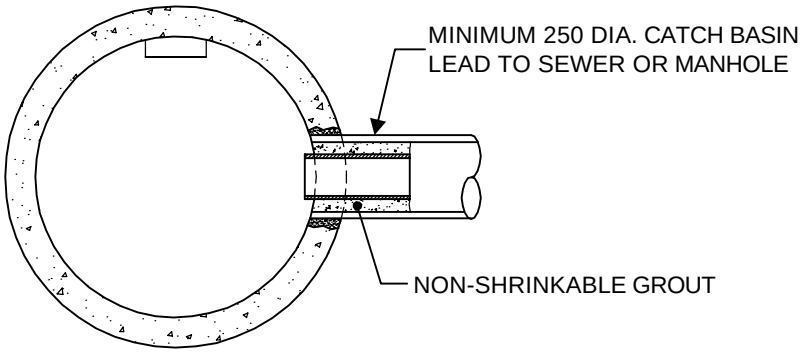
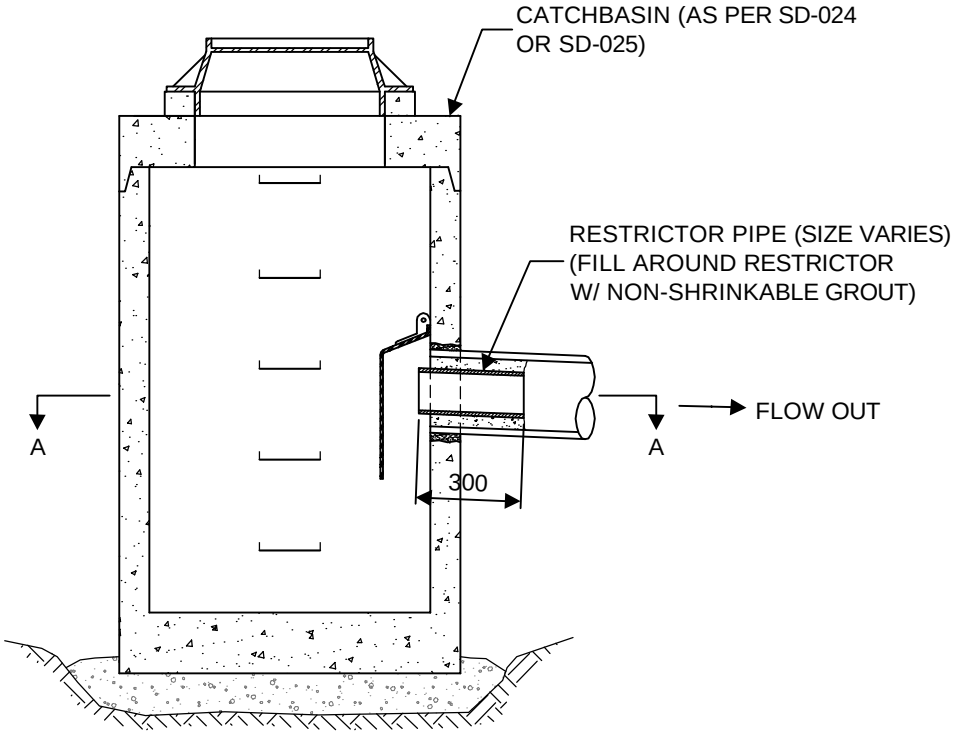
# APPENDIX 'A'

# DETAIL SD-122
# GEOTECHNICAL REPORT




**SECTION A - A**




**OUTLET FLOW RESTRICTOR**

DIMENSIONS IN MILLIMETERS

# THE CITY OF WINNIPEG
## WATER & WASTE DEPARTMENT

**Reference Spec. No.**
CW 2030 CW 2130 CW 3205 CW 3210

STANDARD PRE-CAST
CONCRETE CATCH BASIN
C/W OUTLET RESTRICTOR

| Designed By: | Drawn By: | Scale: |
|---|---|---|
| DG | CJH | N.T.S. |
| **Checked By:** SC | **Date:** 12-02-06 **Revision: 0** | **Drawing No.** SD-122 |
| **Approved:** UNDERGROUND WORKS COMMITTEE | | |

# GEOTECHNICAL STREET TESTING PROGRAM
# 2015 CITY OF WINNIPEG LOCAL IMPROVEMENTS – CONTRACT 2
# WINNIPEG, MANITOBA

**Prepared for:**

**City of Winnipeg**
**Public Works Department**

**Project No: 141-24150-00**
**May, 2015**

**WSP Canada Inc.**
**1600 Buffalo Place**
**Winnipeg, MB R3T 6B8**
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**www.wspgroup.com**

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## 1.0 SUMMARY

A geotechnical investigation was conducted for the proposed lane reconstruction projects in Winnipeg, Manitoba. The purpose of this investigation was to assess the general subsurface conditions with respect to identifying the existing pavement structure and the underlying soil profile.

Eleven (11) lanes (listed in Table 1), were drilled to at least 3.05 m depth in conjunction with City of Winnipeg (COW) geotechnical investigation guidelines. A total of thirty-one (31) boreholes were drilled.

At minimum, seven (7) grab-bag samples were taken for each borehole at 0.3 m intervals to determine the moisture content for each sample as well as particle size analysis on selected samples.

The subsurface conditions for each lane reconstruction project are summarized for each site. Also included are borehole logs (Appendix A), and test results (Appendix B).

## 2.0 INTRODUCTION

### 2.1 SCOPE OF WORK AND BACKGROUND

WSP was retained to undertake a soils investigation for a proposed lane reconstruction and projects in Winnipeg, Manitoba. The purpose of this work was to establish the soil and groundwater conditions at the sites, of which the pavement structure is identified and soil stratigraphy is profiled using the City of Winnipeg (COW) geotechnical investigation guideline. Authorization to proceed with the work was provided by City of Winnipeg.

### 2.2 PROPOSED LANE RECONSTRUCTION PROJECTS

The proposed lane reconstruction projects are as follows:

**Table 1 - List of Lane Reconstruction Projects**

| SITE NO. | LOCATION DETAILS |
|---|---|
| **1** | All lanes bounded by Coniston St/Lyndale Dr/Chandos Ave/Crawford Ave |
| **5** | All lanes bounded by Leighton Ave/Roberta Ave/Woodvale St/Henderson Hwy |
| **6** | Rosemount Ave/Edderton Ave/Rockman St/Wynne St |
| **8** | Pinedale Ave/Birchdale Ave/Highfield St/Kirkdale St |
| **10** | All lanes bounded by Helmsdale Ave/Kimberly Ave/Henderson Hwy/Kildonan Dr |
| **11** | Rue Aubert/Rue La Verendrye/Rue St. Joseph/Rue Langevin including north-south section west of Rue Langevin |
| **13** | North-south lane bounded by Gendreau Ave/east of Dorge Dr/west of Villeneuve Blvd |
| **16** | St. Mary's Rd/Lillian Ave/Cromwell St including east-west and north-south lanes |
| **17** | All lanes bounded by Coniston St/Lyndale Dr/Tache Ave/Monck Ave |
| **19** | Oakland Ave/McLeod Ave/Dundoon St/Golspie St |
| **21** | All lanes bounded by Rue La Verendrye/Rue Notre Dame/Rue Archibald/Rue La Fleche |

## 3.0 FIELD METHODOLOGY

The subsoils encountered were visually classified to the full extent in the borehole and representative soil samples were recovered at regular depth intervals (every 0.3 m down to 2.13 m).

The field investigation was undertaken between January 14, 2015 and February 3, 2015. A total of thirty-one (31) boreholes were cored and drilled down to 3.05 m depth using a truck-mounted B-40LX rig and CME-55 drilling rig equipped with 125 mm auger. All boreholes were backfilled with auger cuttings/bentonite and capped with cold mix asphalt after completion of drilling (if applicable).

For confirmation, all of the soil samples are tested for moisture contents and selected soil samples between the depth of 0.5 m and 1.0 m were submitted for Particle Size Analysis test (PSA). One Atterberg Limit test was also conducted. The asphalt (if applicable) was measured for thicknesses. Any groundwater seepage and sloughing encountered in the boreholes were noted.

## 4.0 SOIL CONDITIONS

### 4.1 SUBSURFACE CONDITIONS (SOIL PROFILE AND GROUNDWATER)

The general soil profile encountered for most boreholes was a top layer of granular fill (typical base course), followed by a layer of clay or silty clay (insitu or fill), which extended to the bottom of each borehole. Some boreholes also revealed a layer of silt between two layers of clay or silty clay.

The granular fill was found to have an approximate thickness ranging from 0.15 m to 0.6 m, averaging around 0.3 m. Ten (10) boreholes also revealed a layer of deteriorated or disintegrated asphalt ranging in thickness from 0.08 m to 0.15 m. In some cases, the suspected asphalt may have been particularly compacted granular material mixed with a sealant.

The clay or silty clay encountered beneath the granular fill ranged from grey to brown and was typically fissured in the upper 1.5 m of the borehole. Some boreholes revealed a layer of clay fill beneath the granular material. The clay fill ranged in thickness from 0.3 m to 1.35 m. The clay fill was largely a mix of brown to grey to black, with some clay fill layers showing a trace of fine gravel.

Various boreholes revealed a layer of silt at an approximate depth ranging from 0.6 m to 2.45 m. The thickness of the silt layer ranged from 0.3 m to 1.35 m and was generally moist to wet.

For each borehole, the groundwater level and depth of frost was measured. The frost ranged in depth from 1.05 m to 1.35 m. No groundwater was encountered after drilling in any of the boreholes.

Detailed descriptions of the soil profiles in each borehole are shown on in the borehole logs in Appendix A.

## 4.2 LABORATORY TESTING

For each borehole, a minimum of seven (7) grab-bag samples were selected at 0.3 m intervals. Each sample was tested to determine its moisture content. Certain samples in the 0.5 m to 1.0 m range were also tested to determine the particle size, so that the selected sample may be classified into four categories: clay (< 30% silt), silty clay (30% - 50% silt), clayey silt (50% - 70%), and silt (>70%). One Atteberg Limit test was also conducted to determine the plasticity of a selected sample.

Detailed descriptions of the moisture content, PSA and Atterberg Limit test results are shown in Appendix B.

## 5.0 SUMMARY OF SOIL CONDITIONS BY SITE

### SITE 1 - All lanes bounded by Coniston St/Lyndale Dr/Chandos Ave/Crawford Ave

| Borehole ID | Borehole Location | Pavement Surface | | Pavement Structure Material | | Soil Description | Borehole Depth | No. of Samples Taken |
|---|---|---|---|---|---|---|---|---|
| | | Type | Thickness (mm) | Type | Thickness (mm) | | | |
| TH 7 | Lane behind 575 Lyndale Dr | Asphalt/ Granular Fill | 125 (deteriorated) | Granular Fill | 200 | Asphalt, granular fill (typ. base course), clay (1.2 m), silt (0.3 m), clay (1.2 m) | 3.05 m | 8 |
| TH 8 | Lane behind 60 Crawford Ave | Asphalt/ Granular Fill | 150 (deteriorated) | Granular Fill | 150 | Asphalt, granular fill (typ. base course), clay fill (0.6 m), clay (0.3 m), silt (0.6 m), clay (1.2 m) | 3.05 m | 8 |
| TH 9 | Lane behind 72 Crawford Ave | Asphalt/ Granular Fill | 175 (deteriorated) | Granular Fill | 150 | Asphalt, granular fill (typ. base course), clay fill (0.3 m), clayey silt (1.2 m), clay (1.2 m) | 3.05 m | 8 |

### SITE 5 – All lanes bounded by Leighton Ave/Roberta Ave/Woodvale St/Henderson Hwy

| Borehole ID | Borehole Location | Pavement Surface | | Pavement Structure Material | | Soil Description | Borehole Depth | No. of Samples Taken |
|---|---|---|---|---|---|---|---|---|
| | | Type | Thickness (mm) | Type | Thickness (mm) | | | |
| TH 31 | Lane behind 182 Leighton Ave | Granular Fill | - | Granular Fill | 600 | Granular fill (typ. limestone base course), clay fill (0.45 m), clay (2.0 m) | 3.05 m | 7 |
| TH 32 | Lane behind 152 Leighton Ave | Granular Fill | - | Granular Fill | 600 | Granular fill (typ. limestone base course), clay fill (0.45 m), clay (2.0 m) | 3.05 m | 7 |
| TH 33 | Lane behind 100 Leighton Ave | Granular Fill | - | Granular Fill | 600 | Granular fill (typ. limestone base course), clay fill (0.45 m), clay (2.0 m) | 3.05 m | 7 |

### SITE 6 – All Lanes Bounded by Rosemount Ave/Edderton Ave/Rockman St/Wynne St

| Borehole ID | Borehole Location | Pavement Surface | | Pavement Structure Material | | Soil Description | Borehole Depth | No. of Samples Taken |
|---|---|---|---|---|---|---|---|---|
| | | Type | Thickness (mm) | Type | Thickness (mm) | | | |
| TH 4 | Lane behind 1048 Rosemount Ave | Granular Fill | - | Granular Fill | 200 | Granular fill (typ. base course), clay fill (0.4 m), clay (2.45 m) | 3.05 m | 8 |
| TH 5 | Lane behind 1036 Rosemount Ave | Granular Fill | - | Granular Fill | 200 | Granular fill (typ. base course), clay fill (1.0 m), clay (0.3 m), silt (0.45 m), clay (1.1 m) | 3.05 m | 8 |
| TH 6 | Lane behind 1016 Rosemount Ave | Granular Fill | - | Granular Fill | 200 | Granular fill (typ. base course), clay fill (0.7 m), clay (2.15 m) | 3.05 m | 8 |

## SITE 8 – All Lanes Bounded by Pinedale Ave/Birchdale Ave/Highfield St/Kirkdale St

| Borehole ID | Borehole Location | Pavement Surface | | Pavement Structure Material | | Soil Description | Borehole Depth | No. of Samples Taken |
|---|---|---|---|---|---|---|---|---|
| | | Type | Thickness (mm) | Type | Thickness (mm) | | | |
| TH 10 | Lane behind 123 Birchdale Ave | Asphalt/ Granular Fill | 100 (deteriorated) | Granular Fill | 200 | Granular fill (typ. base course), clay fill (0.3 m), clay (2.45 m) | 3.05 m | 7 |
| TH 11 | Lane behind 143 Birchdale Ave | Asphalt/ Granular Fill | 75 (deteriorated) | Granular Fill | 225 | Granular fill (typ. base course), clay fill (0.3 m), clay (2.45 m) | 3.05 m | 7 |
| TH 12 | Lane behind 165 Birchdale Ave | Asphalt/ Granular Fill | 100 (deteriorated) | Granular Fill | 200 | Granular fill (typ. base course), clay fill (0.3 m), clay (2.45 m) | 3.05 m | 7 |

## SITE 10 – All lanes bounded by Helmsdale Ave/Kimberly Ave/Henderson Hwy/Kildonan Dr

| Borehole ID | Borehole Location | Pavement Surface | | Pavement Structure Material | | Soil Description | Borehole Depth | No. of Samples Taken |
|---|---|---|---|---|---|---|---|---|
| | | Type | Thickness (mm) | Type | Thickness (mm) | | | |
| TH 13 | Lane behind 764 Henderson Hwy | Granular Fill | - | Granular Fill | 300 | Granular fill (typ. base course), clay (1.2 m), clayey silt (1.35 m), clay (0.2 m) | 3.05 m | 8 |
| TH 14 | Lane behind 137 Kimberley Ave | Granular Fill | - | Granular Fill | 175 | Granular fill (typ. base course), clay (2.3 m), clayey silt (0.6 m) | 3.05 m | 8 |
| TH 15 | Lane behind 103 Kimberley Ave | Asphalt/ Granular Fill | 75 (deteriorated) | Granular Fill | 225 | Granular fill (typ. base course), clay (2.75 m) | 3.05 m | 7 |

## SITE 11 – All lanes bounded Rue Aubert/Rue La Verendrye/Rue St. Joseph/Rue Langevin including north-south section west of Rue Langevin

| Borehole ID | Borehole Location | Pavement Surface | | Pavement Structure Material | | Soil Description | Borehole Depth | No. of Samples Taken |
|---|---|---|---|---|---|---|---|---|
| | | Type | Thickness (mm) | Type | Thickness (mm) | | | |
| TH 63 | Lane behind 186 Rue St. Joesph | Granular Fill | - | Granular Fill | 750 | Granular fill (typ. base course), clay (2.3 m) | 3.05 m | 7 |
| TH 64 | Lane behind 212 Rue St. Joesph | Granular Fill | - | Granular Fill | 300 | Granular fill (typ. base course), clay fill (1.2 m), clay (1.5 m) | 3.05 m | 7 |

## SITE 13 – North-south lane bounded by Gendreau Ave/east of Dorge Dr/west of Villeneuve Blvd

| Borehole ID | Borehole Location | Pavement Surface | | Pavement Structure Material | | Soil Description | Borehole Depth | No. of Samples Taken |
|---|---|---|---|---|---|---|---|---|
| | | Type | Thickness (mm) | Type | Thickness (mm) | | | |
| TH 1 | Lane behind 122 Villeneuve Blvd | Granular Fill | - | Granular Fill | 150 | Granular fill (typ. base course), clay (1.0 m), silt (1.05 m), clay (0.9 m) | 3.05 m | 8 |
| TH 2 | Lane behind 114 Villeneuve Blvd | Granular Fill | - | Granular Fill | 150 | Granular fill (typ. base course), clay (1.5 m), silt (0.75 m), clay (0.6 m) | 3.05 m | 8 |
| TH 3 | Lane behind 100 Villeneuve Blvd | Granular Fill | - | Granular Fill | 300 | Granular fill (typ. base course), clay (1.0 m), silt (0.9 m), clay (0.9 m) | 3.05 m | 8 |

## SITE 16 – East-west and north-south lanes bounded by St. Mary's Rd/Lillian Ave/Cromwell St

| Borehole ID | Borehole Location | Pavement Surface | | Pavement Structure Material | | Soil Description | Borehole Depth | No. of Samples Taken |
|---|---|---|---|---|---|---|---|---|
| | | Type | Thickness (mm) | Type | Thickness (mm) | | | |
| TH 43 | Lane east of 35B Cromwell St | Granular Fill | - | Granular Fill | 150 | Granular fill (typ. base course), clay (2.9 m) | 3.05 m | 7 |
| TH 44 | Lane north of 35A Cromwell St | Granular Fill | - | Granular Fill | 300 | Granular fill (typ. limestone base course), clay (2.75 m) | 3.05 m | 7 |

## SITE 17 – All lanes bounded by Coniston St/Lyndale Dr/Tache Ave/Monck Ave

| Borehole ID | Borehole Location | Pavement Surface | | Pavement Structure Material | | Soil Description | Borehole Depth | No. of Samples Taken |
|---|---|---|---|---|---|---|---|---|
| | | Type | Thickness (mm) | Type | Thickness (mm) | | | |
| TH 19 | Lane behind 521 Lyndale Dr | Asphalt/ Granular Fill | 50 (deteriorated) | Granular Fill | 250 | Granular fill (typ. base course), silty clay (1.2 m), silt (0.6 m), clay (0.9 m) | 3.05 m | 7 |
| TH 20 | Lane behind 55 Tache Ave | Asphalt/ Granular Fill | 50 (deteriorated) | Granular Fill | 250 | Granular fill (typ. base course), silty clay (1.2 m), silt (0.6 m), clay (0.9 m) | 3.05 m | 7 |
| TH 21 | Lane behind 71 Tache Ave | Asphalt | 50 (deteriorated) | - | - | Clay fill (0.55 m), silty clay (1.65 m), clay (0.75 m) | 3.05 m | 7 |

## SITE 19 – All lanes bounded by Oakland Ave/McLeod Ave/Dundoon St/Golspie St

| Borehole ID | Borehole Location | Pavement Surface | | Pavement Structure Material | | Soil Description | Borehole Depth | No. of Samples Taken |
|---|---|---|---|---|---|---|---|---|
| | | Type | Thickness (mm) | Type | Thickness (mm) | | | |
| TH 16 | Lane behind 601 McLeod Ave | Granular Fill | - | Granular Fill | 300 | Granular fill (typ. base course), clay fill (0.6 m), clay (0.6 m), silt (1.2 m), clay (0.3 m) | 3.05 m | 8 |
| TH 17 | Lane behind 637 McLeod Ave | Granular Fill | - | Granular Fill | 450 | Granular fill (typ. base course), clay fill (0.45 m), clay (0.9 m), silt (0.3 m), clay (0.3 m), silt (0.3 m), clay (0.3 m) | 3.05 m | 8 |
| TH 18 | Lane behind 699 McLeod Ave | Granular Fill | - | Granular Fill | 450 | Granular fill (typ. base course), clay fill (0.75 m), clay (0.9 m), silt (0.75 m), clay (0.2 m) | 3.05 m | 8 |

## SITE 21 – All lanes bounded by Rue La Verendrye/Rue Notre Dame/Rue Archibald/Rue La Fleche

| Borehole ID | Borehole Location | Pavement Surface | | Pavement Structure Material | | Soil Description | Borehole Depth | No. of Samples Taken |
|---|---|---|---|---|---|---|---|---|
| | | Type | Thickness (mm) | Type | Thickness (mm) | | | |
| TH 65 | Lane behind 484 Rue La Verendrye | Granular Fill | - | Granular Fill | 300 | Granular fill (typ. base course), clay fill (0.3 m), silty clay (0.9 m), silt (0.3 m), clay (1.2 m) | 3.05 m | 7 |
| TH 66 | Lane behind 498 Rue La Verendrye | Granular Fill | - | Granular Fill | 300 | Granular fill (typ. base course), clay fill (0.3 m), clay (0.9 m), silt (1.35 m), clay (0.2 m) | 3.05 m | 7 |
| TH 67 | Lane behind 508 Rue La Verendrye | Granular Fill | - | Granular Fill | 750 | Granular fill (typ. base course), clay (0.75 m), silt (0.75 m), clay (0.75 m) | 3.05 m | 7 |

## 6.0 CLOSURE

The findings and recommendations provided in this report were prepared by WSP (the Consultant) in accordance with generally accepted professional engineering principles and practices. The recommendations are based on the results of field and laboratory investigations and are reflective only of the actual borehole(s) and/or excavation(s) examined. If conditions encountered during construction appear to be different than those shown by the borehole(s) and/or excavation(s) at this site, the Consultant should be notified immediately in order that the recommendations can be reviewed and modified as necessary to address actual site conditions.

This report is limited in scope to only those items that are specifically referenced in this report. There may be existing conditions that were not recorded in this report. Such conditions were not apparent to the Consultant due to the limitations imposed by the scope of work. The Consultant, therefore, accepts no liability for any costs incurred by the Client for subsequent discovery, manifestation or rectification of such conditions.

This report is intended solely for the Client named as a general indication of the visible or reported physical condition of the items addressed in the report at the time of the geotechnical investigation. The material in this report reflects the Consultant's best judgment in light of the information available to it at the time of preparation.

This report and the information and data contained herein are to be treated as confidential and may be used only by the Client and its officers and employees in relation to the specific project that it was prepared for. Any use a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. The Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The report has been written to be read in its entirety, do not use any part of this report as a separate entity.

All files, notes, source data, test results and master files are retained by the Consultant and remain the property of the Consultant.

Prepared by: Dana T.G. Bredin, P.Eng

Reviewed by: Silvestre S. Urbano, P.Eng.


APEGM

Certificate of Authorization

WSP Canada Inc.

No. 5750 Date: MAY 5, 2015

# APPENDIX A

**Project No: 141-24150-00** **TH 1**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 13 - Alley behind 122 Villeneuve Blvd** **Engineer: S. Urbano**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **GRANULAR FILL**<br>Typ. base course | 99.8 |
| 1 | | | **CLAY FILL**<br>Grey-black mixed, trace of fine gravel | 99.4 |
| 2 | | | **CLAY**<br>Brown, fissured, stiff at 1.5 m, SILTY at 2.15 m to 2.3 m | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | 2 | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa] (50, 150, 250, 350)

200

125

200

SPT [N]

Water Content % (10, 30, 50, 70, 90)

33.0

31.0

33.0

32.0

40.0

39.0

**Drill Method: Auger**

**Drill Date: 1/14/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00** **TH 2**

**Project: 2015 COW Alley Way Improvements**

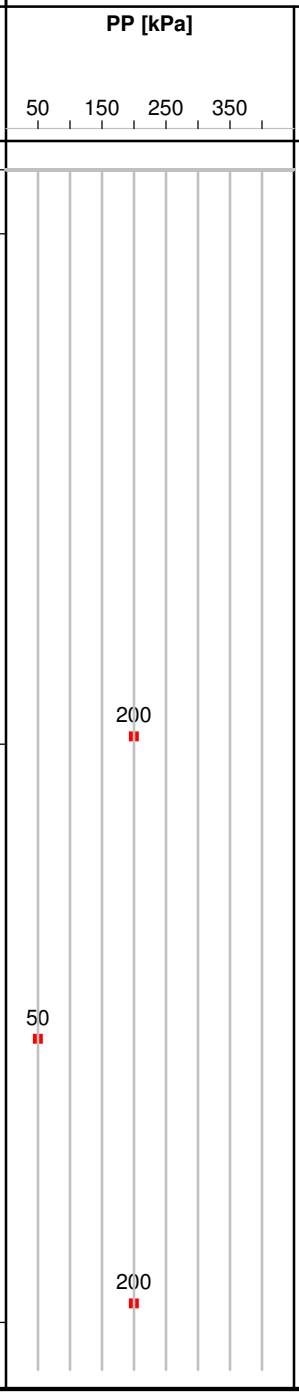
**Client: City of Winnipeg**

**Location: Site 13 - Alley behind 114 Villeneuve Blvd** **Engineer: S. Urbano**

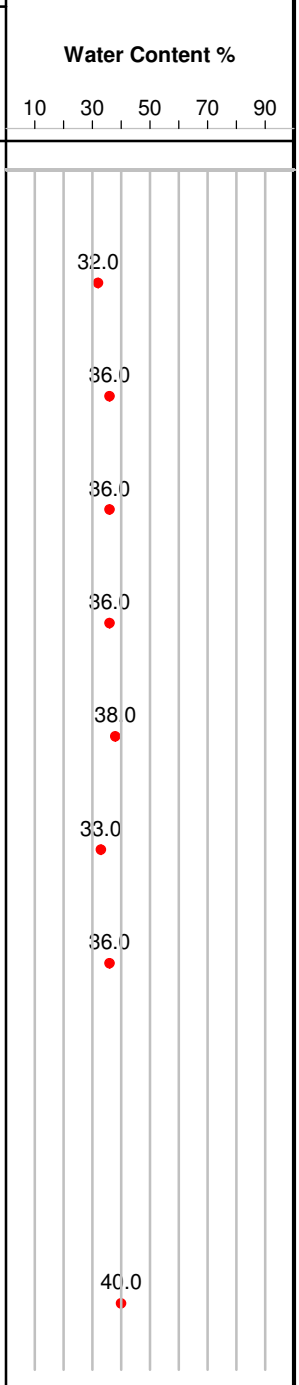
## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **GRANULAR FILL**<br>Typ. limestone base course | 99.8 |
| 1 | | | **CLAY FILL**<br>Grey-black mixed, frost to 1.4 m | |
| 2 | | | | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | 98.5 |
| | | | **CLAY**<br>Grey-black 1.7 m, brown below 1.7 m, stiff,, SILTY at 2.15 m to 2.3 m | |
| 6 | | | | |
| 7 | 2 | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE




SPT [N]




**Drill Method: Auger**

**Drill Date: 1/14/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 3**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 13 - Alley behind 100 Villeneuve Blvd**

**Engineer: S. Urbano**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **GRANULAR FILL**<br>Typ. limestone base course | |
| 1 | | | | 99.7 |
| | | | **CLAY FILL**<br>Grey-black mixed, frost to 1.4 m | |
| 2 | | | | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | 98.5 |
| | | | **CLAY**<br>Grey-black 1.7 m, brown below 2.0 m, SILTY at 1.85 m to 2.0 m | |
| 6 | | | | |
| | 2 | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| | 3 | | | |
| 10 | | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa] (50, 150, 250, 350)

| Depth (ft) | PP [kPa] | SPT [N] | Water Content % |
|---|---|---|---|
| 1 | | | 33.0 |
| 2 | | | 42.0 |
| 3 | | | 39.0 |
| 4 | | | 38.0 |
| 5 | 200 | | 36.0 |
| 6 | 100 | | 38.0 |
| 7 | 200 | | 38.0 |
| 10 | | | 42.0 |

Water Content % (10, 30, 50, 70, 90)

**Drill Method: Auger**

**Drill Date: 1/14/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 4**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

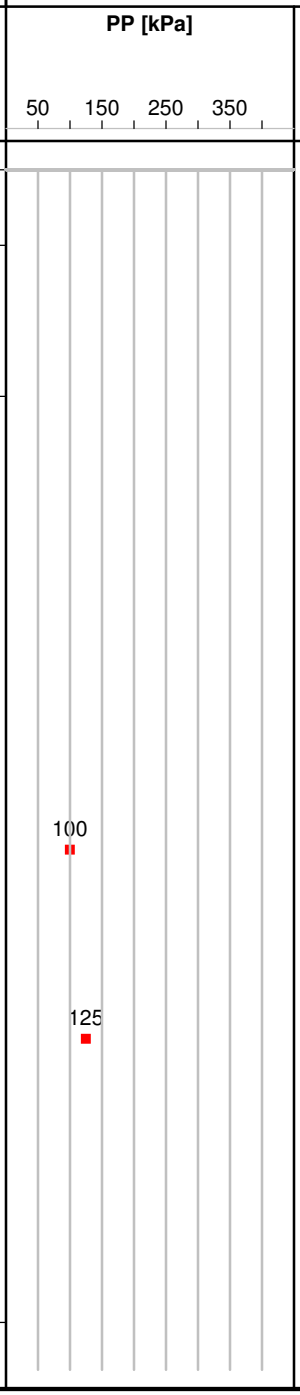
**Location: Site 6 - Alley behind 1048 Rosemount Ave**

**Engineer: S. Urbano**

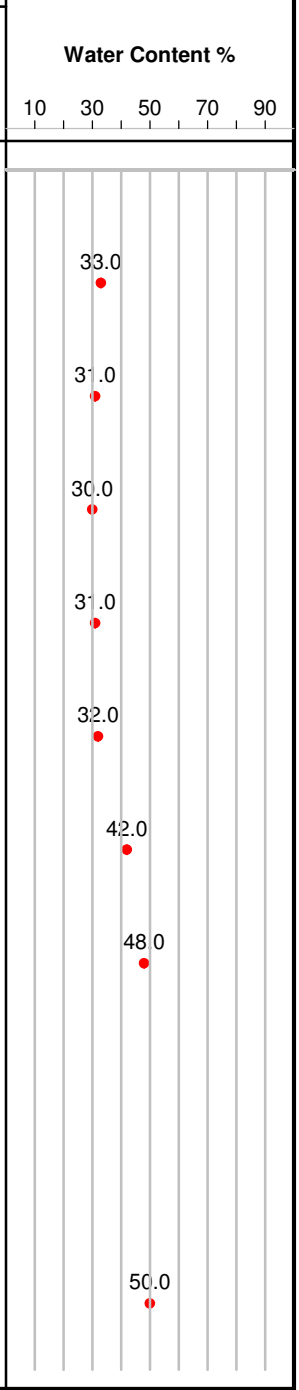
## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **GRANULAR FILL**<br>Typ. base course | 99.8 |
| 1 | | | **CLAY FILL**<br>Black to brown, trace of fine gravel | 99.4 |
| 2 | | | **CLAY**<br>Grey-black, brown below 1.7 m, stiff at 1.7 m, SILTY at 1.8 m to 2.0 m, clayey below 2.0 m | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | 2 | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE




SPT [N]




**Drill Method: Auger**

**Drill Date: 1/14/2015**

**Hole Size: 125 mm**


WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8


**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 5**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 6 - Alley behind 1036 Rosemount Ave**

**Engineer: S. Urbano**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| 0 | 0 | | **GRANULAR FILL**<br>Typ. base course | 99.8 |
| 1 | | | **CLAY FILL**<br>SILTY CLAY, brown to black | |
| 3 | 1 | | | |
| 4 | | | | 98.8 |
| 4 | | | **CLAY**<br>Grey-black, frost to 1.35 m | |
| 5 | | | | 98.5 |
| 5 | | | **SILT**<br>Tan-brown, soft, moist to wet | |
| 6 | | | | 98.0 |
| 6 | 2 | | **CLAY**<br>Brown, stiff | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa]: 50, 150, 250, 350

SPT [N]

Water Content %: 10, 30, 50, 70, 90

| Depth (ft) | Water Content % |
|---|---|
| 4 | 42.0 |
| 5 | 39.0 |
| 6 | 39.0 |
| 7 | 39.0 |
| 8 | 27.0 |
| 9 | 23.0 |
| 10 | 38.0 |
| 10 | 47.0 |

**Drill Method: Auger**

**Drill Date: 1/14/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00** **TH 6**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 6 - Alley behind 1016 Rosemount Ave** **Engineer: S. Urbano**

## SUBSURFACE PROFILE

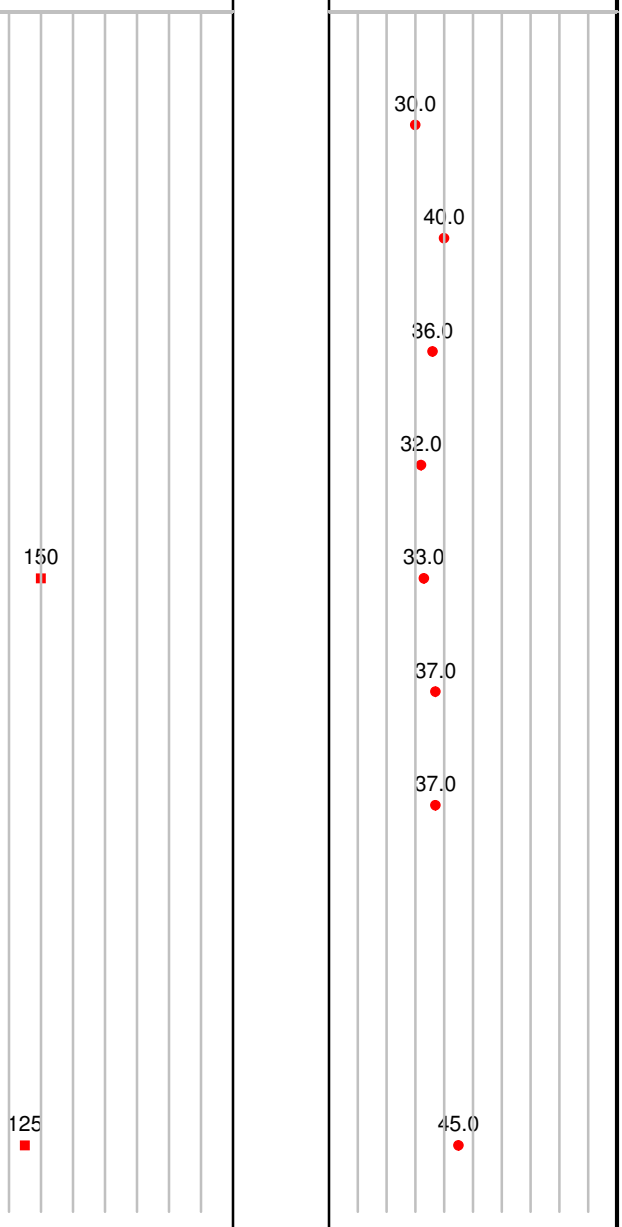
| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| 0 | 0 | | **GRANULAR FILL**<br>Typ. base course | 99.8 |
| 1 | | | **CLAY FILL** | |
| 3 | 1 | | | 99.1 |
| | | | **CLAY**<br>Grey-black, frost to 1.35 m, brown at 1.5 m | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa] (50, 150, 250, 350)

SPT [N]

Water Content % (10, 30, 50, 70, 90)




**Drill Method: Auger**

**Drill Date: 1/14/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 7**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 1 - Alley behind 575 Lyndale Dr**

**Engineer: S. Urbano**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **ASPHALT** | 99.9 |
| | | | **GRANULAR FILL**<br>Typ. base course | 99.7 |
| 1 | | | **CLAY**<br>Grey-black, frost to 1.5 m | |
| 2 | | | | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | 98.5 |
| | | | **SILT**<br>Tan-brown, soft | |
| 6 | | | | 98.2 |
| | 2 | | **CLAY**<br>Brown, stiff, SILTY from 2.9 m to 3.05 m | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa] (50, 150, 250, 350)

125

175

75

SPT [N]

Water Content % (10, 30, 50, 70, 90)

28.0

35.0

33.0

35.0

47.0

37.0

41.0

41.0

**Drill Method: Auger**

**Drill Date: 1/14/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00** **TH 8**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 1 - Alley behind 60 Crawford Ave** **Engineer: S. Urbano**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **ASPHALT** | 99.8 |
| 1 | | | **GRANULAR FILL**<br>Typ. base course | 99.7 |
| 2 | | | **CLAY FILL**<br>Grey-black mixed, trace of fine gravel | |
| 3 | 1 | | | 99.1 |
| | | | **CLAY**<br>Grey-black | |
| 4 | | | | 98.8 |
| | | | **SILT**<br>Tan-brown, dry, frost to 1.35 m | |
| 5 | | | | |
| 6 | | | | 98.2 |
| | 2 | | **CLAY**<br>Brown, stiff, dry | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| | 3 | | | |
| 10 | | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa] (50, 150, 250, 350)

150

SPT [N]

Water Content % (10, 30, 50, 70, 90)

20.0

33.0

33.0

30.0

23.0

41.0

44.0

51.0

**Drill Method: Auger**

**Drill Date: 1/14/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 9**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

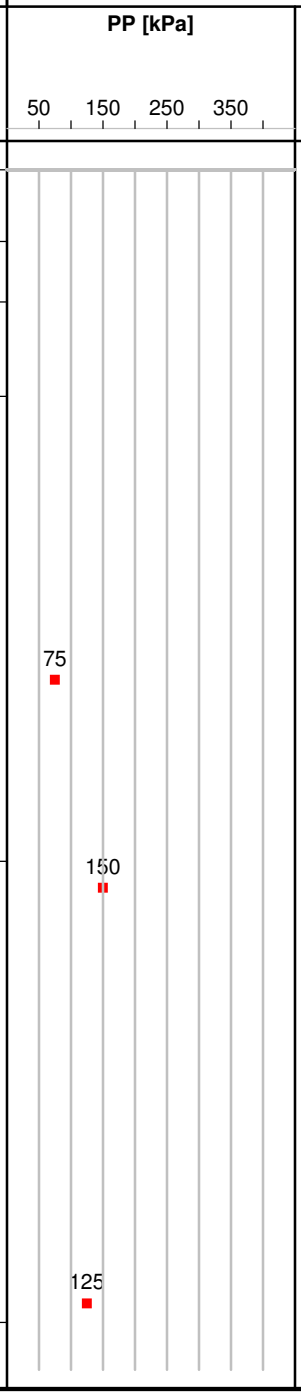
**Location: Site 1 - Alley behind 72 Crawford Ave**

**Engineer: S. Urbano**

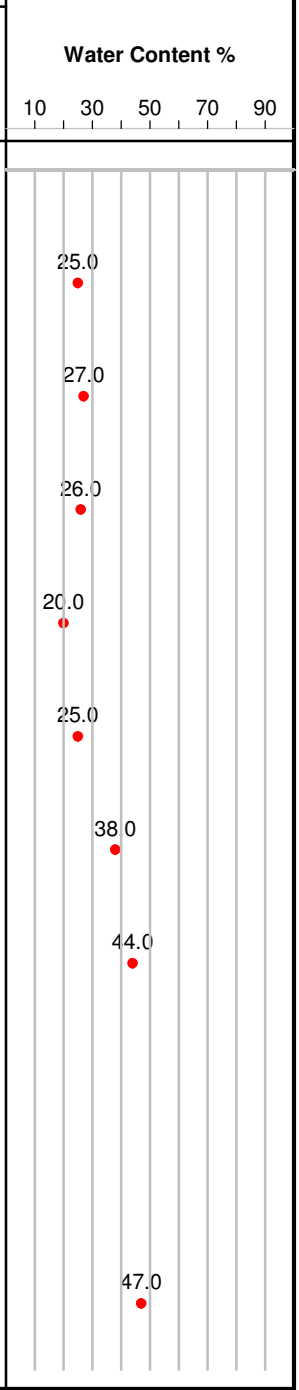
## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **ASPHALT** | 99.8 |
| 1 | | | **GRANULAR FILL**<br>Typ. base course | 99.7 |
| | | | **CLAY FILL**<br>Grey-black | 99.4 |
| 2 | | | **SILT**<br>CLAYEY SILT, tan-brown, dry, frost to 1.35 m, moist to wet below 1.35 m, stratified at 1.5 m | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | 98.2 |
| | 2 | | **CLAY**<br>Brown, stiff, SILTY from 2.45 m to 2.6 m | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE




SPT [N]




**Drill Method: Auger**

**Drill Date: 1/14/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 10**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

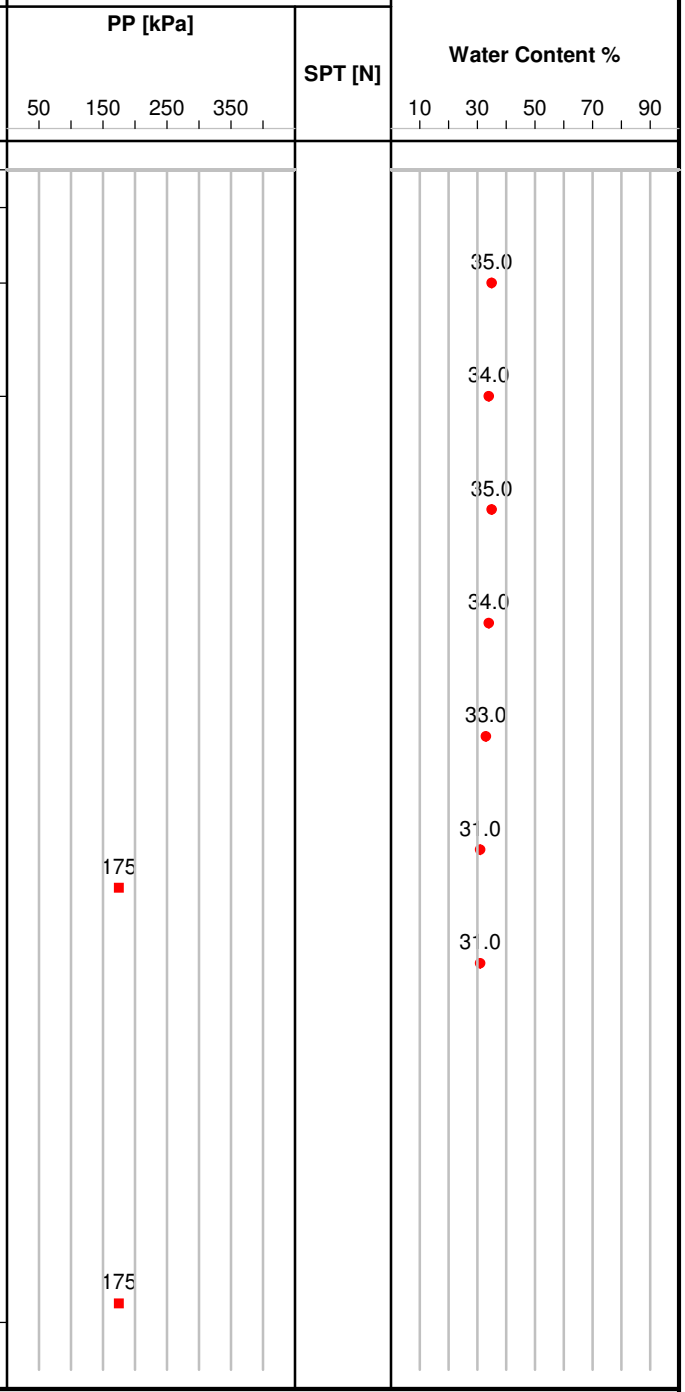
**Location: Site 8 - Alley behind 123 Birchdale Ave**

**Engineer: S. Urbano**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **ASPHALT** | 99.9 |
| | | | **GRANULAR FILL**<br>Typ. base course | 99.7 |
| 1 | | | **CLAY FILL**<br>Grey-black, trace of fine gravel | 99.4 |
| 2 | | | **CLAY**<br>Grey-black, frost to 1.35 m, brown and stiff below 1.85 m | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| | 2 | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| | 3 | | | |
| 10 | | | | 97.0 |
| | | | End of Log | |

## SAMPLE




**Drill Method: Auger**

**Drill Date: 1/15/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00** **TH 11**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 8 - Alley behind 143 Birchdale Ave** **Engineer: S. Urbano**

## SUBSURFACE PROFILE

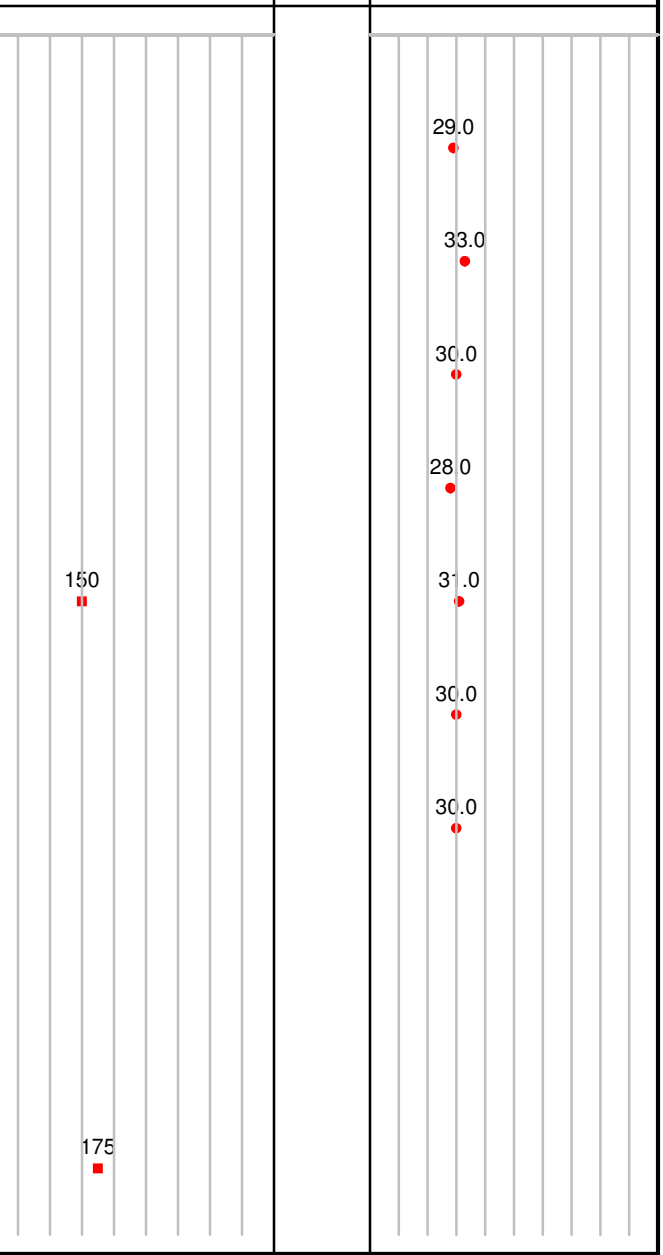
| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| 0 | 0 | | **ASPHALT** | 99.9 |
| 0 | 0 | | **GRANULAR FILL**<br>Typ. base course | 99.7 |
| 1 | 0 | | **CLAY FILL**<br>Grey-black, trace of fine gravel | 99.4 |
| 2 | 0 | | **CLAY**<br>Grey-black, frost to 1.35 m, brown and stiff below 1.85 m | |
| 10 | 3 | | End of Log | 97.0 |

## SAMPLE

PP [kPa] (50, 150, 250, 350)

SPT [N]

Water Content % (10, 30, 50, 70, 90)




**Drill Method: Auger**

**Drill Date: 1/15/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 12**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

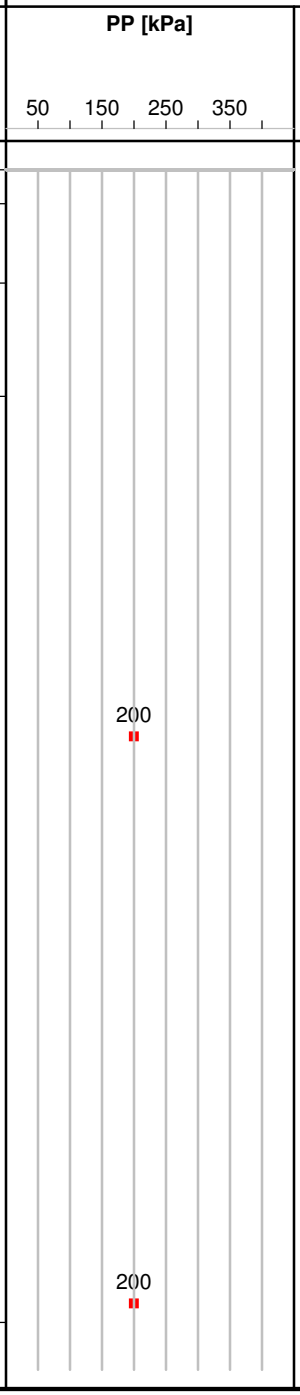
**Location: Site 8 - Alley behind 165 Birchdale Ave**

**Engineer: S. Urbano**

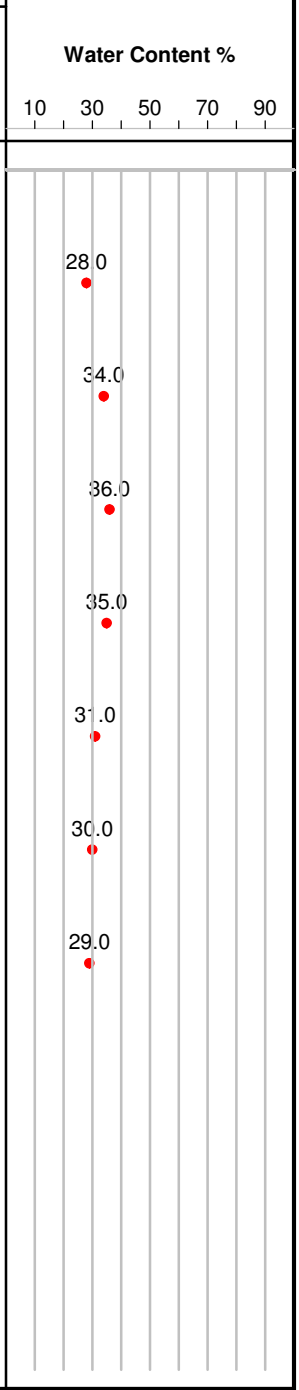
## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **ASPHALT** | 99.9 |
| | | | **GRANULAR FILL**<br>Typ. base course | 99.7 |
| 1 | | | **CLAY FILL**<br>Grey-black, trace of fine gravel | 99.4 |
| 2 | | | **CLAY**<br>Grey-black, frost to 1.35 m, brown below 1.52 m | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | 2 | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE




SPT [N]




**Drill Method: Auger**

**Drill Date: 1/15/2015**

**Hole Size: 125 mm**


WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8


**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00** **TH 13**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 10 - Alley behind 764 Henderson Hwy** **Engineer: S. Urbano**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| 0 | 0 | | **GRANULAR FILL**<br>Typ. base course | |
| 1 | | | | 99.7 |
| 1 | | | **CLAY**<br>Grey-black, brown below 1.2 m, stiff below 1.35 m, frost to 1.35 m | |
| 5 | 1 | | | 98.5 |
| 5 | | | **CLAYEY SILT**<br>Soft, tan-brown, moist to wet | |
| 9 | 2 | | | 97.1 |
| 10 | 3 | | **CLAY**<br>Brown, stiff | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa] (50, 150, 250, 350)

SPT [N]

Water Content % (10, 30, 50, 70, 90)

| Depth (ft) | PP [kPa] | Water Content % |
|---|---|---|
| 1 | | 9.0 |
| 2 | | 32.0 |
| 3 | | 31.0 |
| 4 | | 30.0 |
| 5 | | 31.0 |
| 6 | 25 | 27.0 |
| 7 | | 24.0 |
| 10 | 100 | 33.0 |

**Drill Method: Auger**

**Drill Date: 1/15/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 14**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 10 - Alley behind 137 Kimberly Ave**

**Engineer: S. Urbano**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| 0 | 0 | | **GRANULAR FILL**<br>Typ. base course | 99.8 |
| 1 | | | **CLAY**<br>Brown, fissured, frost to 1.35 m | |
| 2 | | | | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | 2 | | | |
| 7 | | | | |
| 8 | | | | 97.6 |
| 8 | | | **CLAYEY SILT**<br>Soft, tan-brown, moist to wet | |
| 9 | | | | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE

**PP [kPa]** (50, 150, 250, 350)

200

25

**SPT [N]**

**Water Content %** (10, 30, 50, 70, 90)

33.0

33.0

31.0

31.0

31.0

34.0

27.0

24.0

**Drill Method: Auger**

**Drill Date: 1/15/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 15**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

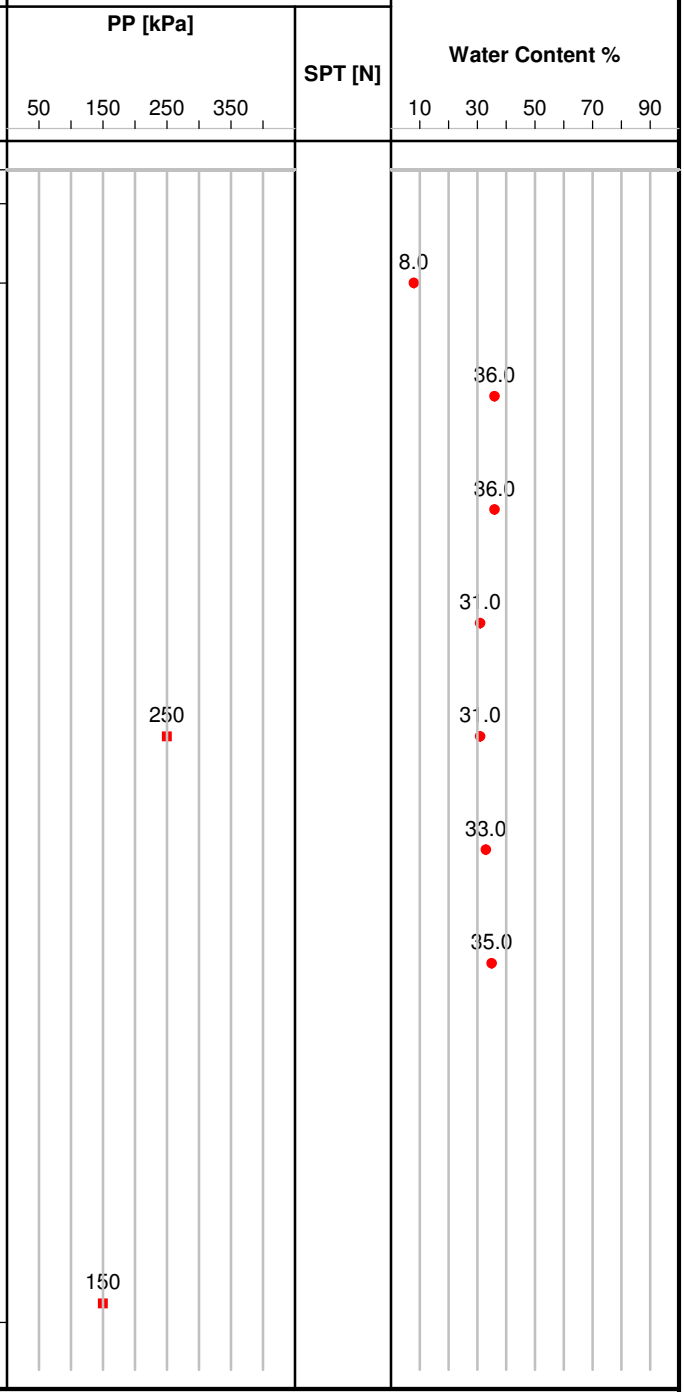
**Location: Site 10 - Alley behind 103 Kimberly Ave**

**Engineer: S. Urbano**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **ASPHALT** | 99.9 |
| | | | **GRANULAR FILL**<br>Typ. base course | 99.7 |
| 1 | | | **CLAY**<br>Grey-black, frost to 1.35 m, brown below 1.5 m, stiff | |
| 2 | | | | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | 2 | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE




**Drill Method: Auger**

**Drill Date: 1/15/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No:** 141-24150-00

**TH 16**

**Project:** 2015 COW Alley Way Improvements

**Client:** City of Winnipeg

**Location:** Site 19 - Alley behind 601 McLeod Ave

**Engineer:** S. Urbano

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **GRANULAR FILL**<br>Typ. base course | 99.7 |
| 1 | | | **CLAY FILL**<br>Mixed brown and black, trace of fine gravel | 99.1 |
| 3 | 1 | | **CLAY**<br>Brown, fissured, frost to 1.35 m | 98.5 |
| 5 | | | **SILT**<br>Clayey, soft, tan-brown | 97.3 |
| 9 | 2 | | **CLAY**<br>Brown, stiff | 97.0 |
| 10 | 3 | | End of Log | |

## SAMPLE

PP [kPa] (50, 150, 250, 350)

SPT [N]

Water Content % (10, 30, 50, 70, 90)

PP [kPa]: 125

Water Content %: 9.0, 31.0, 29.0, 27.0, 27.0, 23.0, 23.0, 35.0

**Drill Method:** Auger

**Drill Date:** 1/15/2015

**Hole Size:** 125 mm

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation:** 100 m

**Checked By:** S.Urbano

**Sheet:** 1 of 1

**Project No:** 141-24150-00

**TH 17**

**Project:** 2015 COW Alley Way Improvements

**Client:** City of Winnipeg

**Location:** Site 19 - Alley behind 637 McLeod Ave

**Engineer:** S. Urbano

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **GRANULAR FILL**<br>Typ. base course | |
| 1 | | | | 99.5 |
| | | | **CLAY FILL**<br>Grey-black, mixed, trace of fine gravel | |
| 2 | | | | 99.1 |
| 3 | 1 | | **CLAY**<br>Grey-black, fissured, frost to 1.35 m | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | 98.2 |
| | 2 | | **SILT**<br>Tan-brown, soft | |
| 7 | | | | 97.9 |
| | | | **CLAY**<br>Brown | |
| 8 | | | | 97.6 |
| | | | **SILT**<br>Tan-brown, soft | |
| 9 | | | | 97.3 |
| | 3 | | **CLAY**<br>Brown | |
| 10 | | | | 97.0 |
| | | | End of Log | |

## SAMPLE

| Elev [m] | PP [kPa] (50 150 250 350) | SPT [N] | Water Content % (10 30 50 70 90) |
|---|---|---|---|
| 100.0 | | | |
| 99.5 | | | 9.0 |
| 99.1 | | | 35.0 |
| 98.2 | | | 36.0 |
| 97.9 | 25 | | 35.0 |
| 97.6 | 100 | | 33.0 |
| 97.3 | 250 | | 24.0 |
| 97.0 | 100 | | 35.0 |
| | | | 25.0 |

**Drill Method:** Auger

**Drill Date:** 1/15/2015

**Hole Size:** 125 mm

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation:** 100 m

**Checked By:** S.Urbano

**Sheet:** 1 of 1

**Project No: 141-24150-00** **TH 18**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 19 - Alley behind 699 McLeod Ave** **Engineer: S. Urbano**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **GRANULAR FILL**<br>Typ. base course | |
| 1 | | | | 99.5 |
| | | | **CLAY FILL**<br>Grey-black, mixed | |
| 2 | | | | |
| 3 | 1 | | | |
| 4 | | | | 98.8 |
| | | | **CLAY**<br>Brown, stiff, frost to 1.35 m | |
| 5 | | | | |
| 6 | 2 | | | |
| 7 | | | | 97.9 |
| | | | **SILT**<br>Tan-brown, soft | |
| 8 | | | | |
| 9 | | | | 97.1 |
| | | | **CLAY**<br>Brown, stiff | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa]: 50, 150, 250, 350

SPT [N]

Water Content %: 10, 30, 50, 70, 90

- 10.0
- 35.0
- 37.0
- 36.0
- 150
- 29.0
- 29.0
- 25.0
- 39.0

**Drill Method: Auger**

**Drill Date: 1/15/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00** **TH 19**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 17 - Alley behind 521 Lyndale Dr.** **Engineer: D.Bredin**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **ASPHALT** | 99.9 |
| | | | **GRANULAR FILL**<br>Typ. base course | 99.7 |
| 1 | | | **SILTY CLAY**<br>Brown, fissured above 1.2 m, frost to 1.2 m | |
| 2 | | | | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | 98.5 |
| | | | **SILT**<br>Tan-brown, moist | |
| 6 | | | | |
| | 2 | | | |
| 7 | | | | 97.9 |
| | | | **CLAY**<br>Brown, cohesive | |
| 8 | | | | |
| 9 | | | | |
| | 3 | | | |
| 10 | | | | 97.0 |
| | | | End of Log | |

## SAMPLE

**PP [kPa]**

50 150 250 350

**SPT [N]**

**Water Content %**

10 30 50 70 90

8.0

29.0

39.0

38.0

29.0

24.0

42.0

**Drill Method: Auger**

**Drill Date: 1/16/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 20**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 17 - Alley behind 55 Tache Ave**

**Engineer: D.Bredin**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **ASPHALT** | 99.9 |
| | | | **GRANULAR FILL**<br>Typ. base course | 99.7 |
| 1 | | | **SILTY CLAY**<br>Brown, fissured above 1.2 m, frost to 1.2 m, SILTY below 1.2 m | |
| 2 | | | | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | 98.5 |
| | | | **SILT**<br>Tan-brown, moist | |
| 6 | 2 | | | |
| 7 | | | | 97.9 |
| | | | **CLAY**<br>Brown, cohesive | |
| 8 | | | | |
| 9 | | | | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa]: 50, 150, 250, 350

SPT [N]

Water Content %: 10, 30, 50, 70, 90

5.0

28.0

42.0

41.0

35.0

31.0

40.0

**Drill Method: Auger**

**Drill Date: 1/16/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 21**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 17 - Alley behind 71 Tache Ave**

**Engineer: D.Bredin**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **ASPHALT** | 99.9 |
| 1 | | | **CLAY FILL**<br>Grey, dry, fractured, trace of gravel | |
| 2 | | | | 99.4 |
| 3 | 1 | | **SILTY CLAY**<br>Brown, fissured above 0.9 m, SILTY from 0.9 m to 2.3 m, frost to 1.2 m | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | 2 | | | 97.7 |
| 8 | | | **CLAY**<br>Brown, cohesive | |
| 9 | | | | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa]: 50, 150, 250, 350

SPT [N]

Water Content %: 10, 30, 50, 70, 90

23.0

36.0

28.0

23.0

23.0

41.0

34.0

**Drill Method: Auger**

**Drill Date: 1/16/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 31**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 5 - Alley behind 182 Leighton Ave**

**Engineer: S. Urbano**

## SUBSURFACE PROFILE

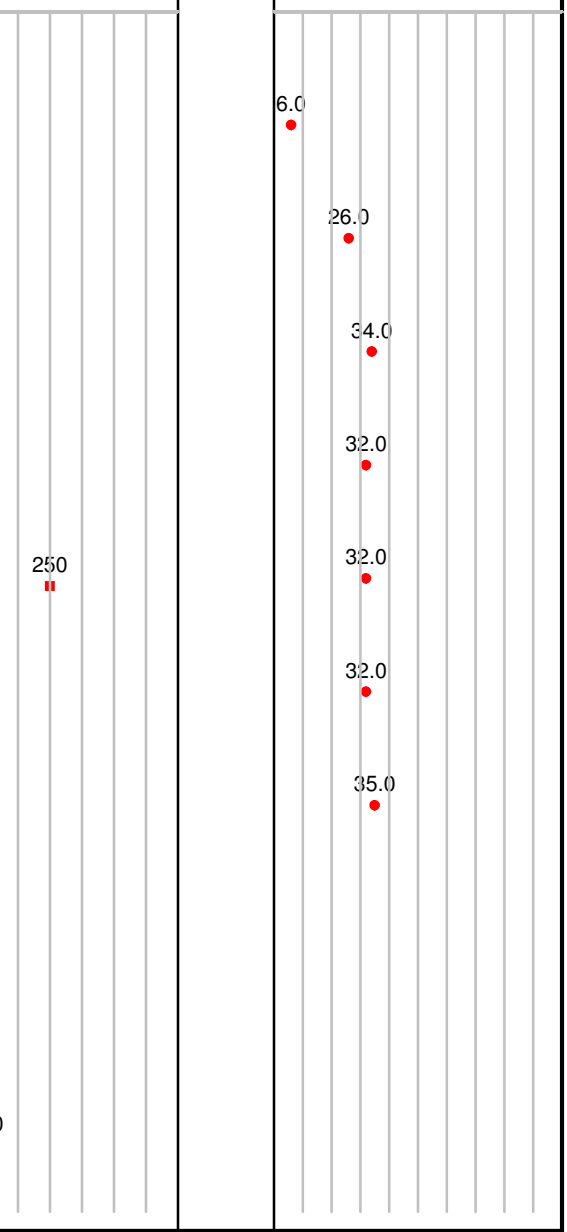
| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| 0 | 0 | | **GRANULAR FILL**<br>Typ. limestone base course | |
| | | | | 99.4 |
| | | | **CLAY FILL**<br>Grey-black, trace of fine gravel | |
| | 1 | | | 99.0 |
| | | | **CLAY**<br>Grey-black, frost to 1.35 m, brown below 1.5 m, stiff | |
| | 2 | | | |
| | 3 | | | 97.0 |
| 10 | | | End of Log | |

## SAMPLE

PP [kPa]: 50, 150, 250, 350

SPT [N]

Water Content %: 10, 30, 50, 70, 90




**Drill Method: Auger**

**Drill Date: 1/19/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 32**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

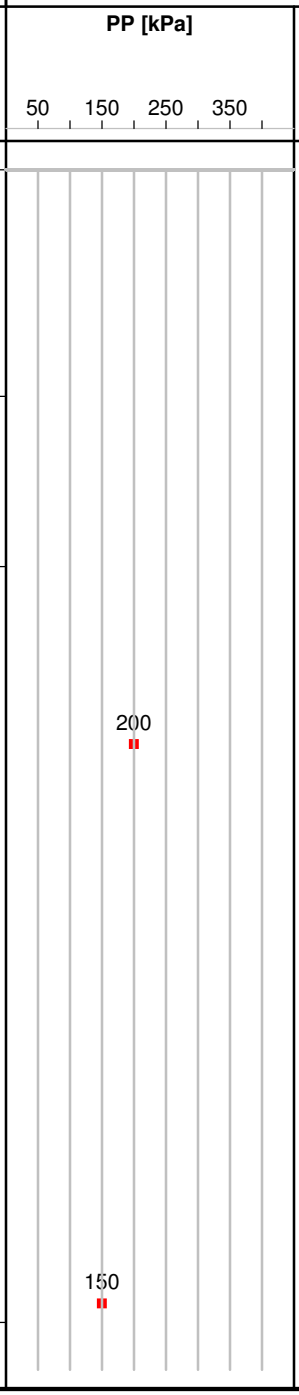
**Location: Site 5 - Alley behind 152 Leighton Ave**

**Engineer: S. Urbano**

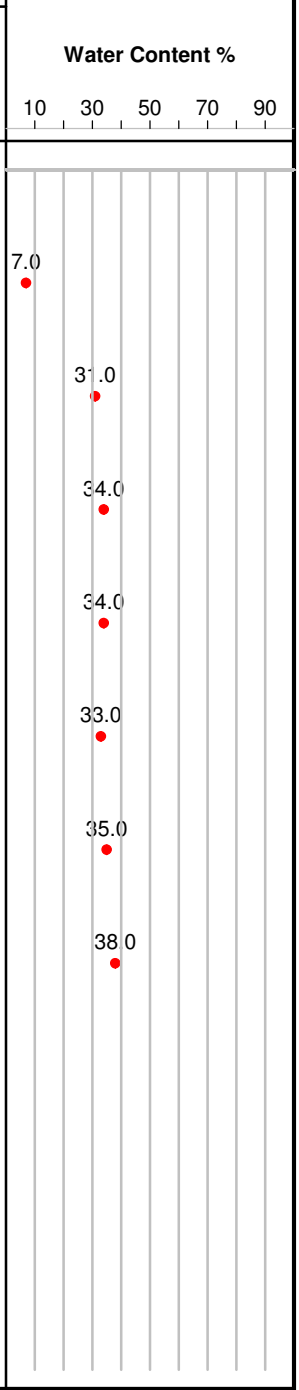
## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **GRANULAR FILL**<br>Typ. limestone base course | |
| | | | | 99.4 |
| | | | **CLAY FILL**<br>Grey-black, trace of fine gravel | |
| | 1 | | | 99.0 |
| | | | **CLAY**<br>Grey-black, frost to 1.35 m, brown below 1.5 m, stiff | |
| | 2 | | | |
| | 3 | | | 97.0 |
| 10 | | | End of Log | |

## SAMPLE




SPT [N]




**Drill Method: Auger**

**Drill Date: 1/19/2015**

**Hole Size: 125 mm**


WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8


**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 33**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 5 - Alley behind 100 Leighton Ave**

**Engineer: S. Urbano**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| 0 – 2 | 0 – 0.6 | | **GRANULAR FILL**<br>Typ. limestone base course | |
| | | | | 99.4 |
| 2 – 3 | 0.6 – 1 | | **CLAY FILL**<br>Grey-black | |
| | | | | 99.0 |
| 3 – 10 | 1 – 3 | | **CLAY**<br>Grey-black, fissured, frost to 1.35 m, brown below 1.35 m | |
| | | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa] (50, 150, 250, 350)

SPT [N]

Water Content % (10, 30, 50, 70, 90)

| Depth (m) | PP [kPa] | Water Content % |
|---|---|---|
| 0.6 | | 8.0 |
| 1.0 | | 24.0 |
| 1.5 | | 33.0 |
| 2.0 | | 33.0 |
| 2.5 | 150 | 33.0 |
| 3.0 | | 32.0 |
| 3.5 | | 32.0 |
| 3.0 | 150 | |

**Drill Method: Auger**

**Drill Date: 1/19/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

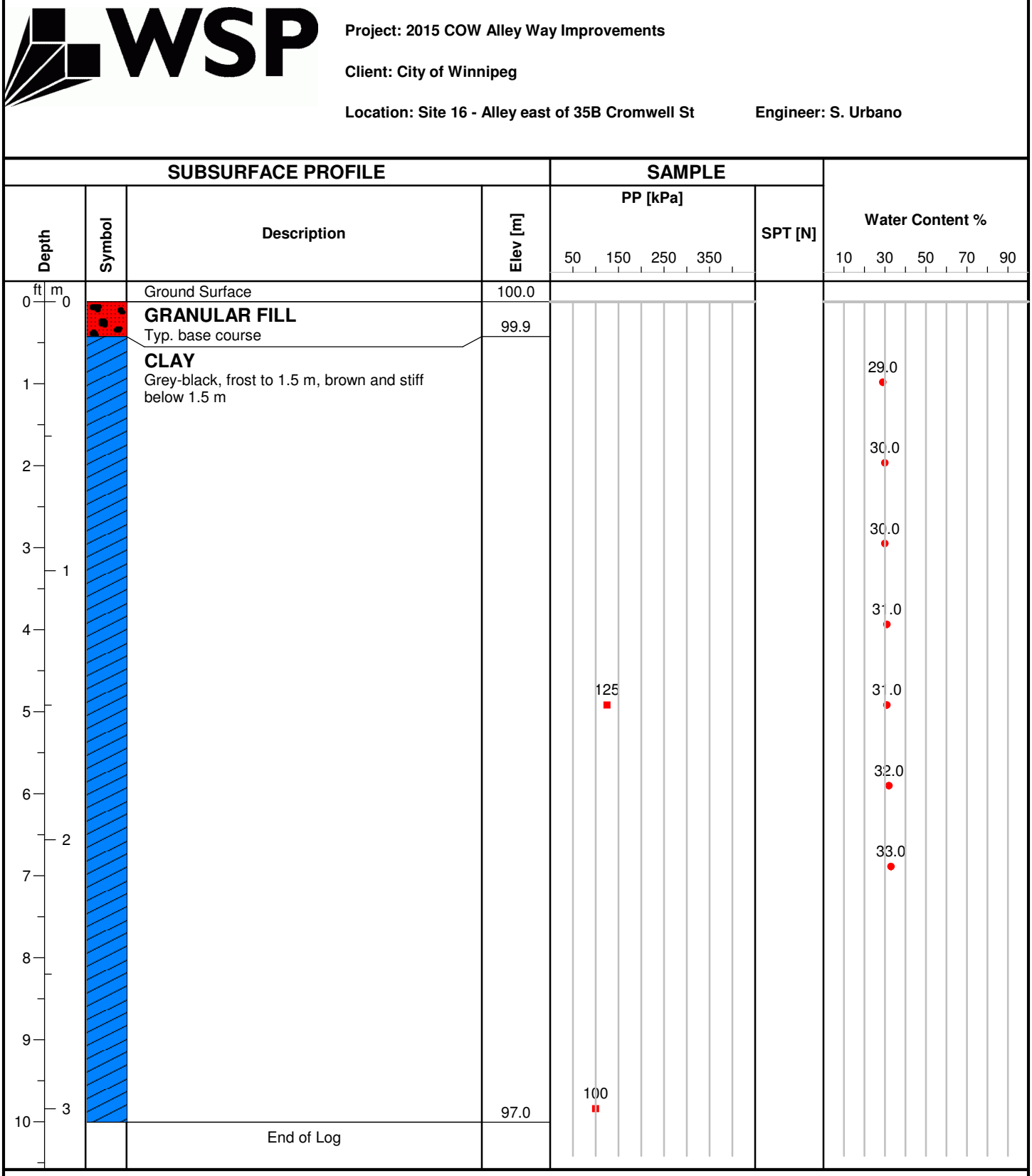
**TH 43**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 16 - Alley east of 35B Cromwell St**

**Engineer: S. Urbano**




**Drill Method: Auger**

**Drill Date: 1/22/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 44**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 16 - Alley north of 35A Cromwell St**

**Engineer: S. Urbano**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| 0 | 0 | | **GRANULAR FILL**<br>Typ. limestone base course | |
| 1 | | | | 99.7 |
| 1 | | | **CLAY**<br>Grey-black, frost to 1.35 m, brown and stiff below 1.5 m | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa] (50, 150, 250, 350)

SPT [N]

Water Content % (10, 30, 50, 70, 90)

| Depth (ft) | PP [kPa] | Water Content % |
|---|---|---|
| 1 | | 5.0 |
| 2 | | 29.0 |
| 3 | | 32.0 |
| 4 | | 33.0 |
| 5 | 150 | 32.0 |
| 6 | | 30.0 |
| 7 | | 31.0 |
| 9 | 125 | |

**Drill Method: Auger**

**Drill Date: 1/22/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 63**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 11 - Alley behind 186 Rue St. Joesph**

**Engineer: D. Bredin**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| 0 | 0 | | **GRANULAR FILL**<br>Typ. base course | |
| | | | | 99.3 |
| 3 | 1 | | **CLAY**<br>Grey and fissured, frost to 1.5 m, brown below 1.5 m, trace of SILT inclusions | |
| | | | | 97.0 |
| 10 | 3 | | End of Log | |

## SAMPLE

PP [kPa]: 50, 150, 250, 350

SPT [N]

Water Content %: 10, 30, 50, 70, 90

8.0

11.0

36.0

36.0

38.0

36.0

36.0

**Drill Method: Auger**

**Drill Date: 2/3/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00** **TH 64**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 11 - Alley behind 212 Rue St. Joesph** **Engineer: D. Bredin**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **GRANULAR FILL**<br>Typ. base course | |
| 1 | | | | 99.7 |
| | | | **CLAY FILL**<br>Grey, fractured and dry above 0.6 m, frost to 1.5 m, trace of fine gravel | |
| 2 | | | | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | 98.5 |
| | | | **CLAY**<br>Brown, SILTY from 1.8 m to 2.1 m, SILT inclusions below 2.1 m | |
| 6 | | | | |
| | 2 | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| | 3 | | | |
| 10 | | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa]: 50, 150, 250, 350

SPT [N]

Water Content %: 10, 30, 50, 70, 90

8.0

35.0

37.0

40.0

37.0

29.0

31.0

**Drill Method: Auger**

**Drill Date: 2/3/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00**

**TH 65**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 21 - Alley behind 484 Rue La Verendrye**

**Engineer: D. Bredin**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **GRANULAR FILL**<br>Typ. base course | 99.7 |
| 1 | | | **CLAY FILL**<br>Grey, fractured and dry above 0.6 m | 99.4 |
| 2 | | | **SILTY CLAY**<br>Brown, SILTY, frost to 1.5 m | |
| 3 | 1 | | | |
| 4 | | | | |
| | | | | 98.5 |
| 5 | | | **SILT**<br>Tan-brown, moist, soft | 98.2 |
| 6 | | | **CLAY**<br>Brown, SILTY from 1.8 m to 2.1 m, cohesive below 2.1 m | |
| 7 | 2 | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | 3 | | | 97.0 |
| | | | End of Log | |

## SAMPLE

PP [kPa]: 50, 150, 250, 350

SPT [N]

Water Content %: 10, 30, 50, 70, 90

11.0

33.0

44.0

38.0

27.0

24.0

27.0

**Drill Method: Auger**

**Drill Date: 2/3/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00** **TH 66**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 21 - Alley behind 498 Rue La Verendrye** **Engineer: D. Bredin**

## SUBSURFACE PROFILE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] |
|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 |
| | | | **GRANULAR FILL**<br>Typ. base course | |
| 1 | | | | 99.7 |
| | | | **CLAY FILL**<br>Grey, fractured and dry above 0.6 m | |
| 2 | | | | 99.4 |
| | | | **CLAY**<br>Grey, fissured, frost to 1.5 m, SILTY from 1.5 m to 1.8 m | |
| 3 | 1 | | | |
| 4 | | | | |
| 5 | | | | 98.5 |
| | | | **SILT**<br>Tan-brown, moist, soft | |
| 6 | | | | |
| | 2 | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| | | | | 97.1 |
| | 3 | | **CLAY**<br>Brown, cohesive, soft | 97.0 |
| 10 | | | End of Log | |

## SAMPLE

PP [kPa]: 50, 150, 250, 350

SPT [N]

Water Content %: 10, 30, 50, 70, 90

9.0
25.0
35.0
33.0
33.0
27.0
24.0

**Drill Method: Auger**

**Drill Date: 2/3/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

**Project No: 141-24150-00** **TH 67**

**Project: 2015 COW Alley Way Improvements**

**Client: City of Winnipeg**

**Location: Site 21 - Alley behind 508 Rue La Verendrye** **Engineer: D. Bredin**

## SUBSURFACE PROFILE

## SAMPLE

| Depth (ft) | Depth (m) | Symbol | Description | Elev [m] | PP [kPa] | SPT [N] | Water Content % |
|---|---|---|---|---|---|---|---|
| 0 | 0 | | Ground Surface | 100.0 | | | |
| 0 | 0 | | **GRANULAR FILL**<br>Typ. base course | | | | 4.0, 8.0 |
| | | | | 99.3 | | | |
| 3 | 1 | | **CLAY**<br>Grey to 1.05 m, brown below 1.05 m, fissured, frost to 1.5 m | | | | 36.0, 35.0, 33.0 |
| | | | | 98.5 | | | |
| 5 | | | **SILT**<br>Tan-brown, moist, soft | | | | 23.0, 24.0 |
| | 2 | | | 97.7 | | | |
| 8 | | | **CLAY**<br>Brown, cohesive, soft | | | | |
| 9 | | | | | | | |
| 10 | 3 | | | 97.0 | | | |
| | | | End of Log | | | | |

PP [kPa]: 50 150 250 350

Water Content %: 10 30 50 70 90

**Drill Method: Auger**

**Drill Date: 2/3/2015**

**Hole Size: 125 mm**

WSP
1600 Buffalo Pl.
Winnipeg, MB
R3T 6B8

**Elevation: 100 m**

**Checked By: S.Urbano**

**Sheet: 1 of 1**

# APPENDIX B

H. MANALO CONSULTING LTD.

1402 Notre Dame Avenue, Winnipeg, MB R3E 3G5
Winnipeg, Manitoba Phone: 204 697-3854 Cell: 204 997-1355
Email: hmanalo@mts.net

# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO:** 1 | **PROJECT NO: 15-02-2** |
| **PROJECT: City of Wpg 2015 Alley** | **DATE SAMPLED: Jan. 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT:** S. Urbano | **DATE TESTED: Jan. 19, 2015** | **TESTED BY:** GP |

| Test Hole No. | **1** | **1** | **1** | **1** | **1** |
|---|---|---|---|---|---|
| Depth | 2 ft | 4 ft | 5 ft | 6 ft | 7 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 115.3 | 142.9 | 153.5 | 143.8 | 122.2 |
| Wt Dry Sample + Tare | 87.5 | 109.7 | 116.7 | 109.6 | 88.3 |
| Wt Water | 27.8 | 33.2 | 36.8 | 34.2 | 33.9 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 83.3 | 105.5 | 112.5 | 105.4 | 84.1 |
| **Moisture Content (%)** | **33** | **31** | **33** | **32** | **40** |

| Test Hole No. | **1** | | | | |
|---|---|---|---|---|---|
| Depth | 10 ft | | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 189.9 | | | | |
| Wt Dry Sample + Tare | 137.6 | | | | |
| Wt Water | 52.3 | | | | |
| Wt Tare | 4.2 | | | | |
| Wt Dry Sample | 133.4 | | | | |
| **Moisture Content (%)** | **39** | | | | |

| Hole No. | **2** | **2** | **2** | **2** | **2** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 144.2 | 126.3 | 175.4 | 179.6 | 158.5 |
| Wt Dry Sample + Tare | 110.3 | 94.1 | 129.8 | 133 | 116.2 |
| Wt Water | 33.9 | 32.2 | 45.6 | 46.6 | 42.3 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 106.1 | 89.9 | 125.6 | 128.8 | 112.0 |
| **Moisture Content (%)** | **32** | **36** | **36** | **36** | **38** |

| Hole No. | **2** | **2** | **2** | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 147.1 | 150.9 | 147.1 | | |
| Wt Dry Sample + Tare | 111.4 | 111.9 | 106.4 | | |
| Wt Water | 35.7 | 39 | 40.7 | | |
| Wt Tare | 4.2 | 4.2 | 4.2 | | |
| Wt Dry Sample | 107.2 | 107.7 | 102.2 | | |
| **Moisture Content (%)** | **33** | **36** | **40** | | |

H. MANALO CONSULTING LTD.

1402 Notre Dame Avenue, Winnipeg, MB R3E 3G5
Winnipeg, Manitoba Phone: 204 697-3854 Cell: 204 997-1355
Email: hmanalo@mts.net

# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO:** 1 | **PROJECT NO: 15-02-2** |
| **PROJECT: City of Wpg 2015 Alley** | **DATE SAMPLED: Jan. 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT:** S. Urbano | **DATE TESTED: Jan. 19, 2015** | **TESTED BY:** GP |

| Test Hole No. | **3** | **3** | **3** | **3** | **3** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 128.6 | 95.5 | 154.6 | 138.1 | 108.5 |
| Wt Dry Sample + Tare | 97.4 | 68.7 | 112.3 | 101.5 | 81 |
| Wt Water | 31.2 | 26.8 | 42.3 | 36.6 | 27.5 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 93.2 | 64.5 | 108.1 | 97.3 | 76.8 |
| **Moisture Content (%)** | **33** | **42** | **39** | **38** | **36** |

| Test Hole No. | **3** | **3** | **3** | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 162.5 | 162.3 | 157.1 | | |
| Wt Dry Sample + Tare | 119.1 | 118.6 | 111.8 | | |
| Wt Water | 43.4 | 43.7 | 45.3 | | |
| Wt Tare | 4.2 | 4.2 | 4.1 | | |
| Wt Dry Sample | 114.9 | 114.4 | 107.7 | | |
| **Moisture Content (%)** | **38** | **38** | **42** | | |

| Hole No. | **4** | **4** | **4** | **4** | **4** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 154.1 | 118.4 | 147.6 | 122.9 | 183.7 |
| Wt Dry Sample + Tare | 117.1 | 91.5 | 114.2 | 94.5 | 140.6 |
| Wt Water | 37 | 26.9 | 33.4 | 28.4 | 43.1 |
| Wt Tare | 4.2 | 4.2 | 4.1 | 4.1 | 4.3 |
| Wt Dry Sample | 112.9 | 87.3 | 110.1 | 90.4 | 136.3 |
| **Moisture Content (%)** | **33** | **31** | **30** | **31** | **32** |

| Hole No. | **4** | **4** | **4** | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 194.8 | 147.3 | 152.2 | | |
| Wt Dry Sample + Tare | 138.7 | 101.1 | 102.7 | | |
| Wt Water | 56.1 | 46.2 | 49.5 | | |
| Wt Tare | 4.2 | 4.1 | 4.2 | | |
| Wt Dry Sample | 134.5 | 97.0 | 98.5 | | |
| **Moisture Content (%)** | **42** | **48** | **50** | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO:** 1 | **PROJECT NO: 15-02-2** |
| **PROJECT: City of Wpg 2015 Alley** | **DATE SAMPLED: Jan. 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT:** S. Urbano | **DATE TESTED: Jan. 19, 2015** | **TESTED BY:** GP |

| Test Hole No. | **5** | **5** | **5** | **5** | **5** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 148.1 | 119.8 | 131.3 | 136.9 | 194.6 |
| Wt Dry Sample + Tare | 105.3 | 87.3 | 95.9 | 99.5 | 153.8 |
| Wt Water | 42.8 | 32.5 | 35.4 | 37.4 | 40.8 |
| Wt Tare | 4.1 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 101.2 | 83.1 | 91.7 | 95.3 | 149.6 |
| **Moisture Content (%)** | **42** | **39** | **39** | **39** | **27** |

| Test Hole No. | **5** | **5** | **5** | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 178.7 | 145 | 126.4 | | |
| Wt Dry Sample + Tare | 145.6 | 106.3 | 87.1 | | |
| Wt Water | 33.1 | 38.7 | 39.3 | | |
| Wt Tare | 4.2 | 4.1 | 4.1 | | |
| Wt Dry Sample | 141.4 | 102.2 | 83.0 | | |
| **Moisture Content (%)** | **23** | **38** | **47** | | |

| Hole No. | **6** | **6** | **6** | **6** | **6** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 132.8 | 151.9 | 125.3 | 119.9 | 125.2 |
| Wt Dry Sample + Tare | 103 | 109.4 | 92.9 | 91.5 | 95.4 |
| Wt Water | 29.8 | 42.5 | 32.4 | 28.4 | 29.8 |
| Wt Tare | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Wt Dry Sample | 98.9 | 105.3 | 88.8 | 87.4 | 91.3 |
| **Moisture Content (%)** | **30** | **40** | **36** | **32** | **33** |

| Hole No. | **6** | **6** | **6** | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 131 | 131.8 | 161.7 | | |
| Wt Dry Sample + Tare | 96.8 | 97.4 | 112.7 | | |
| Wt Water | 34.2 | 34.4 | 49 | | |
| Wt Tare | 4.1 | 4.1 | 4.1 | | |
| Wt Dry Sample | 92.7 | 93.3 | 108.6 | | |
| **Moisture Content (%)** | **37** | **37** | **45** | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO:** 1 | **PROJECT NO: 15-02-2** |
| **PROJECT: City of Wpg 2015 Alley** | **DATE SAMPLED: Jan. 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT:** S. Urbano | **DATE TESTED: Jan. 20, 2015** | **TESTED BY:** GP |

| Test Hole No. | **7** | **7** | **7** | **7** | **7** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 177.6 | 124.8 | 181.8 | 165.3 | 187.9 |
| Wt Dry Sample + Tare | 139.2 | 93.8 | 137.4 | 123.3 | 129.1 |
| Wt Water | 38.4 | 31 | 44.4 | 42 | 58.8 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 135.0 | 89.6 | 133.2 | 119.1 | 124.9 |
| **Moisture Content (%)** | **28** | **35** | **33** | **35** | **47** |

| Test Hole No. | **7** | **7** | **7** | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 144.3 | 187.3 | 183.1 | | |
| Wt Dry Sample + Tare | 106.7 | 133.6 | 131.1 | | |
| Wt Water | 37.6 | 53.7 | 52 | | |
| Wt Tare | 4.2 | 4.2 | 4.2 | | |
| Wt Dry Sample | 102.5 | 129.4 | 126.9 | | |
| **Moisture Content (%)** | **37** | **41** | **41** | | |

| Hole No. | **8** | **8** | **8** | **8** | **8** |
|---|---|---|---|---|---|
| Depth | 1ft | 2ft | 3ft | 4ft | 5ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 194.3 | 157.8 | 163.5 | 176.9 | 231.3 |
| Wt Dry Sample + Tare | 162.5 | 119.5 | 124.3 | 136.6 | 188.8 |
| Wt Water | 31.8 | 38.3 | 39.2 | 40.3 | 42.5 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 158.3 | 115.3 | 120.1 | 132.4 | 184.6 |
| **Moisture Content (%)** | **20** | **33** | **33** | **30** | **23** |

| Hole No. | **8** | **8** | **8** | | |
|---|---|---|---|---|---|
| Depth | 6ft | 7ft | 10ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 137.6 | 173.3 | 142.8 | | |
| Wt Dry Sample + Tare | 98.8 | 121.7 | 95.9 | | |
| Wt Water | 38.8 | 51.6 | 46.9 | | |
| Wt Tare | 4.2 | 4.2 | 4.2 | | |
| Wt Dry Sample | 94.6 | 117.5 | 91.7 | | |
| **Moisture Content (%)** | **41** | **44** | **51** | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO:** 1 | **PROJECT NO: 15-02-2** |
| **PROJECT: City of Wpg 2015 Alley** | **DATE SAMPLED: Jan. 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT:** S. Urbano | **DATE TESTED: Jan. 20, 2015** | **TESTED BY:** GP |

| Test Hole No. | **9** | **9** | **9** | **9** | **9** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 117.6 | 141.2 | 209.4 | 194.7 | 210.1 |
| Wt Dry Sample + Tare | 94.8 | 112 | 167.7 | 162.3 | 169 |
| Wt Water | 22.8 | 29.2 | 41.7 | 32.4 | 41.1 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 90.6 | 107.8 | 163.5 | 158.1 | 164.8 |
| **Moisture Content (%)** | **25** | **27** | **26** | **20** | **25** |

| Test Hole No. | **9** | **9** | **9** | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 150.6 | 153.4 | 156.7 | | |
| Wt Dry Sample + Tare | 110.3 | 108.1 | 107.8 | | |
| Wt Water | 40.3 | 45.3 | 48.9 | | |
| Wt Tare | 4.1 | 4.2 | 4.2 | | |
| Wt Dry Sample | 106.2 | 103.9 | 103.6 | | |
| **Moisture Content (%)** | **38** | **44** | **47** | | |

| Hole No. | **10** | **10** | **10** | **10** | **10** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 168.4 | 139.5 | 113.2 | 150.6 | 165 |
| Wt Dry Sample + Tare | 126.1 | 105 | 85.2 | 113.2 | 125.3 |
| Wt Water | 42.3 | 34.5 | 28 | 37.4 | 39.7 |
| Wt Tare | 4.2 | 4.1 | 4.1 | 4.2 | 4.2 |
| Wt Dry Sample | 121.9 | 100.9 | 81.1 | 109.0 | 121.1 |
| **Moisture Content (%)** | **35** | **34** | **35** | **34** | **33** |

| Hole No. | **10** | **10** | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 175.5 | 125.9 | | | |
| Wt Dry Sample + Tare | 134.8 | 96.9 | | | |
| Wt Water | 40.7 | 29 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 130.6 | 92.7 | | | |
| **Moisture Content (%)** | **31** | **31** | | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO:** 1 | **PROJECT NO: 15-02-2** |
| **PROJECT: City of Wpg 2015 Alley** | **DATE SAMPLED: Jan. 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT:** S. Urbano | **DATE TESTED: Jan. 20, 2015** | **TESTED BY:** GP |

| Test Hole No. | **11** | **11** | **11** | **11** | **11** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 165.1 | 135.4 | 118.3 | 167.9 | 183.7 |
| Wt Dry Sample + Tare | 129.4 | 102.5 | 92 | 132.4 | 141.5 |
| Wt Water | 35.7 | 32.9 | 26.3 | 35.5 | 42.2 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 125.2 | 98.3 | 87.8 | 128.2 | 137.3 |
| **Moisture Content (%)** | **29** | **33** | **30** | **28** | **31** |

| Test Hole No. | **11** | **11** | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 145.8 | 178.4 | | | |
| Wt Dry Sample + Tare | 113.1 | 138.3 | | | |
| Wt Water | 32.7 | 40.1 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 108.9 | 134.1 | | | |
| **Moisture Content (%)** | **30** | **30** | | | |

| Hole No. | **12** | **12** | **12** | **12** | **12** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 168.2 | 125.2 | 131.3 | 157.4 | 143.1 |
| Wt Dry Sample + Tare | 132.8 | 94.2 | 97.6 | 117.5 | 109.9 |
| Wt Water | 35.4 | 31 | 33.7 | 39.9 | 33.2 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.1 | 4.2 |
| Wt Dry Sample | 128.6 | 90.0 | 93.4 | 113.4 | 105.7 |
| **Moisture Content (%)** | **28** | **34** | **36** | **35** | **31** |

| Hole No. | **12** | **12** | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 159.2 | 182.3 | | | |
| Wt Dry Sample + Tare | 123.1 | 142 | | | |
| Wt Water | 36.1 | 40.3 | | | |
| Wt Tare | 4.2 | 4.1 | | | |
| Wt Dry Sample | 118.9 | 137.9 | | | |
| **Moisture Content (%)** | **30** | **29** | | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO:** 1 | **PROJECT NO: 15-02-2** |
| **PROJECT: City of Wpg 2015 Alley** | **DATE SAMPLED: Jan. 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT:** S. Urbano | **DATE TESTED: Jan. 20, 2015** | **TESTED BY:** GP |

| Test Hole No. | **13** | **13** | **13** | **13** | **13** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 218.7 | 157.8 | 137.7 | 167.3 | 181.1 |
| Wt Dry Sample + Tare | 201.6 | 120.9 | 106.1 | 129.3 | 139.3 |
| Wt Water | 17.1 | 36.9 | 31.6 | 38 | 41.8 |
| Wt Tare | 4.1 | 4.2 | 4.2 | 4.2 | 4.1 |
| Wt Dry Sample | 197.5 | 116.7 | 101.9 | 125.1 | 135.2 |
| **Moisture Content (%)** | **9** | **32** | **31** | **30** | **31** |

| Test Hole No. | **13** | **13** | **13** | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 174.5 | 153.8 | 142.2 | | |
| Wt Dry Sample + Tare | 138.8 | 125.1 | 107.7 | | |
| Wt Water | 35.7 | 28.7 | 34.5 | | |
| Wt Tare | 4.2 | 4.2 | 4.2 | | |
| Wt Dry Sample | 134.6 | 120.9 | 103.5 | | |
| **Moisture Content (%)** | **27** | **24** | **33** | | |

| Hole No. | **14** | **14** | **14** | **14** | **14** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 130.8 | 138.4 | 119.7 | 138.6 | 177.5 |
| Wt Dry Sample + Tare | 99.3 | 105.1 | 92.1 | 106.7 | 136.8 |
| Wt Water | 31.5 | 33.3 | 27.6 | 31.9 | 40.7 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 |
| Wt Dry Sample | 95.1 | 100.9 | 87.9 | 102.6 | 132.7 |
| **Moisture Content (%)** | **33** | **33** | **31** | **31** | **31** |

| Hole No. | **14** | **14** | **14** | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 158.2 | 154.9 | 154 | | |
| Wt Dry Sample + Tare | 119.5 | 122.6 | 125 | | |
| Wt Water | 38.7 | 32.3 | 29 | | |
| Wt Tare | 4.1 | 4.2 | 4.1 | | |
| Wt Dry Sample | 115.4 | 118.4 | 120.9 | | |
| **Moisture Content (%)** | **34** | **27** | **24** | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO:** 1 | **PROJECT NO: 15-02-2** |
| **PROJECT: City of Wpg 2015 Alley** | **DATE SAMPLED: Jan. 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT:** S. Urbano | **DATE TESTED: Jan. 20, 2015** | **TESTED BY:** GP |

| Test Hole No. | **15** | **15** | **15** | **15** | **15** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 174.9 | 124.9 | 135.3 | 158.1 | 162.2 |
| Wt Dry Sample + Tare | 161.7 | 92.9 | 100.8 | 121.4 | 125 |
| Wt Water | 13.2 | 32 | 34.5 | 36.7 | 37.2 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 157.5 | 88.7 | 96.6 | 117.2 | 120.8 |
| **Moisture Content (%)** | **8** | **36** | **36** | **31** | **31** |

| Test Hole No. | **15** | **15** | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 141.9 | 153.5 | | | |
| Wt Dry Sample + Tare | 107.8 | 114.6 | | | |
| Wt Water | 34.1 | 38.9 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 103.6 | 110.4 | | | |
| **Moisture Content (%)** | **33** | **35** | | | |

| Hole No. | **16** | **16** | **16** | **16** | **16** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 180.9 | 134.3 | 150.9 | 162.1 | 174.1 |
| Wt Dry Sample + Tare | 165.9 | 103.5 | 118 | 128.1 | 137.8 |
| Wt Water | 15 | 30.8 | 32.9 | 34 | 36.3 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 161.7 | 99.3 | 113.8 | 123.9 | 133.6 |
| **Moisture Content (%)** | **9** | **31** | **29** | **27** | **27** |

| Hole No. | **16** | **16** | **16** | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 189.6 | 194.3 | 153.6 | | |
| Wt Dry Sample + Tare | 155.4 | 159 | 114.9 | | |
| Wt Water | 34.2 | 35.3 | 38.7 | | |
| Wt Tare | 4.2 | 4.2 | 4.2 | | |
| Wt Dry Sample | 151.2 | 154.8 | 110.7 | | |
| **Moisture Content (%)** | **23** | **23** | **35** | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO:** 1 | **PROJECT NO: 15-02-2** |
| **PROJECT: City of Wpg 2015 Alley** | **DATE SAMPLED: Jan. 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT:** S. Urbano | **DATE TESTED: Jan. 21, 2015** | **TESTED BY:** GP |

| Test Hole No. | **17** | **17** | **17** | **17** | **17** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 203.6 | 121.4 | 160.4 | 161.8 | 193.1 |
| Wt Dry Sample + Tare | 187.3 | 90.9 | 119.2 | 121 | 146.3 |
| Wt Water | 16.3 | 30.5 | 41.2 | 40.8 | 46.8 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 183.1 | 86.7 | 115.0 | 116.8 | 142.1 |
| **Moisture Content (%)** | **9** | **35** | **36** | **35** | **33** |

| Test Hole No. | **17** | **17** | **17** | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 189.1 | 142.7 | 196.8 | | |
| Wt Dry Sample + Tare | 153.2 | 106.6 | 158.2 | | |
| Wt Water | 35.9 | 36.1 | 38.6 | | |
| Wt Tare | 4.2 | 4.2 | 4.2 | | |
| Wt Dry Sample | 149.0 | 102.4 | 154.0 | | |
| **Moisture Content (%)** | **24** | **35** | **25** | | |

| Hole No. | **18** | **18** | **18** | **18** | **18** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 177.1 | 159.7 | 127.3 | 159.3 | 195.7 |
| Wt Dry Sample + Tare | 161.4 | 119.8 | 94.2 | 118.5 | 152.7 |
| Wt Water | 15.7 | 39.9 | 33.1 | 40.8 | 43 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 157.2 | 115.6 | 90.0 | 114.3 | 148.5 |
| **Moisture Content (%)** | **10** | **35** | **37** | **36** | **29** |

| Hole No. | **18** | **18** | **18** | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 180.6 | 190.9 | 195.4 | | |
| Wt Dry Sample + Tare | 141.2 | 153.1 | 141.5 | | |
| Wt Water | 39.4 | 37.8 | 53.9 | | |
| Wt Tare | 4.2 | 4.2 | 4.2 | | |
| Wt Dry Sample | 137.0 | 148.9 | 137.3 | | |
| **Moisture Content (%)** | **29** | **25** | **39** | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO: 1** | **PROJECT NO: 15-02-19 & 20** |
| **PROJECT: City of Wpg 2015 Alleys** | **DATE SAMPLED: Jan. 29, 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT: S. Urbano** | **DATE TESTED: February 4, 2015** | **TESTED BY: GP** |

| Test Hole No. | 19 | 19 | 19 | 19 | 19 |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 267.5 | 155.6 | 157.3 | 178.7 | 182.6 |
| Wt Dry Sample + Tare | 249.1 | 121.5 | 114.3 | 130.2 | 142.6 |
| Wt Water | 18.4 | 34.1 | 43 | 48.5 | 40 |
| Wt Tare | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Wt Dry Sample | 245.0 | 117.4 | 110.2 | 126.1 | 138.5 |
| **Moisture Content (%)** | **8** | **29** | **39** | **38** | **29** |
| Test Hole No. | **19** | **19** | | | |
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 256.4 | 169.4 | | | |
| Wt Dry Sample + Tare | 207.9 | 120.7 | | | |
| Wt Water | 48.5 | 48.7 | | | |
| Wt Tare | 4.1 | 4.1 | | | |
| Wt Dry Sample | 203.8 | 116.6 | | | |
| **Moisture Content (%)** | **24** | **42** | | | |
| Test Hole No. | **20** | **20** | **20** | **20** | **20** |
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 202.3 | 183.8 | 169.6 | 178.6 | 178.2 |
| Wt Dry Sample + Tare | 192.9 | 144.7 | 120.7 | 127.9 | 133.1 |
| Wt Water | 9.4 | 39.1 | 48.9 | 50.7 | 45.1 |
| Wt Tare | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Wt Dry Sample | 188.8 | 140.6 | 116.6 | 123.8 | 129.0 |
| **Moisture Content (%)** | **5** | **28** | **42** | **41** | **35** |
| Test Hole No. | **20** | **20** | | | |
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 233.5 | 162.6 | | | |
| Wt Dry Sample + Tare | 179.3 | 117.4 | | | |
| Wt Water | 54.2 | 45.2 | | | |
| Wt Tare | 4.1 | 4.1 | | | |
| Wt Dry Sample | 175.2 | 113.3 | | | |
| **Moisture Content (%)** | **31** | **40** | | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO: 1** | **PROJECT NO: 15-02-21 & 22** |
| **PROJECT: City of Wpg 2015 Alleys** | **DATE SAMPLED: Jan. 29, 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT: S. Urbano** | **DATE TESTED: February 4, 2015** | **TESTED BY: GP** |

| Test Hole No. | 21 | 21 | 21 | 21 | 21 |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 193.8 | 174.3 | 196.8 | 221.9 | 237.9 |
| Wt Dry Sample + Tare | 158.1 | 128.9 | 154.1 | 181.8 | 194.2 |
| Wt Water | 35.7 | 45.4 | 42.7 | 40.1 | 43.7 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 153.9 | 124.7 | 149.9 | 177.6 | 190.0 |
| **Moisture Content (%)** | **23** | **36** | **28** | **23** | **23** |

| Test Hole No. | 21 | 21 | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 162.5 | 204.1 | | | |
| Wt Dry Sample + Tare | 116.6 | 153 | | | |
| Wt Water | 45.9 | 51.1 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 112.4 | 148.8 | | | |
| **Moisture Content (%)** | **41** | **34** | | | |

| Test Hole No. | 22 | 22 | 22 | 22 | 22 |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 219.3 | 154.4 | 159.8 | 208.8 | 183.1 |
| Wt Dry Sample + Tare | 193.8 | 118.9 | 117.7 | 155.3 | 140.8 |
| Wt Water | 25.5 | 35.5 | 42.1 | 53.5 | 42.3 |
| Wt Tare | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| Wt Dry Sample | 189.7 | 114.8 | 113.6 | 151.2 | 136.7 |
| **Moisture Content (%)** | **13** | **31** | **37** | **35** | **31** |

| Test Hole No. | 22 | 22 | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 225.5 | 180.6 | | | |
| Wt Dry Sample + Tare | 174 | 130.6 | | | |
| Wt Water | 51.5 | 50 | | | |
| Wt Tare | 4.1 | 4.1 | | | |
| Wt Dry Sample | 169.9 | 126.5 | | | |
| **Moisture Content (%)** | **30** | **40** | | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO: 1** | **PROJECT NO: 15-04-1&2** |
| **PROJECT: City of Wpg 2015 Alleys** | **DATE SAMPLED: Jan. 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT: S. Urbano** | **DATE TESTED: Jan. 26, 2015** | **TESTED BY: GP** |

| Test Hole No. | **31** | **31** | **31** | **31** | **31** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 209.9 | 175.4 | 180.8 | 165.9 | 177.1 |
| Wt Dry Sample + Tare | 197.7 | 140.5 | 136.1 | 126.7 | 135.5 |
| Wt Water | 12.2 | 34.9 | 44.7 | 39.2 | 41.6 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 193.5 | 136.3 | 131.9 | 122.5 | 131.3 |
| **Moisture Content (%)** | **6** | **26** | **34** | **32** | **32** |

| Test Hole No. | **31** | **31** | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 147.4 | 150.3 | | | |
| Wt Dry Sample + Tare | 112.4 | 112.7 | | | |
| Wt Water | 35 | 37.6 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 108.2 | 108.5 | | | |
| **Moisture Content (%)** | **32** | **35** | | | |

| Test Hole No. | **32** | **32** | **32** | **32** | **32** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 218.3 | 154.3 | 142.3 | 185.6 | 135.9 |
| Wt Dry Sample + Tare | 203.4 | 118.8 | 107.4 | 139.9 | 103 |
| Wt Water | 14.9 | 35.5 | 34.9 | 45.7 | 32.9 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 199.2 | 114.6 | 103.2 | 135.7 | 98.8 |
| **Moisture Content (%)** | **7** | **31** | **34** | **34** | **33** |

| Test Hole No. | **32** | **32** | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 150.2 | 129.6 | | | |
| Wt Dry Sample + Tare | 112.7 | 95.1 | | | |
| Wt Water | 37.5 | 34.5 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 108.5 | 90.9 | | | |
| **Moisture Content (%)** | **35** | **38** | | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO: 1** | **PROJECT NO: 15-04-3&4** |
| **PROJECT: City of Wpg 2015 Alleys** | **DATE SAMPLED: Jan. 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT: S. Urbano** | **DATE TESTED: Jan. 26, 2015** | **TESTED BY: GP** |

| | | | | | |
|---|---|---|---|---|---|
| Test Hole No. | **33** | **33** | **33** | **33** | **33** |
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 198.7 | 197.9 | 142.5 | 142.7 | 140.3 |
| Wt Dry Sample + Tare | 183.8 | 160.5 | 108 | 108.6 | 106.7 |
| Wt Water | 14.9 | 37.4 | 34.5 | 34.1 | 33.6 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 179.6 | 156.3 | 103.8 | 104.4 | 102.5 |
| **Moisture Content (%)** | **8** | **24** | **33** | **33** | **33** |
| Test Hole No. | **33** | **33** | | | |
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 149.5 | 152.3 | | | |
| Wt Dry Sample + Tare | 114.1 | 116.4 | | | |
| Wt Water | 35.4 | 35.9 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 109.9 | 112.2 | | | |
| **Moisture Content (%)** | **32** | **32** | | | |
| Test Hole No. | **34** | **34** | **34** | **34** | **34** |
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 198.6 | 198.7 | 122.9 | 163.8 | 132.8 |
| Wt Dry Sample + Tare | 182.9 | 157.1 | 92.4 | 136.3 | 102.2 |
| Wt Water | 15.7 | 41.6 | 30.5 | 27.5 | 30.6 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 178.7 | 152.9 | 88.2 | 132.1 | 98.0 |
| **Moisture Content (%)** | **9** | **27** | **35** | **21** | **31** |
| Test Hole No. | **34** | **34** | **34** | | |
| Depth | 6 ft | 7 ft | 10 ft | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 181.9 | 165.4 | 134.3 | | |
| Wt Dry Sample + Tare | 145.9 | 133.7 | 96.6 | | |
| Wt Water | 36 | 31.7 | 37.7 | | |
| Wt Tare | 4.2 | 4.2 | 4.2 | | |
| Wt Dry Sample | 141.7 | 129.5 | 92.4 | | |
| **Moisture Content (%)** | **25** | **24** | **41** | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT: WSP Group** | **TEST NO: 1** | **PROJECT NO: 15-04-13&14** |
| **PROJECT: City of Wpg 2015 Alleys** | **DATE SAMPLED: Jan. 2015** | **SAMPLED BY: SU** |
| **PROJECT CONTACT: S. Urbano** | **DATE TESTED: Jan. 28, 2015** | **TESTED BY: GP** |

| Test Hole No. | **43** | **43** | **43** | **43** | **43** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 165.4 | 175.5 | 149.7 | 174.1 | 177.4 |
| Wt Dry Sample + Tare | 128.9 | 135.9 | 115.7 | 134.2 | 136.1 |
| Wt Water | 36.5 | 39.6 | 34 | 39.9 | 41.3 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 124.7 | 131.7 | 111.5 | 130.0 | 131.9 |
| **Moisture Content (%)** | **29** | **30** | **30** | **31** | **31** |

| Test Hole No. | **43** | **43** | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 167.3 | 146.7 | | | |
| Wt Dry Sample + Tare | 127.8 | 111.6 | | | |
| Wt Water | 39.5 | 35.1 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 123.6 | 107.4 | | | |
| **Moisture Content (%)** | **32** | **33** | | | |

| Test Hole No. | **44** | **44** | **44** | **44** | **44** |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 243.9 | 150.3 | 163.5 | 145.6 | 167.7 |
| Wt Dry Sample + Tare | 232.4 | 117.1 | 124.5 | 110.5 | 128.5 |
| Wt Water | 11.5 | 33.2 | 39 | 35.1 | 39.2 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 228.2 | 112.9 | 120.3 | 106.3 | 124.3 |
| **Moisture Content (%)** | **5** | **29** | **32** | **33** | **32** |

| Test Hole No. | **44** | **44** | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 147.5 | 159.8 | | | |
| Wt Dry Sample + Tare | 114.3 | 123 | | | |
| Wt Water | 33.2 | 36.8 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 110.1 | 118.8 | | | |
| **Moisture Content (%)** | **30** | **31** | | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT:** WSP Group | **TEST NO:** 1 | **PROJECT NO:** 15-02-5 |
| **PROJECT:** City of Winnipeg 2015 Alleys | **DATE SAMPLED:** Feb. 23, 2015 | **SAMPLED BY:** SU |
| **PROJECT CONTACT:** S. Urbano | **DATE TESTED:** Feb. 26, 2015 | **TESTED BY:** GP |

| Test Hole No. | 62 | 62 | 62 | 62 | 62 |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 207.8 | 176.9 | 170.9 | 181.4 | 182.6 |
| Wt Dry Sample + Tare | 178.9 | 125.1 | 128.4 | 138.1 | 137.5 |
| Wt Water | 28.9 | 51.8 | 42.5 | 43.3 | 45.1 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 174.7 | 120.9 | 124.2 | 133.9 | 133.3 |
| **Moisture Content (%)** | **17** | **43** | **34** | **32** | **34** |

| Test Hole No. | 62 | 62 | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 201.7 | 156.5 | | | |
| Wt Dry Sample + Tare | 152.5 | 111.8 | | | |
| Wt Water | 49.2 | 44.7 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 148.3 | 107.6 | | | |
| **Moisture Content (%)** | **33** | **42** | | | |

| Hole No. | 63 | 63 | 63 | 63 | 63 |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 192.7 | 201.5 | 180.4 | 157.8 | 163.5 |
| Wt Dry Sample + Tare | 179.3 | 181.2 | 133.7 | 116.9 | 119.4 |
| Wt Water | 13.4 | 20.3 | 46.7 | 40.9 | 44.1 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 175.1 | 177.0 | 129.5 | 112.7 | 115.2 |
| **Moisture Content (%)** | **8** | **11** | **36** | **36** | **38** |

| Hole No. | 63 | 63 | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 178.2 | 168.3 | | | |
| Wt Dry Sample + Tare | 132.4 | 124.9 | | | |
| Wt Water | 45.8 | 43.4 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 128.2 | 120.7 | | | |
| **Moisture Content (%)** | **36** | **36** | | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT:** WSP Group | **TEST NO:** 1 | **PROJECT NO:** 15-02-5 |
| **PROJECT:** City of Winnipeg 2015 Alleys | **DATE SAMPLED:** Feb. 23, 2015 | **SAMPLED BY:** SU |
| **PROJECT CONTACT:** S. Urbano | **DATE TESTED:** Feb. 26, 2015 | **TESTED BY:** GP |

| Test Hole No. | 64 | 64 | 64 | 64 | 64 |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 140.4 | 116.7 | 159 | 135.1 | 172.2 |
| Wt Dry Sample + Tare | 130.4 | 87.5 | 117.6 | 97.9 | 126.8 |
| Wt Water | 10 | 29.2 | 41.4 | 37.2 | 45.4 |
| Wt Tare | 4.7 | 4.7 | 4.4 | 4.3 | 4.7 |
| Wt Dry Sample | 125.7 | 82.8 | 113.2 | 93.6 | 122.1 |
| **Moisture Content (%)** | **8** | **35** | **37** | **40** | **37** |

| Test Hole No. | 64 | 64 | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 176.9 | 200.7 | | | |
| Wt Dry Sample + Tare | 138.6 | 154.3 | | | |
| Wt Water | 38.3 | 46.4 | | | |
| Wt Tare | 4.3 | 4.7 | | | |
| Wt Dry Sample | 134.3 | 149.6 | | | |
| **Moisture Content (%)** | **29** | **31** | | | |

| Hole No. | 65 | 65 | 65 | 65 | 65 |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 207.8 | 160.8 | 156.7 | 172.5 | 163.5 |
| Wt Dry Sample + Tare | 188.1 | 122.3 | 110 | 125.8 | 129.6 |
| Wt Water | 19.7 | 38.5 | 46.7 | 46.7 | 33.9 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 183.9 | 118.1 | 105.8 | 121.6 | 125.4 |
| **Moisture Content (%)** | **11** | **33** | **44** | **38** | **27** |

| Hole No. | 65 | 65 | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 214.8 | 194.1 | | | |
| Wt Dry Sample + Tare | 174 | 153.8 | | | |
| Wt Water | 40.8 | 40.3 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 169.8 | 149.6 | | | |
| **Moisture Content (%)** | **24** | **27** | | | |

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# MOISTURE CONTENT OF SOIL

## ASTM D2216

| | | |
|---|---|---|
| **CLIENT:** WSP Group | **TEST NO:** 1 | **PROJECT NO:** 15-02-5 |
| **PROJECT:** City of Winnipeg 2015 Alleys | **DATE SAMPLED:** Feb. 23, 2015 | **SAMPLED BY:** SU |
| **PROJECT CONTACT:** S. Urbano | **DATE TESTED:** Feb. 26, 2015 | **TESTED BY:** GP |

| Test Hole No. | 66 | 66 | 66 | 66 | 66 |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 175.5 | 148 | 129 | 200.4 | 180.9 |
| Wt Dry Sample + Tare | 161.1 | 119.2 | 96.9 | 151.3 | 136.8 |
| Wt Water | 14.4 | 28.8 | 32.1 | 49.1 | 44.1 |
| Wt Tare | 4.6 | 4.5 | 4.6 | 4.6 | 4.6 |
| Wt Dry Sample | 156.5 | 114.7 | 92.3 | 146.7 | 132.2 |
| **Moisture Content (%)** | **9** | **25** | **35** | **33** | **33** |

| Test Hole No. | 66 | 66 | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 210.2 | 221.9 | | | |
| Wt Dry Sample + Tare | 166.3 | 179.7 | | | |
| Wt Water | 43.9 | 42.2 | | | |
| Wt Tare | 4.5 | 4.5 | | | |
| Wt Dry Sample | 161.8 | 175.2 | | | |
| **Moisture Content (%)** | **27** | **24** | | | |

| Hole No. | 67 | 67 | 67 | 67 | 67 |
|---|---|---|---|---|---|
| Depth | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 222.1 | 210.7 | 157.4 | 160.9 | 150.3 |
| Wt Dry Sample + Tare | 213.6 | 195.8 | 117.1 | 120.4 | 113.9 |
| Wt Water | 8.5 | 14.9 | 40.3 | 40.5 | 36.4 |
| Wt Tare | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Wt Dry Sample | 209.4 | 191.6 | 112.9 | 116.2 | 109.7 |
| **Moisture Content (%)** | **4** | **8** | **36** | **35** | **33** |

| Hole No. | 67 | 67 | | | |
|---|---|---|---|---|---|
| Depth | 6 ft | 7 ft | | | |
| Tare No. | | | | | |
| Wt Wet Sample + Tare | 229.3 | 205.1 | | | |
| Wt Dry Sample + Tare | 187.2 | 166.7 | | | |
| Wt Water | 42.1 | 38.4 | | | |
| Wt Tare | 4.2 | 4.2 | | | |
| Wt Dry Sample | 183.0 | 162.5 | | | |
| **Moisture Content (%)** | **23** | **24** | | | |

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# PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

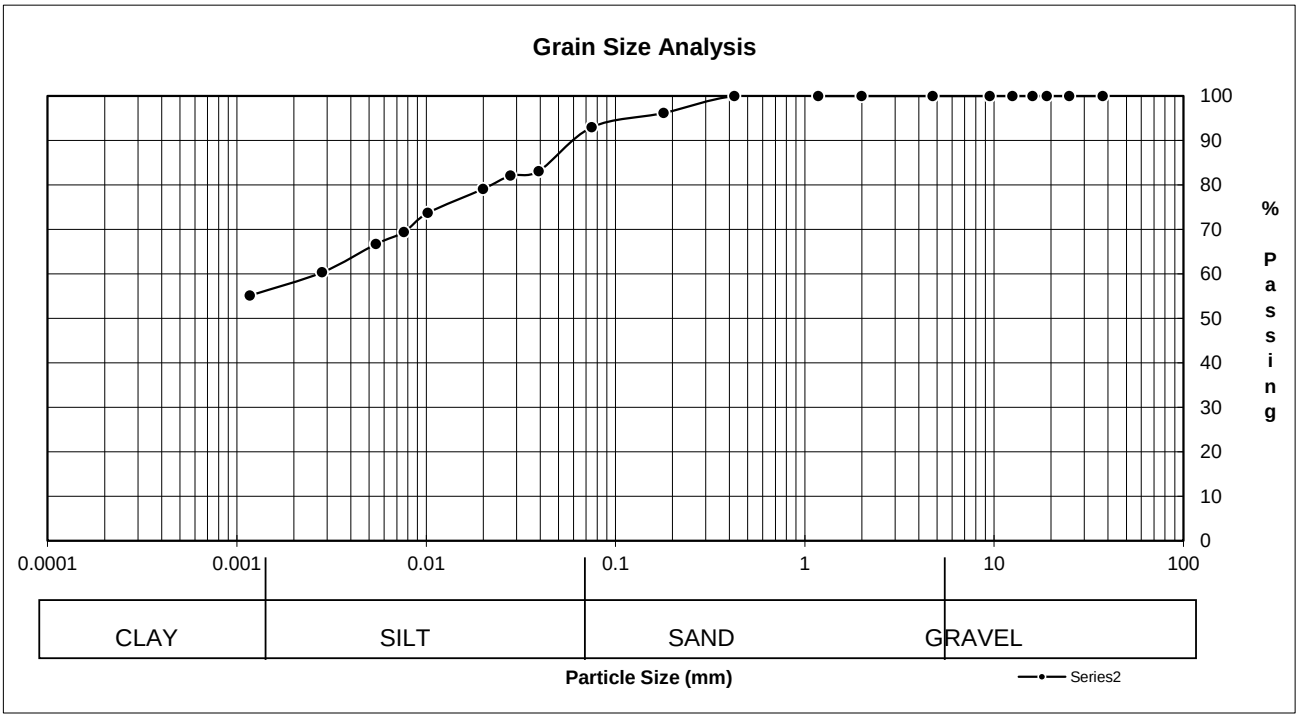
CLIENT: WSP Canada
1600 Buffalo Place
Winnipeg, MB R3T 6B8
ATTN:
PROJECT: COW Alley Renewal

PROJECT NO.

Date Sampled: unknown Date Received: Jan/Feb/15
Sampled By: Client Date Tested: 16-Mar-15

**Material Identification**
B.H./T.H. No. **TH5 @ 2'**
**Sample No.** **1**
Sample Source
Specific Gravity of Material: 2.65

| Sieve Analysis | | Hydrometer Analysis | |
|---|---|---|---|
| Sieve (mm) | % Passing | Diameter | % Finer |
| 50.00 | 100.0 | | |
| 37.50 | 100.0 | | |
| 25.00 | 100.0 | | |
| 19.00 | 100.0 | | |
| 16.00 | 100.0 | | |
| 12.50 | 100.0 | 0.0393 | 83.1 |
| 9.50 | 100.0 | 0.0279 | 82.1 |
| 4.75 | 100.0 | 0.0200 | 79.1 |
| 2.00 | 100.0 | 0.0102 | 73.7 |
| 1.18 | 100.0 | 0.0076 | 69.4 |
| 0.425 | 100.0 | 0.0054 | 66.7 |
| 0.180 | 96.2 | 0.0028 | 60.4 |
| 0.075 | 93.0 | 0.0012 | 55.1 |




| SOIL DESCRIPTION | % Composition | | D10 | |
|---|---|---|---|---|
| | | Gravel | D30 | 0.00129 |
| | 7 | Sand | D60 | 0.02176 |
| The sample tested can be classified as silty clay. | 38 | Silt | Cu | #DIV/0! |
| | 55 | Clay | Cc | #DIV/0! |

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM

REVIEWED BY: Hermie Manalo

**H. MANALO CONSULTING LTD.**
1402 NOTRE DAME AVENUE, WINNIPEG, MB R3E 3G5
PHONE: 204 697 3854 CELL: 204 997-1355
hmanalo@mts.net

# PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

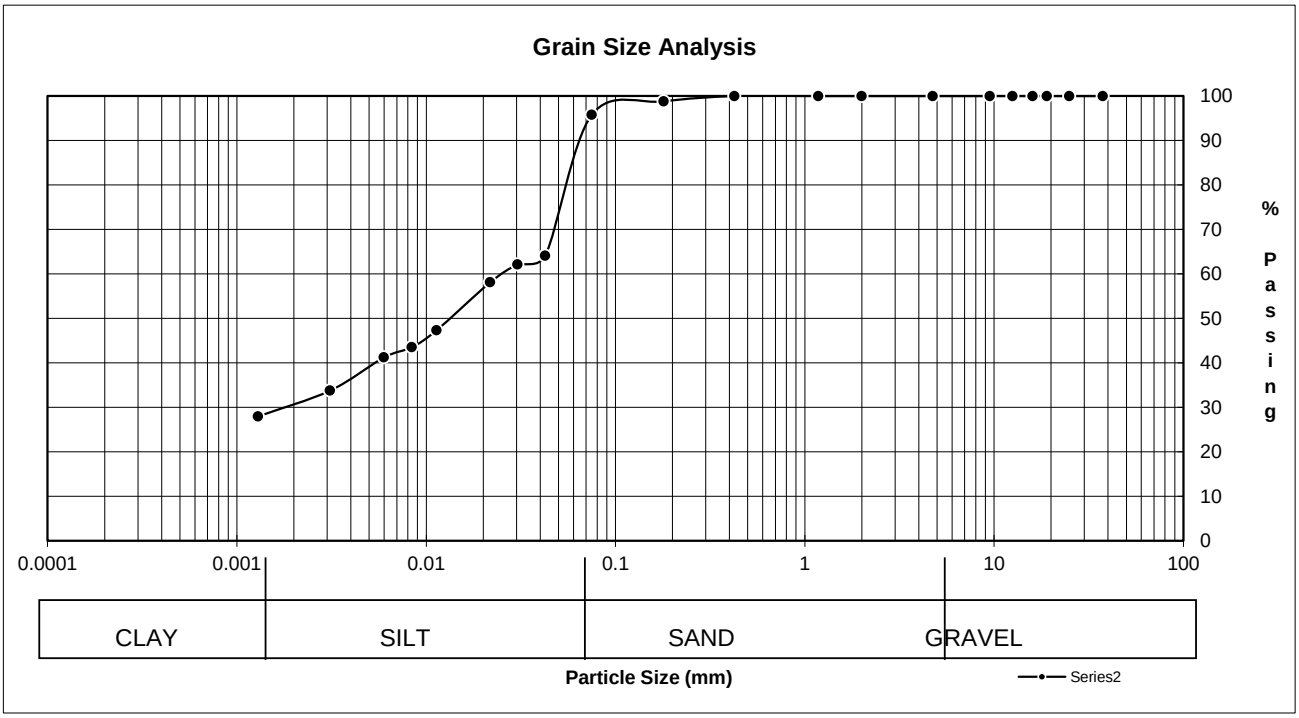
CLIENT: WSP Canada
1600 Buffalo Place
Winnipeg, MB R3T 6B8
ATTN:
PROJECT: COW Alley Renewal

PROJECT NO.

Date Sampled: unknown Date Received: Jan/Feb/15
Sampled By: Client Date Tested: 16-Mar-15

**Material Identification**
B.H./T.H. No. **TH9 @ 3'**
**Sample No.** **2**
Sample Source
Specific Gravity of Material: 2.65

| Sieve Analysis | | Hydrometer Analysis | |
|---|---|---|---|
| Sieve (mm) | % Passing | Diameter | % Finer |
| 50.00 | 100.0 | | |
| 37.50 | 100.0 | | |
| 25.00 | 100.0 | | |
| 19.00 | 100.0 | | |
| 16.00 | 100.0 | | |
| 12.50 | 100.0 | 0.0425 | 64.1 |
| 9.50 | 100.0 | 0.0303 | 62.1 |
| 4.75 | 100.0 | 0.0218 | 58.1 |
| 2.00 | 100.0 | 0.0113 | 47.3 |
| 1.18 | 100.0 | 0.0084 | 43.5 |
| 0.425 | 100.0 | 0.0060 | 41.2 |
| 0.180 | 98.8 | 0.0031 | 33.8 |
| 0.075 | 95.8 | 0.0013 | 28.0 |




| SOIL DESCRIPTION | % Composition | | D10 | |
|---|---|---|---|---|
| | | Gravel | D30 | 0.00129 |
| The sample tested can be classified as silty clay loam. | 4 | Sand | D60 | 0.02176 |
| | 68 | Silt | Cu | #DIV/0! |
| | 28 | Clay | Cc | #DIV/0! |

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM

REVIEWED BY: Hermie Manalo

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# PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

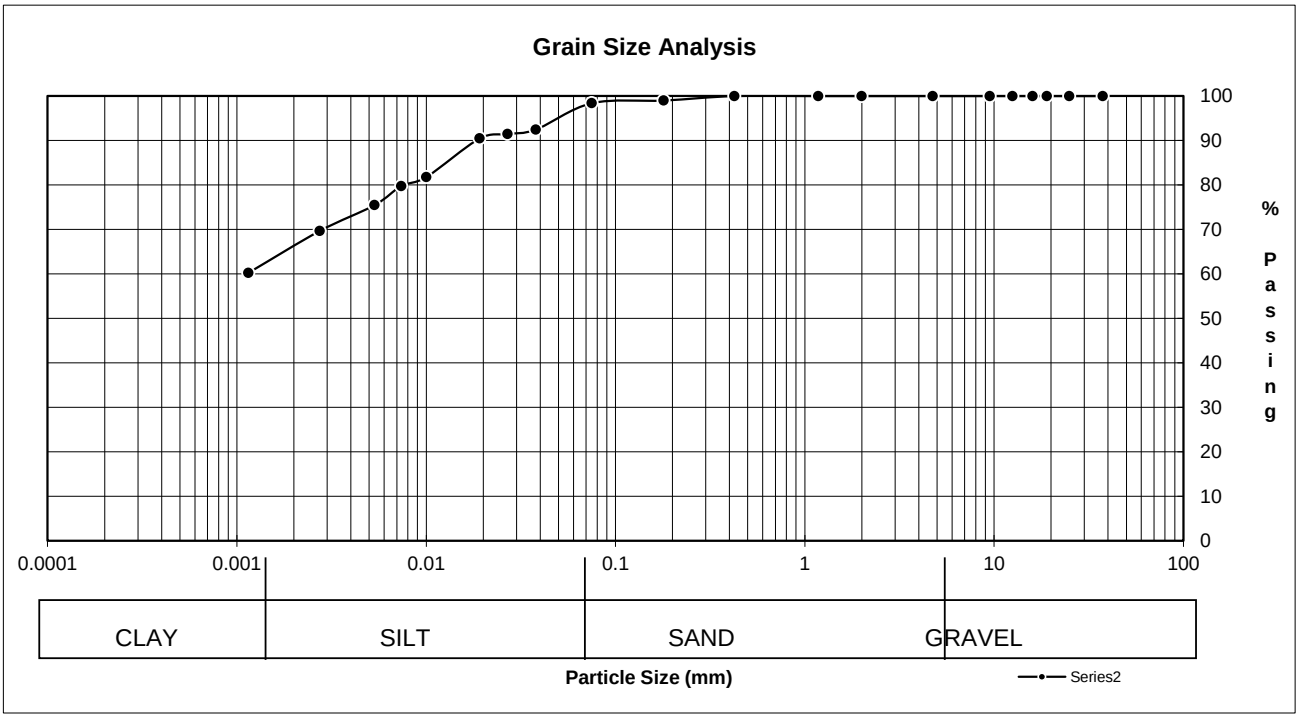
CLIENT: WSP Canada
1600 Buffalo Place
Winnipeg, MB R3T 6B8
ATTN:
PROJECT: COW Alley Renewal

PROJECT NO.

Date Sampled: unknown Date Received: Jan/Feb/15
Sampled By: Client Date Tested: 16-Mar-15

**Material Identification**
B.H./T.H. No. **TH13 @ 2'**
**Sample No.** **12**
Sample Source
Specific Gravity of Material: 2.65

| Sieve Analysis | | Hydrometer Analysis | |
|---|---|---|---|
| Sieve (mm) | % Passing | Diameter | % Finer |
| 50.00 | 100.0 | | |
| 37.50 | 100.0 | | |
| 25.00 | 100.0 | | |
| 19.00 | 100.0 | | |
| 16.00 | 100.0 | | |
| 12.50 | 100.0 | 0.0379 | 92.5 |
| 9.50 | 100.0 | 0.0269 | 91.5 |
| 4.75 | 100.0 | 0.0191 | 90.5 |
| 2.00 | 100.0 | 0.0100 | 81.8 |
| 1.18 | 100.0 | 0.0074 | 79.8 |
| 0.425 | 100.0 | 0.0053 | 75.5 |
| 0.180 | 99.0 | 0.0027 | 69.7 |
| 0.075 | 98.4 | 0.0012 | 60.3 |




| SOIL DESCRIPTION | % Composition | | D10 | |
|---|---|---|---|---|
| | | Gravel | D30 | |
| The sample tested can be classified as silty clay. | 2 | Sand | D60 | 0.00115 |
| | 38 | Silt | Cu | #DIV/0! |
| | 60 | Clay | Cc | #DIV/0! |

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM

REVIEWED BY: Hermie Manalo

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# PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

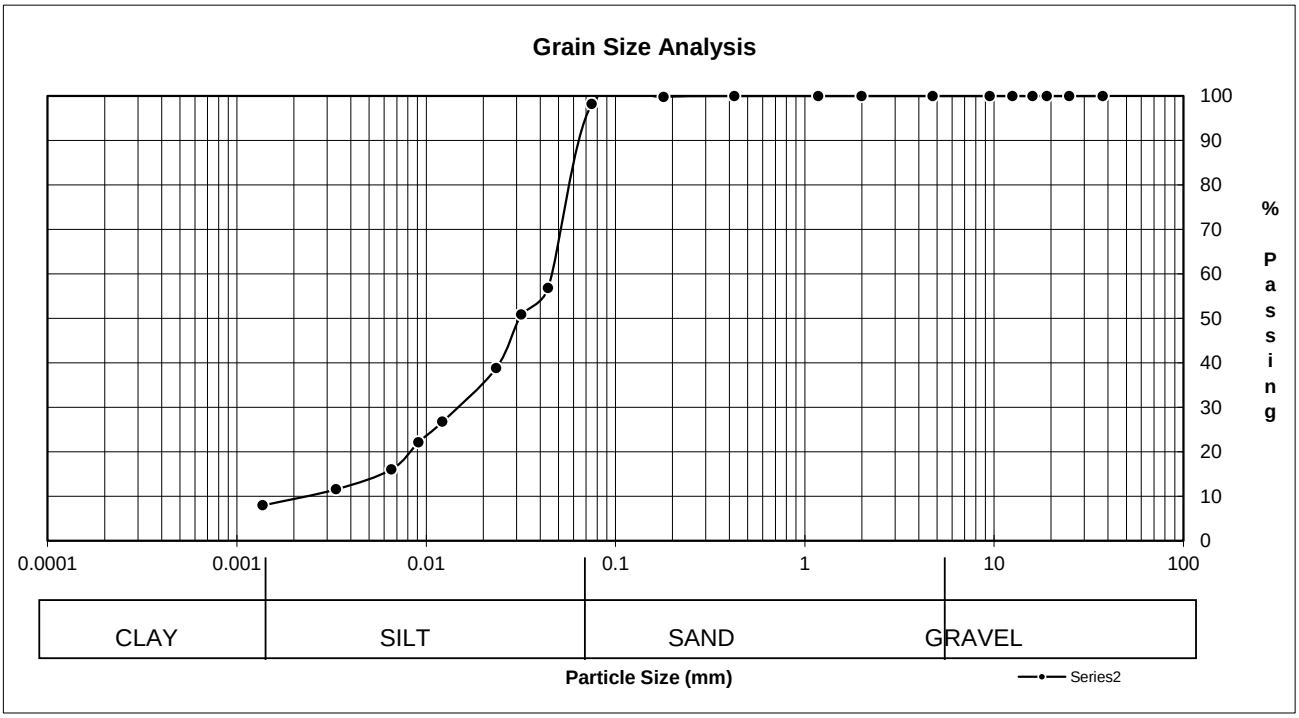
CLIENT: WSP Canada
1600 Buffalo Place
Winnipeg, MB R3T 6B8
ATTN:
PROJECT: COW Alley Renewal

PROJECT NO.

Date Sampled: unknown Date Received: Jan/Feb/15
Sampled By: Client Date Tested: 16-Mar-15

**Material Identification**
B.H./T.H. No. **TH13 @ 6'**
**Sample No.** **13**
Sample Source
Specific Gravity of Material: 2.65

| Sieve Analysis | | Hydrometer Analysis | |
|---|---|---|---|
| Sieve (mm) | % Passing | Diameter | % Finer |
| 50.00 | 100.0 | | |
| 37.50 | 100.0 | | |
| 25.00 | 100.0 | | |
| 19.00 | 100.0 | | |
| 16.00 | 100.0 | | |
| 12.50 | 100.0 | 0.0440 | 56.8 |
| 9.50 | 100.0 | 0.0318 | 50.8 |
| 4.75 | 100.0 | 0.0235 | 38.9 |
| 2.00 | 100.0 | 0.0122 | 26.8 |
| 1.18 | 100.0 | 0.0091 | 22.2 |
| 0.425 | 100.0 | 0.0066 | 16.1 |
| 0.180 | 99.8 | 0.0033 | 11.6 |
| 0.075 | 98.2 | 0.0014 | 8.0 |




| SOIL DESCRIPTION | % Composition | | D10 | |
|---|---|---|---|---|
| | | Gravel | D30 | |
| The sample tested can be classified as silt loam. | 2 | Sand | D60 | 0.00115 |
| | 90 | Silt | Cu | #DIV/0! |
| | 8 | Clay | Cc | #DIV/0! |

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM

REVIEWED BY: Hermie Manalo

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# PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

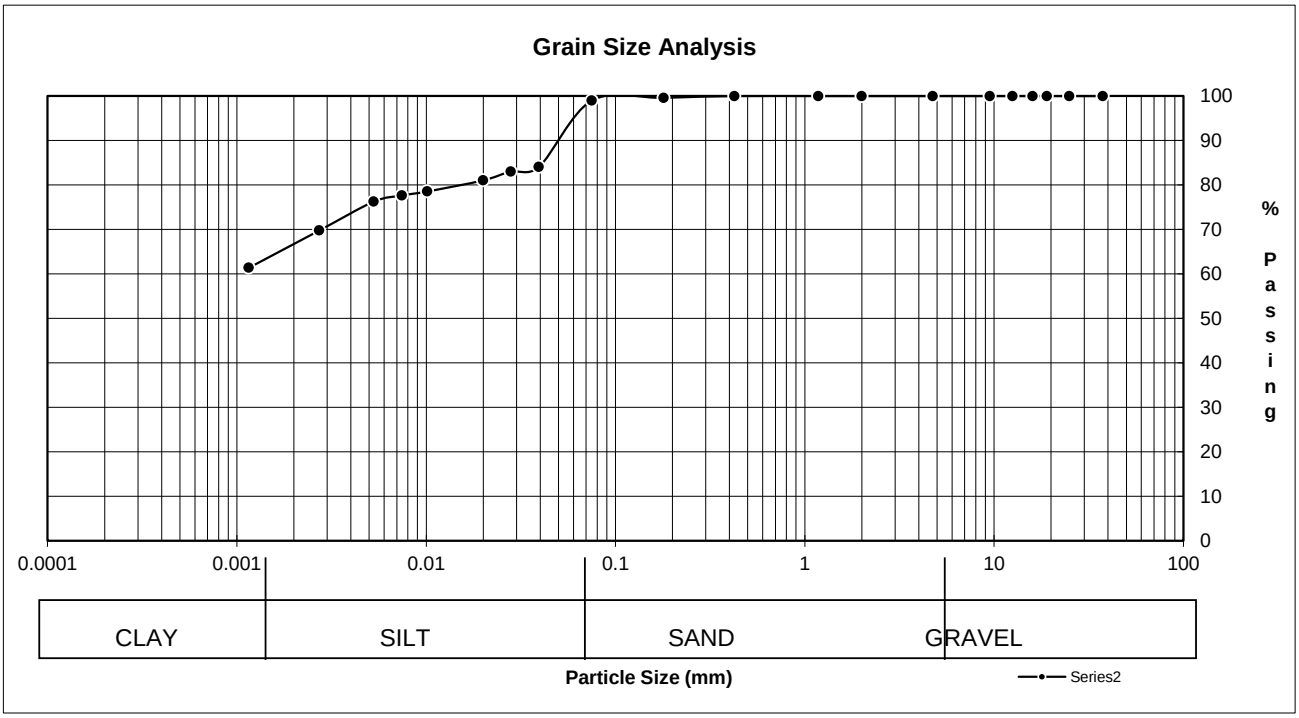
CLIENT: WSP Canada
1600 Buffalo Place
Winnipeg, MB R3T 6B8
ATTN:
PROJECT: COW Alley Renewal

PROJECT NO.

Date Sampled: unknown Date Received: Jan/Feb/15
Sampled By: Client Date Tested: 16-Mar-15

**Material Identification**
B.H./T.H. No. **TH19 @ 3'**
**Sample No.** **14**
Sample Source
Specific Gravity of Material: 2.65

| Sieve Analysis | | Hydrometer Analysis | |
|---|---|---|---|
| Sieve (mm) | % Passing | Diameter | % Finer |
| 50.00 | 100.0 | | |
| 37.50 | 100.0 | | |
| 25.00 | 100.0 | | |
| 19.00 | 100.0 | | |
| 16.00 | 100.0 | | |
| 12.50 | 100.0 | 0.0394 | 84.0 |
| 9.50 | 100.0 | 0.0280 | 83.0 |
| 4.75 | 100.0 | 0.0200 | 81.0 |
| 2.00 | 100.0 | 0.0101 | 78.6 |
| 1.18 | 100.0 | 0.0074 | 77.7 |
| 0.425 | 100.0 | 0.0053 | 76.3 |
| 0.180 | 99.6 | 0.0027 | 69.8 |
| 0.075 | 99.0 | 0.0012 | 61.4 |




| SOIL DESCRIPTION | % Composition | | D10 | |
|---|---|---|---|---|
| | | Gravel | D30 | |
| | 1 | Sand | D60 | |
| The sample tested can be classified as silty clay. | 38 | Silt | Cu | #DIV/0! |
| | 61 | Clay | Cc | #DIV/0! |

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM

REVIEWED BY: Hermie Manalo

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# PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT: WSP Canada
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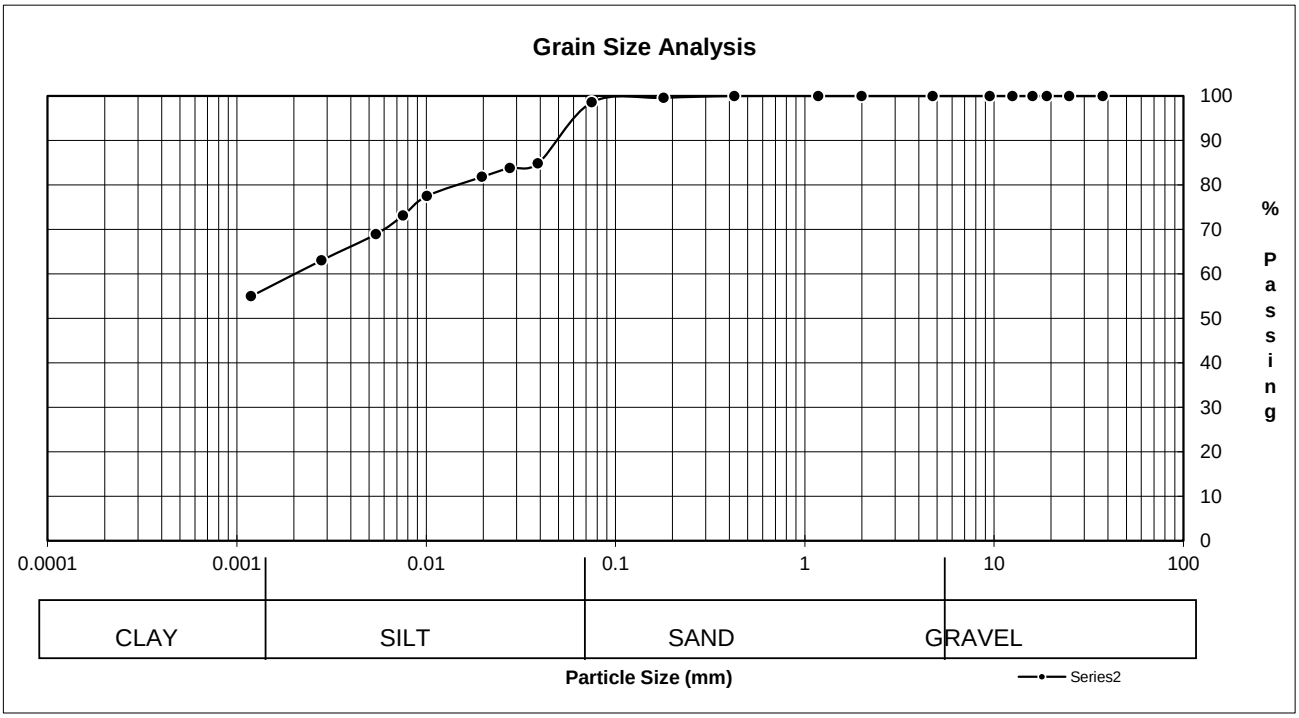
Winnipeg, MB R3T 6B8
ATTN:
PROJECT: COW Alley Renewal

PROJECT NO.

Date Sampled: unknown Date Received: Jan/Feb/15
Sampled By: Client Date Tested: 16-Mar-15

**Material Identification**
B.H./T.H. No. **TH32 @ 3'**
**Sample No.** **18**
Sample Source
Specific Gravity of Material: 2.65

| Sieve Analysis | | Hydrometer Analysis | |
|---|---|---|---|
| Sieve (mm) | % Passing | Diameter | % Finer |
| 50.00 | 100.0 | | |
| 37.50 | 100.0 | | |
| 25.00 | 100.0 | | |
| 19.00 | 100.0 | | |
| 16.00 | 100.0 | | |
| 12.50 | 100.0 | 0.0389 | 84.8 |
| 9.50 | 100.0 | 0.0276 | 83.8 |
| 4.75 | 100.0 | 0.0197 | 81.8 |
| 2.00 | 100.0 | 0.0101 | 77.5 |
| 1.18 | 100.0 | 0.0075 | 73.1 |
| 0.425 | 100.0 | 0.0054 | 68.9 |
| 0.180 | 99.6 | 0.0028 | 63.1 |
| 0.075 | 98.6 | 0.0012 | 55.0 |




| SOIL DESCRIPTION | % Composition | | D10 | |
|---|---|---|---|---|
| | | Gravel | D30 | 0.01210 |
| The sample tested can be classified as silty clay. | 1 | Sand | D60 | 0.04475 |
| | 44 | Silt | Cu | #DIV/0! |
| | 55 | Clay | Cc | #DIV/0! |

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM

REVIEWED BY: Hermie Manalo

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# PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

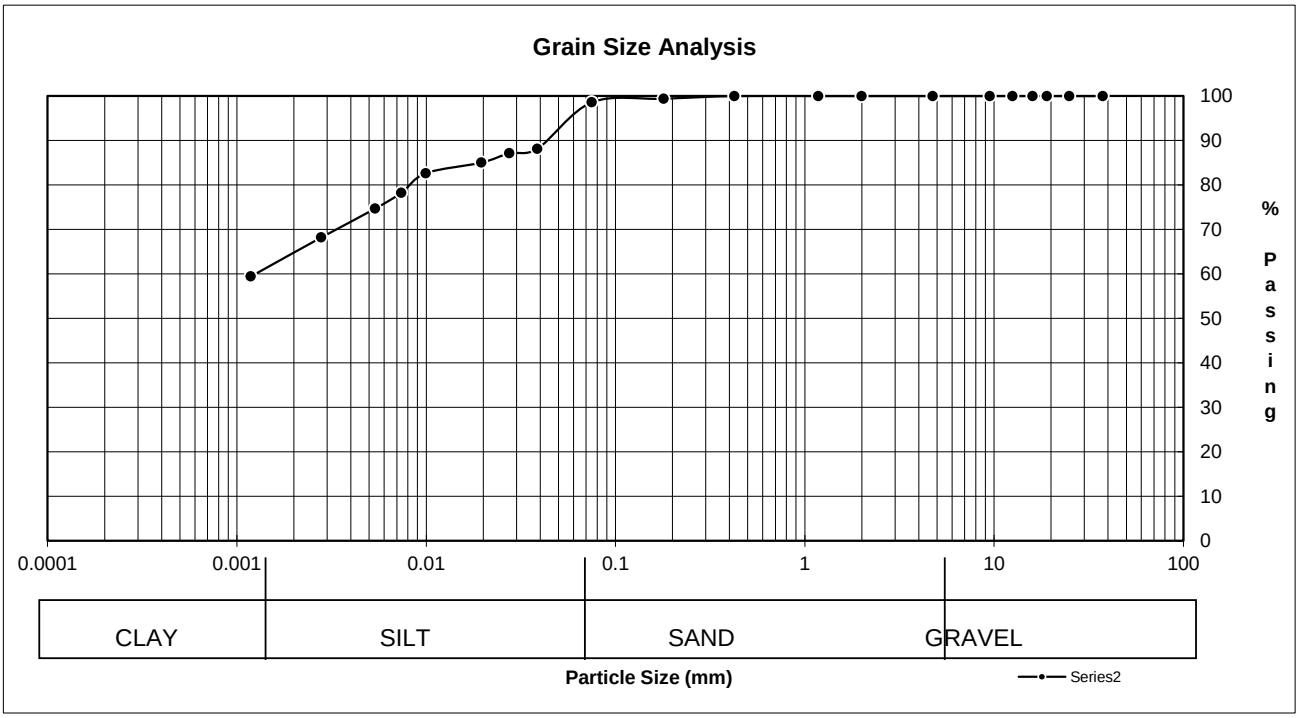
CLIENT: WSP Canada
1600 Buffalo Place
Winnipeg, MB R3T 6B8
ATTN:
PROJECT: COW Alley Renewal

PROJECT NO.

Date Sampled: unknown Date Received: Jan/Feb/15
Sampled By: Client Date Tested: 16-Mar-15

**Material Identification**
B.H./T.H. No. **TH65 @ 3'**
**Sample No.** **11**
Sample Source
Specific Gravity of Material: 2.65

| Sieve Analysis | | Hydrometer Analysis | |
|---|---|---|---|
| Sieve (mm) | % Passing | Diameter | % Finer |
| 50.00 | 100.0 | | |
| 37.50 | 100.0 | | |
| 25.00 | 100.0 | | |
| 19.00 | 100.0 | | |
| 16.00 | 100.0 | | |
| 12.50 | 100.0 | 0.0386 | 88.1 |
| 9.50 | 100.0 | 0.0274 | 87.1 |
| 4.75 | 100.0 | 0.0196 | 85.0 |
| 2.00 | 100.0 | 0.0099 | 82.7 |
| 1.18 | 100.0 | 0.0074 | 78.3 |
| 0.425 | 100.0 | 0.0054 | 74.7 |
| 0.180 | 99.4 | 0.0028 | 68.2 |
| 0.075 | 98.6 | 0.0012 | 59.4 |




| SOIL DESCRIPTION | % Composition | | D10 | |
|---|---|---|---|---|
| | | Gravel | D30 | |
| The sample tested can be classified as silty clay. | 1 | Sand | D60 | 0.00118 |
| | 40 | Silt | Cu | #DIV/0! |
| | 59 | Clay | Cc | #DIV/0! |

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM

REVIEWED BY: Hermie Manalo