | | - trace silt inclustions (<10 mm diam.) below 2.3 m | | G81 | ● | △✜ |
| 2.5 | | | | | | |
| 3.0 | | - trace silt inclusions (<20 mm diam.), trace oxidation, mottled brown and grey, firm below 2.9 m | | G82 | ● | ✜△ |

END OF TEST HOLE AT 3.0 m IN CLAY

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-09**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 183 Garrioch Ave (14 U 625985 E, 5527262 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 28 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number | Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL | Undrained Shear Strength (kPa) 0 50 100 150 200250 |
|---|---|---|---|---|---|---|
| | | ASPHALT (38 mm thick) | | C83 | | |
| | | CONCRETE (152 mm thick) | | C84 | | |
| | | CLAY - some silt, trace organics, dark grey, frozen, moist and firm when thawed, intermediate plasticity | | G85 | | |
| 0.5 | | CLAY - silty<br>- brown<br>- frozen to 1.4 m, moist and firm when thawed<br>- high plasticity | | G86 | | |
| | | | | G87 | | |
| 1.0 | | | | G88 | | |
| | | - moist, stiff below 1.4 m | | G89 | | |
| 1.5 | | | | | | |
| | | - trace silt inclusions (<10 mm diam.), trace precipitates (<1 mm diam.), firm to stiff below 1.7 m | | G90 | | |
| 2.0 | | | | | | |
| | | - soft below 2.3 m | | G91 | | |
| 2.5 | | | | | | |
| | | - trace oxidation below 2.9 m | | G92 | | |
| 3.0 | | END OF TEST HOLE AT 3.0 m IN CLAY | | | | |

Notes:
1. No sloughing.
2. Seepage observed at 0.2 m.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-10**



**Client:** Morrison Hershfield
**Project Number:** 0035 001 00
**Project Name:** 2011 Residential Street Renewals
**Location:** Garrioch Ave - In Front of Church (14 U 626036 E, 5527262 N)
**Contractor:** Paddock Drilling Ltd.
**Ground Elevation:** Existing Ground
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount
**Date Drilled:** 28 March 2011

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number |
|---|---|---|---|---|
| | | ASPHALT (51 mm thick) | | C93 |
| | | CONCRETE (152 mm thick) | | C94 |
| | | CLAY - some silt, trace organics<br>- dark grey<br>- frozen, moist and firm when thawed<br>- intermediate plasticity | | G95 |
| 0.5 | | CLAY - silty<br>- brown<br>- frozen to 1.4 m, moist and firm when thawed<br>- high plasticity | | G96 |
| | | | | G97 |
| 1.0 | | | | G98 |
| | | - moist, stiff below 1.4 m | | G99 |
| 1.5 | | - trace silt inclusions (<20 mm diam.), trace organics (fine fibrous), firm to stiff below 1.7 m | | G100 |
| | | - mottled brown and grey, firm below 1.8 m | | |
| 2.0 | | | | |
| | | | | G101 |
| 2.5 | | - soft below 2.4 m | | |
| | | | | G102 |
| 3.0 | | END OF TEST HOLE AT 3.0 m IN CLAY | | |

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21
Particle Size (%): 0 20 40 60 80 100
PL MC LL
Undrained Shear Strength (kPa): 0 50 100 150 200 250
△ Torvane △
✤ Pocket Pen. ✤
☒ Qu ☒
○ Field Vane ○

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-11**



**Client:** Morrison Hershfield
**Project Number:** 0035 001 00
**Project Name:** 2011 Residential Street Renewals
**Location:** 542 Camden Place (14 U 630410 E, 5527180 N)
**Contractor:** Paddock Drilling Ltd.
**Ground Elevation:** Existing Ground
**Method:** 125mm Solid Stem Auger, Brat 22 Truck Mount
**Date Drilled:** 29 March 2011

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number | Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL 0 20 40 60 80 100 | Undrained Shear Strength (kPa) 0 50 100 150 200 250 (△ Torvane △, ✿ Pocket Pen. ✿, ☒ Qu ☒, ○ Field Vane ○) |
|---|---|---|---|---|---|---|
| | | ASPHALT (64 mm thick) | | C103 | | |
| | | SAND (Fill) - trace clay, light brown, frozen, dry to moist and compact when thawed, well graded | | G104 | ● | |
| | | CLAY (Fill) - silty, trace organics, trace fine grained sand<br>- dark brown<br>- frozen, moist and soft to firm when thawed<br>- high plasticity | | G105 | ● | |
| 0.5 | | | | G106 | ● | |
| | | SILT - clayey, trace organics<br>- light brown<br>- frozen, moist and soft to firm when thawed<br>- low plasticity | | G107 | ● | |
| 1.0 | | | | | | |
| | | CLAY - silty, trace fine grained sand<br>- brown<br>- frozen to 1.7 m, moist and firm when thawed<br>- high plasticity | | G108 | ● | |
| | | - trace gravel (<25 mm diam.) at 1.4 m | | G109 | ● | |
| 1.5 | | | | | | |
| | | - moist, firm below 1.7 m | | G110 | ● | |
| 2.0 | | | | G111 | ● | ✿ |
| | | | | | | |
| 2.5 | | | | G112 | ● | |
| | | CLAY AND SILT - brown clay, light brown silt, moist, soft, low to intermediate plasticity, high plasticity clay | | | | |
| | | CLAY - silty, brown, moist, soft, high plasticity | | G113 | ● | ✿ △ |
| 3.0 | | | | | | |

END OF TEST HOLE AT 3.0 m IN CLAY

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.2 m below top of pavement, sand to 0.1 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-12**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 528 Camden Place (14 U 630408 E, 5527126 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 29 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number | Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL | Undrained Shear Strength (kPa) △ Torvane △ ✪ Pocket Pen. ✪ ☒ Qu ☒ ○ Field Vane ○ 0 50 100 150 200250 |
|---|---|---|---|---|---|---|
| | | ASPHALT (89 mm thick) | | C114 | | |
| | | SAND (Fill) - trace clay, light brown, frozen, dry to moist and compact when thawed, well graded | | G115 | ● | |
| | | CLAY (Fill) - silty, black, frozen, moist and soft when thawed, low to intermediate plasticity | | G116 | ● | |
| 0.5 | | SILT - some clay<br>- light brown<br>- frozen, moist and soft when thawed<br>- low to intermediate plasticity | | G117 | ● | |
| | | | | G118 | ● | |
| 1.0 | | CLAY - silty<br>- brown<br>- frozen, moist and firm when thawed<br>- high plasticity | | G119 | ● | |
| 1.5 | | SILT - clayey<br>- light brown<br>- frozen up to 1.7 m, moist and soft when thawed<br>- low to intermediate plasticity | | G120 | ● | |
| | | - moist, soft below 1.7 m | | G121 | ● | |
| 2.0 | | CLAY - silty, trace gravel (<20 mm diam.)<br>- brown<br>- moist, stiff<br>- high plasticity | | G122 | ● | ✪△ |
| 2.5 | | - trace silt inclusions (<10 mm diam.), trace oxidation, soft to firm below 2.6 m | | G123 | ● | ✪△ |
| 3.0 | | | | G124 | ● | ✪△ |

END OF TEST HOLE AT 3.0 m IN CLAY

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.2 m below top of pavement, sand to 0.1 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-13**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 520 Camden Place (14 U 630406 E, 5527094 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 29 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number |
|---|---|---|---|---|
| | | ASPHALT (76 mm thick) | | C125 |
| | | SAND (Fill) - trace clay, light brown, frozen, wet and compact when thawed, well graded | | G126 |
| | | CLAY - silty, trace organics<br>- black<br>- frozen, moist and very soft to soft when thawed<br>- intermediate plasticity | | G127 |
| 0.5 | | | | G128 |
| | | SILT - some clay, light brown, frozen, moist and soft when thawed<br>- low to intermediate plasticity | | G129 |
| 1.0 | | CLAY - silty, trace gravel (<25 mm diam.)<br>- brown<br>- frozen up to 1.7 m, moist and firm when thawed<br>- high plasticity | | G130 |
| | | | | G131 |
| 1.5 | | - moist, stiff below 1.7 m | | G132 |
| 2.0 | | | | G133 |
| 2.5 | | - trace oxidation, trace organics (amorphous), firm below 2.6 m | | G134 |
| 3.0 | | - trace silt inclusions (<5 mm diam.), soft to firm below 2.9 m | | G135 |

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21

Particle Size (%): 0 20 40 60 80 100

PL MC LL

Undrained Shear Strength (kPa): 0 50 100 150 200 250

△ Torvane △ ✪ Pocket Pen. ✪ ☒ Qu ☒ ○ Field Vane ○

END OF TEST HOLE AT 3.0 m IN CLAY

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.2 m below top of pavement, sand to 0.1 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-14**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 512 Camden Place (14 U 630406 E, 5527065 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 29 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number |
|---|---|---|---|---|
| | | ASPHALT (76 mm thick) | | C136 |
| | | SAND (Fill) - trace clay, trace gravel (<12.5 mm diam.), light brown, frozen, dry to moist and compact when thawed, well graded | | G137 |
| | | CLAY - silty, trace gravel (<12.5 mm diam.), trace organics (roots/amorphous)<br>- dark brown to black<br>- frozen up to 1.4 m, moist and firm to stiff when thawed<br>- low to intermediate plasticity | | G138 |
| 0.5 | | | | G139 |
| | | - trace to some silt inclusions (<25 mm diam.) | | G140 |
| 1.0 | | | | G141 |
| | | SILT - some clay<br>- light brown<br>- moist, soft<br>- low plasticity | | G142 |
| 1.5 | | | | G143 |
| 2.0 | | CLAY - silty<br>- brown<br>- moist, stiff<br>- high plasticity | | G144 |
| 2.5 | | - trace silt inclusions (10 mm diam.), firm to stiff below 2.6 m | | G145 |
| 3.0 | | - trac silt inclusions (<20 mm diam.), trace oxidation, trace precipitate, firm below 2.9 m | | G146 |

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21

Particle Size (%): 0 20 40 60 80 100

PL MC LL

Undrained Shear Strength (kPa): 0 50 100 150 200250

△ Torvane △ ✿ Pocket Pen. ✿ ☒ Qu ☒ ○ Field Vane ○

END OF TEST HOLE AT 3.0 m IN CLAY

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.2 m below top of pavement, sand to 0.1 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-15**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 498 Camden Place (14 U 630407 E, 5527009 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 29 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number |
|---|---|---|---|---|
| | | ASPHALT (57 mm thick) | | C147 |
| | | SAND (Fill) - some gravel (<20 mm diam.), trace clay, light brown, frozen, dry to moist and compact when thawed, well graded | | G148 |
| | | CLAY - silty, trace gravel (<20 mm diam.)<br>- black<br>- frozen, moist and soft when thawed<br>- low to intermediate plasticity | | G149 |
| 0.5 | | - brown, high plasticity below 0.5 m | | G150 |
| | | SILT - some clay<br>- light brown<br>- frozen, moist and soft when thawed<br>- low to intermediate plasticity | | G151 |
| 1.0 | | | | G152 |
| | | CLAY - some silt<br>- brown<br>- frozen up to 1.2 m, moist and stiff when thawed<br>- high plasticity | | G153 |
| 1.5 | | | | G154 |
| 2.0 | | - trace silt inclusions (<5 mm diam.), stiff below 2.0 m | | G155 |
| 2.5 | | - trace silt inclusions (<20 mm diam.), trace silt lamniations (<2 mm thick), trace oxidation, trace precipitates (<2mm diam.), firm to stiff below 2.6 m | | G156 |
| 3.0 | | - firm below 2.9 m | | G157 |

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21

Particle Size (%): 0 20 40 60 80 100

PL MC LL

Undrained Shear Strength (kPa): 0 50 100 150 200250

△ Torvane △ ✿ Pocket Pen. ✿ ☒ Qu ☒ ○ Field Vane ○

END OF TEST HOLE AT 3.0 m IN CLAY

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.2 m below top of pavement, sand to 0.1 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-16**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | Camden Place - In Front of School (14 U 630406 E, 5526963 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 29 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number | Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL | Undrained Shear Strength (kPa) 0 50 100 150 200250 |
|---|---|---|---|---|---|---|
| | | ASPHALT (57 mm thick) | | C158 | | |
| | | SAND (Fill) - some gravel (<20 mm diam.), trace clay, light brown, frozen, dry to moist and compact when thawed, well graded | | G159 | ● | |
| | | CLAY - silty, trace gravel (<20 mm diam.), black, frozen, moist and firm to stiff when thawed, low to intermediate plasticity | | G160 | ● | |
| 0.5 | | SAND - trace gravel (10 mm diam.), dark brown to black, frozen, dry to moist and loose when thawed, well graded | | G161 | ● | |
| | | CLAY - silty, some sand (fine grained)<br>- brown<br>- frozen up to 1.2 m, moist and stiff when thawed<br>- low to intermediate plasticity | | G162 | ● | |
| 1.0 | | - dark brown, high plastic below 0.9 m | | G163 | ● | |
| | | | | G164 | ● | △ ✤ |
| 1.5 | | | | G165 | ● | |
| 2.0 | | SILT - clayey<br>- brown<br>- moist, soft<br>- low to intermediate plasticity | | G166 | ● | ✤ |
| 2.5 | | - trace sand (fine grained) | | G167 | ● | ✤ |
| 3.0 | | | | G168 | ● | ✤ |

END OF TEST HOLE AT 3.0 m IN CLAY

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.2 m below top of pavement, sand to 0.1 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-17**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 176 Ridley Street (14 U 621891 E, 5527329 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 29 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number | Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL | Undrained Shear Strength (kPa) △ Torvane △ ✤ Pocket Pen. ✤ ☒ Qu ☒ ○ Field Vane ○ 0 50 100 150 200250 |
|---|---|---|---|---|---|---|
| | | CONCRETE (165 mm thick) | | C169 | | |
| | | SAND AND GRAVEL (Fill) - trace clay, light brown, frozen, wet and compact when thawed, well graded | | G170 | ● | |
| | | | | G171 | ● | |
| | | CLAY - silty, trace gravel (<20 mm dia.), dark brown, frozen, moist and firm to stiff when thawed, intermediate to high plasticity | | | | |
| 0.5 | | CLAY - silty<br>- brown<br>- frozen to 1.7 m, moist and firm to stiff when thawed<br>- high plasticity | | G172 | ● | |
| | | | | G173 | ● | |
| 1.0 | | | | G174 | ● | |
| | | | | G175 | ● | |
| 1.5 | | - moist, firm below 1.7 m | | G176 | ● | ✤△ |
| 2.0 | | - trace silt inclusions (<5 mm diam.), trace oxidation below 2.0 m | | G177 | ● | ✤ |
| 2.5 | | | | G178 | ● | ✤△ |
| 3.0 | | - trace silt inclusions (<20 mm diam.), trace precipitates below 2.9 m | | G179 | ● | ✤△ |

END OF TEST HOLE AT 3.0 m IN CLAY

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

# Sub-Surface Log

**Test Hole TH11-18**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 178 Ridley Street (14 U 621888 E, 5527292 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 29 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number | Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL | Undrained Shear Strength (kPa) △ Torvane △ ✪ Pocket Pen. ✪ ☒ Qu ☒ ○ Field Vane ○ 0 50 100 150 200250 |
|---|---|---|---|---|---|---|
| | | CONCRETE (152 mm thick) | | C180 | | |
| | | SAND AND GRAVEL (Fill) - trace clay, light brown, frozen, wet and compact when thawed, well graded | | G181 | ● | |
| | | CLAY - silty, dark brown, frozen, moist and firm to stiff when thawed, intermediate to high plasticity | | G182 | ● | |
| 0.5 | | CLAY - silty<br>- brown<br>- frozen to 1.7 m, moist and firm to stiff when thawed<br>- high plasticity | | G183 | ● | |
| | | | | G184 | ● | |
| 1.0 | | | | G185 | ● | |
| | | | | G186 | ● | |
| 1.5 | | - trace silt inclusions (<10 mm diam.), moist, firm below 1.7 m | | G187 | ● | ✪ △ |
| 2.0 | | | | G188 | ● | △ |
| 2.5 | | - soft to firm below 2.4 m<br>- trace silt inclusions (<20 mm diam.), mottled brown and grey below 2.6 m | | G189 | ● | ✪ |
| 3.0 | | | | G190 | ● | ✪ |

END OF TEST HOLE AT 3.0 m IN CLAY

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-19**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | Between 182 and 184 Ridley Street (14 U 621887 E, 5527244 N |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 29 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number | Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL | Undrained Shear Strength (kPa) △ Torvane △ ✪ Pocket Pen. ✪ ☒ Qu ☒ ○ Field Vane ○ 0 50 100 150 200250 |
|---|---|---|---|---|---|---|
| | | CONCRETE (152 mm thick) | | C191 | | |
| | | SAND AND GRAVEL (Fill) - trace clay, light brown, frozen, wet and compact when thawed, well graded | | G192 | ● | |
| | | | | G193 | ● | |
| | | CLAY - silty<br>- black<br>- frozen, moist and firm when thawed<br>- intermediate to high plasticity | | G194 | ● | |
| 0.5 | | CLAY - silty<br>- dark brown<br>- frozen to 1.7 m, moist and firm when thawed<br>- high plasticity | | G195 | ● | |
| 1.0 | | | | G196 | ● | |
| | | | | G197 | ● | |
| 1.5 | | - trace silt inclusions (<10 mm diam.), trace coarse grained sand(<5 mm diam.), trace precipitate, brown, moist, firm to stiff below 1.7 m | | G198 | ● | ✪△ |
| 2.0 | | - trace silt inclusions (<20 mm diam.), trace oxidation, mottled brown and grey, firm below 2.0 m | | G199 | ● | ✪△ |
| 2.5 | | | | G200 | ● | ✪△ |
| 3.0 | | - soft to firm below 2.9 m | | G201 | ● | ✪△ |

END OF TEST HOLE AT 3.0 m IN CLAY

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Sub-Surface Log

**Test Hole TH11-20**



| | | | |
|---|---|---|---|
| **Client:** | Morrison Hershfield | **Project Number:** | 0035 001 00 |
| **Project Name:** | 2011 Residential Street Renewals | **Location:** | 176 Ridley Street (14 U 621889 E, 5527190 N) |
| **Contractor:** | Paddock Drilling Ltd. | **Ground Elevation:** | Existing Ground |
| **Method:** | 125mm Solid Stem Auger, Brat 22 Truck Mount | **Date Drilled:** | 29 March 2011 |

Sample Type: Grab | Shelby Tube | Split Spoon | Split Barrel | Core

Particle Size Legend: Clay | Silt | Sand | Gravel | Cobbles | Boulders

| Depth (m) | Soil Symbol | MATERIAL DESCRIPTION | Sample Type | Sample Number | Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL | Undrained Shear Strength (kPa) △ Torvane △ ✪ Pocket Pen. ✪ ☒ Qu ☒ ○ Field Vane ○ 0 50 100 150 200 250 |
|---|---|---|---|---|---|---|
| | | CONCRETE (152 mm thick) | | C202 | | |
| | | SAND AND GRAVEL (Fill) - trace clay, light brown, frozen, wet and compact when thawed, well graded | | G203 | ● | |
| | | | | G204 | ● | |
| | | CLAY - silty<br>- brown<br>- frozen up to 1.7 m, moist and firm when thawed<br>- intermediate to high plasticity | | | | |
| 0.5 | | | | G205 | ● | |
| | | | | G206 | ● | |
| 1.0 | | | | G207 | ● | |
| | | | | G208 | ● | |
| 1.5 | | - moist, firm to stiff below 1.7 m | | G209 | ● | ✪ |
| | | - soft to firm below 1.8 m | | | | |
| 2.0 | | - trace oxidation, trace precipitates below 2.0 m | | G210 | ● | △ |
| 2.5 | | - mottled brown and grey below 2.6 m | | G211 | ● | ✪△ |
| | | - firm below 2.9 m | | G212 | ● | ✪ |
| 3.0 | | END OF TEST HOLE AT 3.0 m IN CLAY | | | | |

Notes:
1. No sloughing.
2. No seepage.
3. Backfilled test hole with auger cuttings to 0.3 m below top of pavement, sand to 0.2 m below top of pavement, and asphalt cold patch to top of pavement.
4. UTM coordinates from hand held GPS.

**Logged By:** Stephen Renner **Reviewed By:** Nelson Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG 2011 RESIDENTIAL STREET RENEWALS.GPJ TREK GEOTECHNICAL.GDT 4/5/11

# Appendix B

Photos of Core Samples


Photo 1: Asphalt core sample from TH11-01


Photo 2: Concrete core sample from TH11-01


Photo 3: Asphalt core sample from TH11-02


Photo 4: Concrete core sample from TH11-02


Photo 5: Asphalt core sample from TH11-03


Photo 6: Concrete core sample from TH11-03


Photo 7: Asphalt core sample from TH11-04


Photo 8: Concrete core sample from TH11-04


Photo 9: Asphalt core sample from TH11-05


Photo 10: Concrete core sample from TH11-05


Photo 11: Asphalt core sample from TH11-06


Photo 12: Concrete core sample from TH11-06


Photo 13: Asphalt core sample from TH11-07


Photo 14: Concrete core sample from TH11-07


Photo 15: Asphalt core sample from TH11-08


Photo 16: Concrete core sample from TH11-08


Photo 17: Asphalt core sample from TH11-09


Photo 18: Concrete core sample from TH11-09


Photo 19: Asphalt core sample from TH11-10


Photo 20: Concrete core sample from TH11-10


Photo 21: Asphalt core sample from TH11-11


Photo 22: Asphalt core sample from TH11-12


Photo 23: Asphalt core sample from TH11-13


Photo 24: Asphalt core sample from TH11-14


Photo 25: Asphalt core sample from TH11-15


Photo 26: Asphalt core sample from TH11-16


Photo 27: Concrete core sample from TH11-17


Photo 28: Concrete core sample from TH11-18


Photo 29: Concrete core sample from TH11-19


Photo 30: Concrete core sample from TH11-20

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