# Appendix D: Geotechnical Investigation

# Oxford County

## Geotechnical Investigation

**FINAL**

**Project Name**
Geotechnical Investigation for Part of Oxford Road 16

**Project Number**
KCH-00227972-GE

**Prepared By:**

exp **Services Inc.**
15701 Robin's Hill Road
London, ON, N5V 0A5
Canada

**Date Submitted**
October 2015

# Oxford County

## Geotechnical Investigation

**Type of Document:**
Final Report

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Geotechnical Investigation for Part of Oxford Road 16

**Project Number:**
KCH-00227972-GE

**Prepared By:**
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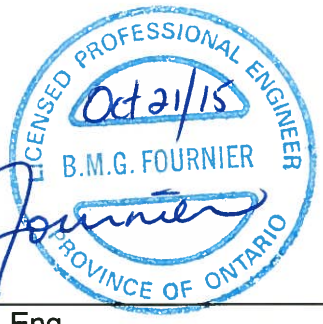


Geordy Fournier, P. Eng.

for

Rebecca Walker P. Eng.

**Date Submitted: October 2015**

# Legal Notification

This report was prepared by **exp** Services Inc. for the account of **Oxford County.**

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## Appendices

# 1. Introduction

As requested, **exp** Services Inc. (**exp**) has conducted a geotechnical investigation to determine the asphalt and granular thicknesses along Oxford Road 16, from Kintore to Township of Zorra 31st Line. It is understood that the proposed work program will consist of road rehabilitation. This report summarizes the results of the geotechnical investigation and provides geotechnical engineering guidelines to assist with the design and construction of the proposed project.

## 1.1 Terms of Reference

The geotechnical investigation was generally performed in accordance with our proposal P15-225, dated July 15, 2015. This investigation was authorized by Oxford County through Purchase Order PO2015-01165 dated August 14, 2015.

The purpose of this investigation was to examine the asphalt and granular thicknesses along the various roads listed above by drilling widely spaced sampled boreholes, and based on an interpretation of the factual data, to provide engineering guidelines for the geotechnical design of road rehabilitation, in accordance with information provided by Oxford County.

This report is provided on the basis of the terms of reference presented above and on the assumption that the design will be in accordance with applicable codes and standards. If there are any changes in the design features relevant to the geotechnical analyses, or if any questions arise concerning geotechnical aspects of the codes and standards, this office should be contacted to review the design.

The information in this report in no way reflects on the environmental aspects of the soil. Should specific information in this regard be needed, additional testing may be required.

# 2. Methodology

The fieldwork was carried out on August 20, 2015. In general, the geotechnical investigation consisted of the drilling of a total of thirteen (13) boreholes to a depth of approximately 2 m. The approximate locations of the boreholes are shown in Appendix A.

Underground utility locates were carried out for each road section prior to the drilling fieldwork being carried out. Traffic control during the drilling was conducted in general conformance with Ministry of Transportation, Ontario Traffic Manual Book 7 – Temporary Conditions.

The boreholes were advanced using truck-mounted equipment operated by a specialist contractor.

Within the boreholes, Standard Penetration Tests (SPTs) were performed to assess the compactness of the underlying soils and to obtain representative samples. Where needed, auger samples were also collected. During the drilling, the stratigraphy in the boreholes was examined and logged in the field by exp geotechnical personnel. Short-term groundwater level observations within the open boreholes and the natural moisture contents of recovered soil samples were recorded on the borehole logs.

After the completion of the field analysis, the test holes were then backfilled and surfaced with a layer of “cold patch” asphalt.

Representative samples of the various soil strata encountered at the test locations were taken to our laboratory in our Cambridge Office for further examination by a geotechnical engineer and laboratory classification testing. Laboratory testing included *in situ* moisture contents and one composite grain size analysis from each road section.

# 3. Site and Subsurface Conditions

## 3.1 Site Description

The proposed work is along the following road section:

- **Oxford Road 16**– from Kintore to Township of Zorra 31st Line

The roadway surface along this section presently has fair flexible pavement conditions as observed during the drilling.

## 3.2 Soil Stratigraphy

In general, sandy silt and/or sandy silt till was encountered below the asphalt and granular fill. The detailed stratigraphy encountered in each borehole is described in the attached borehole logs and summarized in the table below. It must be noted that boundaries of soil indicated are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect transition zones for the purposes of geotechnical design and should not be interpreted as exact planes of geological change. Thicknesses should not be used for design purposes.

**TABLE 1**
**Summary of Existing Pavement Structure and Subgrade**

| Borehole Location | Approximate Asphalt Thickness, (mm) | Approximate Granular Fill Depth (mm) | Subgrade Description |
|---|---|---|---|
| BH1* | n/a | 1600 | Sandy Silt Till |
| BH2 | 150 | 400 | Sandy Silt |
| BH3 | 150 | 600 | Sandy Silt |
| BH4 | 150 | 600 | Sandy Silt |
| BH5 | 150 | 300 | Sandy Silt |
| BH6 | 75 | 600 | Sandy Silt and Sandy Silt Till |
| BH7 | 150 | 300 | Sandy Silt |
| BH8 | 150 | 400 | Sandy Silt |
| BH9 | 150 | 500 | Sandy Silt and Sandy Silt Till |
| BH10 | 150 | 500 | Sandy Silt Fill and Sandy Silt |
| BH11 | 150 | 400 | Sandy Silt and Sandy Silt Till |
| BH12 | 100 | 500 | Sandy Silt |
| BH13 | 225 | 700 | Sandy Silt Till |

** Borehole had to be drilled off edge of shoulder due to utility conflicts.*

## 3.2 Existing Subgrade

As noted in the borehole logs and Table 1, the subgrade along the road section generally consists of sandy silt or sandy silt till. The compactness condition/consistency is generally stiff or loose to compact. Locally, the granular base is underlain by sandy silt fill containing traces of gravel, organics, and asphalt fragments. Grain size analyses were conducted on selected composite samples of the native subgrade material from each road section, with results presented in Appendix C.

A grain size analysis was conducted on a selected sample of the subgrade at Borehole 6 and 7 on Oxford Road 16. The results indicate the subgrade at these locations consists of 62% silt, 23% sand, 8% gravel, and 7% clay.

## 3.3 Groundwater Conditions

The boreholes were generally dry upon completion. It is noted that insufficient time was allowed to observe the stabilized groundwater levels.

It is further noted that the depth to the groundwater table may vary in response to climatic or seasonal conditions, and, as such, may differ at the time of construction, with higher levels in wet seasons. Capillary rise effects should also be anticipated within fine-grained soils.

# 4. Discussion and Recommendations

## 4.1 General

Along each road section, the average Granular Base Equivalencies (GBE), asphalt (ASP) thicknesses, and granular base/subbase (GB) thicknesses of the existing pavement structures were all found to be at or above the recommended configuration for the specified class of roads. A summary of the findings is given in the table below.

**TABLE 2**
**Summary of Existing Pavement Structure and Traffic**

| Road Designation | Average Asphalt Thickness (mm) | Average Granular Thickness (mm) | Average Granular Base Equivalency GBE* (mm) | Recommended GBE (mm) | 2012/2013 Traffic (AADT) |
|---|---|---|---|---|---|
| Rural | 145 | 483 | 614 | 685 | 2483 |

** For existing GBE, Equivalency Factors used: 2.00 for existing asphalt, 0.67 for old granular, medium subgrade for GBE calculation.*
*** Recommended GBE based on existing pavement structure design drawings for each road section, provided by Oxford County.*

## 4.2 Pavement Rehabilitation

The results of the investigation show that the average asphalt thickness along this road section is close to the Oxford County design requirement. However, the overall GBE along this section is less than required and is attributed to a lower granular base thickness. Assuming that overall road grade changes are not possible, full reconstruction may be considered. Alternatively an asphalt overlay of 35 to 40 mm of HL3 would increase the GBE to the required thickness.

## 4.3 General Comments

For localized re-construction, assuming that grade changes are not allowed for the roadways, the best option is the removal of the existing asphalt along with some of the underlying granular fill, and removed from site. The existing pavement structure would be cut to below the existing subgrade level to receive the new pavement structures.

The proposed pavement area to be reconstructed or added should be stripped of all asphalt and other obviously unsuitable material. The exposed subgrade must then be proof rolled. Any soft spots revealed by this or any other observations must be sub excavated and backfilled with approved granular material compacted to 100 percent Standard Proctor Maximum Dry Density (SPMDD). All fill required to backfill service trenches, or to raise the subgrade to design levels must conform to current County Standards or O.P.S. Standards. Preferably, native materials should be used to maintain uniform subgrade conditions, provided that adequate compaction can be achieved. Where native materials are too wet and/or unsuitable for reuse, imported granular material should be used to backfill under roads, driveways, sidewalks, curb and gutters as per current County Standards or O.P.S. Standards. Where free-draining backfill is required, and for backfill in confined areas, Granular 'B' Type II fill is recommended.

Disposal of excavated materials should conform to the current Ministry of the Environment Guidelines and Regulations.

Good drainage provisions will optimize pavement performance. Accordingly, the subgrade in areas to be paved should be crowned and shaped to promote drainage. The final grading plan should be reviewed prior to finalizing the design requirement.

Where the new pavement joins the existing pavement, a straight vertical joint should be placed to receive the new asphalt as a transition joint. The transition joint should be routed and sealed.

Provided the preceding recommendations are followed, the pavement thickness design requirements given in Table 3 are recommended. A function design life of about fifteen years has been used to establish the pavement design. This represents the number of years to the first major rehabilitation, assuming regular maintenance is carried out. If recommendations on street classification other than those specified are required, **exp** should be contacted for further comments.

**TABLE 3**
**Suggested Flexible Pavement Thickness Design***

| Road Section | Asphalt Wearing Course (HL3 or HL4) (mm) | Asphalt Binder Course (HL8) (mm) | Granular Base (OPSS Granular 'A') (mm) | Granular Subbase (Granular 'B') (mm) |
|---|---|---|---|---|
| Oxford Road 16 | HL-4 40 | 60 | 150 | 500 |

1. If construction is undertaken under adverse weather conditions such as wet/freezing subgrade preparation, the granular sub-base requirements should be reviewed at that time by the geotechnical engineer.
2. A program of in-place density testing must be carried out to verify that satisfactory levels of compaction are being achieved.
3. Granular base/sub-base should be compacted to 100% Standard Proctor maximum dry density. Asphaltic concrete should be compacted per OPS requirements.
4. Minimum overlay should be 40 mm for mill and overlay option for shoulder or edge repair.

**Based on Oxford County design drawings, included in Appendix D.*

Additional comments on the construction of roadways are as follows:

1. The most severe loading conditions on pavement areas and the subgrade may occur during construction. Consequently, special provisions such as restricted lanes, half-loads during paving, etc., may be required, especially if construction is carried out during unfavourable weather.

2. It is recommended that **exp** be retained to review the final pavement structure designs and drainage plans prior to construction to ensure that they are consistent with the recommendations of this report.

### 4.3 Curbs and Gutters

The following recommendations are provided should curbs and gutters need to be locally replaced or constructed on an as needed basis. The concrete for the curbs and gutters should be proportioned, mixed placed and cured in accordance with the requirements of OPSS 353 and OPSS 1350, and the required CSA standards.

During cold weather, the freshly placed concrete should be covered with insulating blankets to protect against freezing.

## 4.4 Inspection and Testing

An effective inspection and testing program is an essential part of construction monitoring. The Inspection and Testing Program for road reconstruction typically includes the following items:

- Subbase examination prior to asphalt placement;
- Inspection of the asphalt placement;
- Inspection, compaction, and materials testing for subbase, base and surface asphalt, including laboratory testing on asphalt sampling to confirm conformance to project specifications and standards;
- Inspection, compaction, and materials testing for concrete curb and gutter, including laboratory testing on concrete sampling to confirm conformance to project specifications and standards.

# 5. General Comments

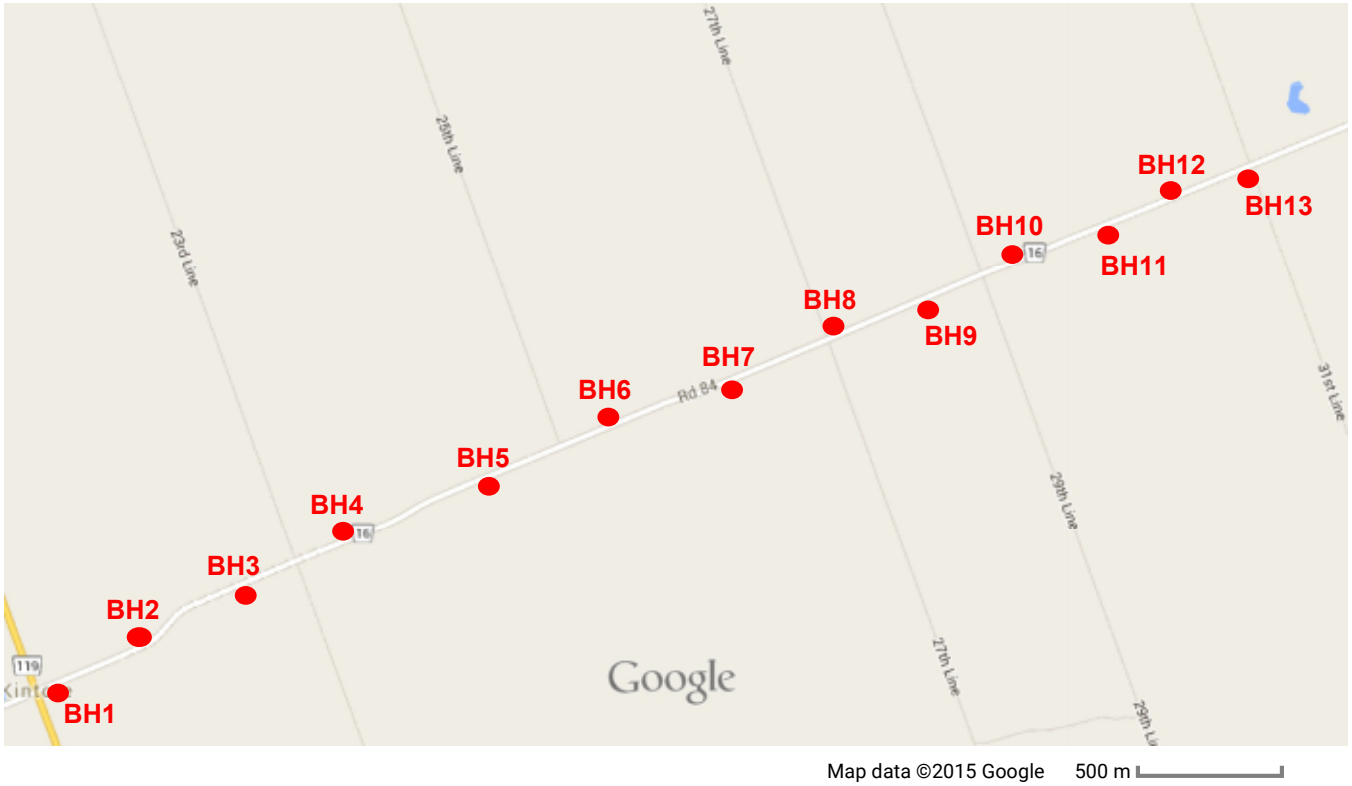
The comments given in this report are intended only for the guidance of design engineers. The number of test holes required to determine the localized underground conditions between test holes affecting construction costs, techniques, sequencing, equipment, scheduling, etc. would be much greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results, so that they may draw their own conclusions as to how the subsurface conditions may affect them.

Exp Services Inc. should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not afforded the privilege of making this review, exp Services Inc. will assume no responsibility for interpretation of the recommendations in this report.

We trust that this report is satisfactory to your present requirements and we look forward to assisting you in the completion of this project. Should you have any questions, please contact the office at your convenience.

# Appendix A

Borehole Location Maps



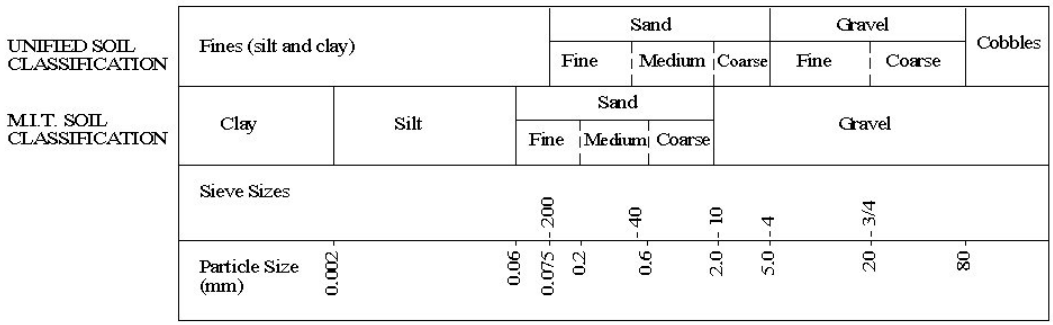

**APPROXIMATE BOREHOLE LOCATIONS - OXFORD ROAD 16**

# Appendix B

Borehole Logs

# NOTES ON SAMPLE DESCRIPTIONS

1. All descriptions included in this report follow the 'modified' Massachusetts Institute of Technology (M.I.T.) soil classification system. The laboratory grain-size analysis also follows this classification system. Others may designate the Unified Classification System as their source; a comparison of the two is shown for your information. Please note that, with the exception of those samples where the grain size analysis has been carried out, all samples are classified visually and the accuracy of the visual examination is not sufficient to differentiate between the classification systems or exact grain sizing. The M.I.T. system has been modified and the **exp** classification includes a designation for cobbles above the 75 mm size and boulders above the 200 mm size.




2. **Fill**: Where fill is designated on the borehole log, it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description therefore, may not be applicable as a general description of the site fill material. All fills should be expected to contain obstructions such as large concrete pieces or subsurface basements, floors, tanks, even though none of these obstructions may have been encountered in the borehole. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact and correct composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. The fill at this site has been monitored for the presence of methane gas and the results are recorded on the borehole logs. The monitoring process neither indicates the volume of gas that can be potentially generated or pinpoints the source of the gas. These readings are to advise of a potential or existing problem (if they exist) and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic waste that renders the material unacceptable for deposition in any but designated land fill sites; unless specifically stated, the fill on the site has not been tested for contaminants that may be considered hazardous. This testing and a potential hazard study can be carried out if you so request. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common, but not detectable using conventional geotechnical procedures.

3. **Glacial Till**: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process, the till must be considered heterogeneous in composition and as such, may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (75 to 200 mm in diameter) or boulders (greater than 200 mm diameter) and therefore, contractors may encounter them during excavation, even if they are not indicated on the borehole logs. It should be appreciated that normal sampling equipment can not differentiate the size or type of obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited area; therefore, caution is essential when dealing with sensitive excavations or dewatering programs in till material.

**BH 1**
Sheet 1 of 1

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**
CLIENT **County of Oxford** DATUM **Local**
DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| | 0.13 | **TOPSOIL**, dark brown, rootlets, moist | | | | | | | |
| | | **GRANULAR FILL**, Grey/brown, sand & gravel (sub-rounded & angular), asphalt inclusions, moist, compact to loose | | | | S1 | 375 | 13 | |
| 1 | | | | | | S2 | | 9 | |
| | 1.72 | | | | | | | | |
| | | **SANDY SILT TILL**, Grey/brown, trace gravel, some clay, moist, very stiff | | | | S3 | | 25 | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

SHEAR STRENGTH
✤ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
100 200 kPa
Atterberg Limits and Moisture
$W_P$ W $W_L$
● SPT N Value × Dynamic Cone
10 20 30 40
3.4 ▲

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▯ Rock Core (eg. BQ, NQ, etc.) ▯ VN Vane Sample

OTHER TESTS

| | |
|---|---|
| G Specific Gravity | C Consolidation |
| H Hydrometer | CD Consolidated Drained Triaxial |
| S Sieve Analysis | CU Consolidated Undrained Triaxial |
| γ Unit Weight | UU Unconsolidated Undrained Triaxial |
| P Field Permeability | UC Unconfined Compression |
| K Lab Permeability | DS Direct Shear |

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

**BH 10**
Sheet 1 of 1

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**

CLIENT **County of Oxford** DATUM **Local**

DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | **ASPHALT**, ~.150 m | | | | | | | |
| | 0.15 | **FILL**, ~Brown sand & gravel, some cobbles, damp, compact | | | | S1 | 400 | 29 | |
| | 0.50 | **FILL**, Dark brown/black, sandy silt, trace gravel, asphalt fragments, moist, compact | | | | | | | |
| | 0.76 | **SANDY SILT**, Dark grey/brown, trace clay, trace fine gravel, moist, firm | | | | S2 | 250 | 7 | |
| 1 | | becoming light brown at depth | | | | S3 | | 5 | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

**SHEAR STRENGTH**
S Field Vane Test (#=Sensitivity)
Penetrometer Torvane
100 200 kPa

**Atterberg Limits and Moisture**
$W_P$ W $W_L$
SPT N Value Dynamic Cone
10 20 30 40

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
AS Auger Sample SS Split Spoon ST Shelby Tube
Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS
G Specific Gravity
H Hydrometer
S Sieve Analysis
γ Unit Weight
P Field Permeability
K Lab Permeability
C Consolidation
CD Consolidated Drained Triaxial
CU Consolidated Undrained Triaxial
UU Unconsolidated Undrained Triaxial
UC Unconfined Compression
DS Direct Shear

WATER LEVELS
Apparent Measured Artesian (see Notes)

**BH 11**
Sheet 1 of 1

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**

CLIENT **County of Oxford** DATUM **Local**

DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | **ASPHALT**, ~.150 m | | | | | | | |
| | 0.15 | | | | | | | | |
| | | **FILL**, ~Brown sand & gravel, damp, compact | | | | | | | |
| | 0.45 | | | | | S1 | 100 | 19 | |
| | | **FILL**, Grey/brown, sandy silt, trace gravel, trace clay, moist, compact | | | | | | | |
| 1 | | | | | | S2 | 350 | 7 | |
| | 1.06 | | | | | | | | |
| | | **SANDY SILT**, Light brown, trace clay, moist, firm | | | | | | | |
| | 1.52 | | | | | | | | |
| | | **SANDY SILT TILL**, Grey/brown, mottled, trace clay, trace gravel, moist, very stiff | | | | S3 | 225 | 16 | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

**SHEAR STRENGTH**
✤ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
100 200 kPa

**Atterberg Limits and Moisture**
$W_P$ W $W_L$
● SPT N Value × Dynamic Cone
10 20 30 40

3.4 ▲

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▯ Rock Core (eg. BQ, NQ, etc.) ▯ VN Vane Sample

OTHER TESTS

| | |
|---|---|
| G Specific Gravity | C Consolidation |
| H Hydrometer | CD Consolidated Drained Triaxial |
| S Sieve Analysis | CU Consolidated Undrained Triaxial |
| γ Unit Weight | UU Unconsolidated Undrained Triaxial |
| P Field Permeability | UC Unconfined Compression |
| K Lab Permeability | DS Direct Shear |

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

**BH 12**
Sheet 1 of 1

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**

CLIENT **County of Oxford** DATUM **Local**

DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.10 | **ASPHALT**, ~.100 m | | | | | | | |
| | 0.50 | **FILL**, ~Brown sand & gravel, damp, compact | | | | S1 | 350 | 17 | |
| | 0.76 | **FILL**, Grey/brown, sandy silt, some gravel, moist, compact | | | | | | | |
| 1 | | **SANDY SILT**, Bark brown/black, trace clay, trace gravel, moist, firm | | | | S2 | 50 | 6 | |
| | | becoming grey/brown, mottled yellow, sandy silt with thin fine sand seams | | | | S3 | 350 | 7 | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

**SHEAR STRENGTH**
✤ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
100 200 kPa

**Atterberg Limits and Moisture**
$W_P$ W $W_L$
● SPT N Value × Dynamic Cone
10 20 30 40

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▯ Rock Core (eg. BQ, NQ, etc.) ▯ VN Vane Sample

OTHER TESTS

| | |
|---|---|
| G Specific Gravity | C Consolidation |
| H Hydrometer | CD Consolidated Drained Triaxial |
| S Sieve Analysis | CU Consolidated Undrained Triaxial |
| γ Unit Weight | UU Unconsolidated Undrained Triaxial |
| P Field Permeability | UC Unconfined Compression |
| K Lab Permeability | DS Direct Shear |

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

**BH 13**
Sheet 1 of 1

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**

CLIENT **County of Oxford** DATUM **Local**

DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | **ASPHALT**, ~.225 m | | | | | | | |
| | 0.23 | **FILL**, ~Brown sand & gravel, damp, dense | | | | S1 | 375 | 33 | |
| | 0.60 | **SANDY SILT TILL**, Grey/brown, trace fine to coarse grained gravel, trace clay, moist, stiff to very stiff | | | | S2 | 225 | 12 | |
| 1 | | | | | | S3 | 450 | 24 | |
| | | sand seams at depth | | | | | | | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

**SHEAR STRENGTH**
✤ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
100 200 kPa

**Atterberg Limits and Moisture**
$W_P$ W $W_L$
● SPT N Value × Dynamic Cone
10 20 30 40

2.8

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▯ Rock Core (eg. BQ, NQ, etc.) ▯ VN Vane Sample

OTHER TESTS

| | |
|---|---|
| G Specific Gravity | C Consolidation |
| H Hydrometer | CD Consolidated Drained Triaxial |
| S Sieve Analysis | CU Consolidated Undrained Triaxial |
| γ Unit Weight | UU Unconsolidated Undrained Triaxial |
| P Field Permeability | UC Unconfined Compression |
| K Lab Permeability | DS Direct Shear |

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

**BH 2**
Sheet 1 of 1

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**

CLIENT **County of Oxford** DATUM **Local**

DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | **ASPHALT**, ~.150 m | | | | | | | |
| | 0.15 | **FILL**, Brown sand & gravel, some cobbles, damp to moist, compact | | | | | | | |
| | 0.45 | **SANDY SILT**, Grey/brown, mottled, trace clay, trace gravel, moist to very moist, firm | | | | S1 | 350 | 19 | |
| 1 | | | | | | S2 | 200 | 5 | |
| | | | | | | S3 | 187 | 8 | |
| | | becoming sandy silt till | | | | | | | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

**SHEAR STRENGTH**
✤ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
100 200 kPa

**Atterberg Limits and Moisture**
$W_P$ W $W_L$
● SPT N Value × Dynamic Cone
10 20 30 40

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▯ Rock Core (eg. BQ, NQ, etc.) ▯ VN Vane Sample

OTHER TESTS

| | |
|---|---|
| G Specific Gravity | C Consolidation |
| H Hydrometer | CD Consolidated Drained Triaxial |
| S Sieve Analysis | CU Consolidated Undrained Triaxial |
| γ Unit Weight | UU Unconsolidated Undrained Triaxial |
| P Field Permeability | UC Unconfined Compression |
| K Lab Permeability | DS Direct Shear |

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

**BH 3**
Sheet 1 of 2

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**

CLIENT **County of Oxford** DATUM **Local**

DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | **ASPHALT**, ~.150 m | | | | | | | |
| | 0.15 | **FILL**, ~Brown sand & gravel, some cobbles, damp to moist, compact | | | | S1 | 400 | 22 | |
| | 0.61 | **SANDY SILT**, Grey/brown, mottled, trace clay, trace fine gravel, moist, firm to stiff | | | | | | | |
| 1 | | | | | | S2 | 300 | 8 | |
| | | | | | | S3 | | 10 | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

**SHEAR STRENGTH**
✤ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
100 200 kPa

**Atterberg Limits and Moisture**
$W_P$ W $W_L$
● SPT N Value × Dynamic Cone
10 20 30 40

Continued Next Page

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▯ Rock Core (eg. BQ, NQ, etc.) ▯ VN Vane Sample

OTHER TESTS

| | |
|---|---|
| G Specific Gravity | C Consolidation |
| H Hydrometer | CD Consolidated Drained Triaxial |
| S Sieve Analysis | CU Consolidated Undrained Triaxial |
| γ Unit Weight | UU Unconsolidated Undrained Triaxial |
| P Field Permeability | UC Unconfined Compression |
| K Lab Permeability | DS Direct Shear |

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

**BH 3**
Sheet 2 of 2

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**
CLIENT **County of Oxford** DATUM **Local**
DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) | SHEAR STRENGTH / Atterberg Limits and Moisture |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | | **End of Borehole at 1.98 m depth** | | | | | | | | |
| 4 | | | | | | | | | | |
| 5 | | | | | | | | | | |

SHEAR STRENGTH
✤ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
40 80 kPa
Atterberg Limits and Moisture
$W_P$ W $W_L$
● SPT N Value × Dynamic Cone
10 20 30 40

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▯ Rock Core (eg. BQ, NQ, etc.) ▯ VN Vane Sample

OTHER TESTS

| | |
|---|---|
| G Specific Gravity | C Consolidation |
| H Hydrometer | CD Consolidated Drained Triaxial |
| S Sieve Analysis | CU Consolidated Undrained Triaxial |
| γ Unit Weight | UU Unconsolidated Undrained Triaxial |
| P Field Permeability | UC Unconfined Compression |
| K Lab Permeability | DS Direct Shear |

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

**BH 4**
Sheet 1 of 1

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**

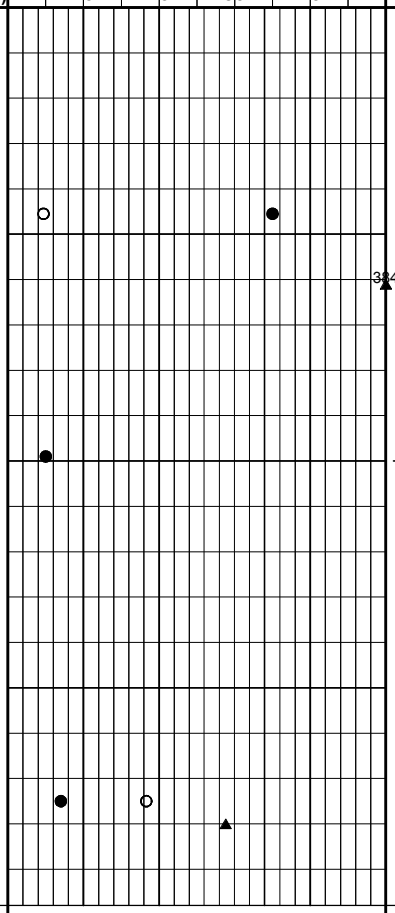
CLIENT **County of Oxford** DATUM **Local**

DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | **ASPHALT**, ~.150 m | | | | | | | |
| | 0.15 | **FILL**, ~Brown sand & gravel, some cobbles, moist, dense | | | | | | | |
| | | **SANDY SILT**, Grey/brown, mottled, trace clay, trace fine gravel, moist to very moist, firm | | | | S1 | 375 | 35 | |
| | 0.61 | | | | | | | | |
| 1 | | | | | | S2 | 50 | 5 | |
| | | | | | | S3 | | 7 | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

**SHEAR STRENGTH**
S Field Vane Test (#=Sensitivity)
Penetrometer Torvane
100 200 kPa

**Atterberg Limits and Moisture**
$W_P$ W $W_L$
SPT N Value × Dynamic Cone
10 20 30 40




***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
AS Auger Sample SS Split Spoon ST Shelby Tube
Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS

| | |
|---|---|
| G Specific Gravity | C Consolidation |
| H Hydrometer | CD Consolidated Drained Triaxial |
| S Sieve Analysis | CU Consolidated Undrained Triaxial |
| γ Unit Weight | UU Unconsolidated Undrained Triaxial |
| P Field Permeability | UC Unconfined Compression |
| K Lab Permeability | DS Direct Shear |

WATER LEVELS
Apparent Measured Artesian (see Notes)

**BH 5**
Sheet 1 of 1

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**

CLIENT **County of Oxford** DATUM **Local**

DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | **ASPHALT**, ~.150 m | | | | | | | |
| | 0.15 | | | | | | | | |
| | | **FILL**, ~Brown sand & gravel, moist, compact | | | | | | | |
| | 0.35 | | | | | | | | |
| | | **FILL**, Grey/brown sandy silt, trace gravel, trace clay, moist, stiff | | | | S1 | 400 | 19 | |
| 1 | | | | | | S2 | 350 | 9 | |
| | 1.22 | | | | | | | | |
| | | **SANDY SILT**, Reddish brown, trace clay, moist, stiff with sand seams | | | | S3 | 300 | 8 | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

**SHEAR STRENGTH**
✤ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
100 200 kPa

**Atterberg Limits and Moisture**
$W_P$ W $W_L$
● SPT N Value × Dynamic Cone
10 20 30 40

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▥ Rock Core (eg. BQ, NQ, etc.) ▣ VN Vane Sample

OTHER TESTS

| | |
|---|---|
| G Specific Gravity | C Consolidation |
| H Hydrometer | CD Consolidated Drained Triaxial |
| S Sieve Analysis | CU Consolidated Undrained Triaxial |
| γ Unit Weight | UU Unconsolidated Undrained Triaxial |
| P Field Permeability | UC Unconfined Compression |
| K Lab Permeability | DS Direct Shear |

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

**BH 6**
Sheet 1 of 1

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**
CLIENT **County of Oxford** DATUM **Local**
DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.08 | **ASPHALT**, ~.075 m | | | | | | | |
| | | **FILL**, ~Brown sand & gravel, moist, compact | | | | S1 | 300 | 14 | |
| | 0.50 | | | | | | | | |
| | | **FILL**, Dark brown/black, sandy silt, trace organics, moist, compact | | | | | | | |
| | 0.76 | | | | | | | | |
| 1 | | **SANDY SILT**, Grey/brown, trace clay, trace gravel, mottled, moist, stiff | | | | S2 | 250 | 9 | |
| | 1.52 | | | | | | | | |
| | | **SANDY SILT TILL**, Grey/brown, trace clay, trace gravel, moist, very stiff | | | | S3 | 450 | 28 | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

**SHEAR STRENGTH**
S Field Vane Test (#=Sensitivity)
Penetrometer Torvane
100 200 kPa

**Atterberg Limits and Moisture**
$W_P$ W $W_L$
SPT N Value × Dynamic Cone
10 20 30 40

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
AS Auger Sample SS Split Spoon ST Shelby Tube
Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS

| | |
|---|---|
| G Specific Gravity | C Consolidation |
| H Hydrometer | CD Consolidated Drained Triaxial |
| S Sieve Analysis | CU Consolidated Undrained Triaxial |
| γ Unit Weight | UU Unconsolidated Undrained Triaxial |
| P Field Permeability | UC Unconfined Compression |
| K Lab Permeability | DS Direct Shear |

WATER LEVELS
Apparent Measured Artesian (see Notes)

**BH 7**
Sheet 1 of 1

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**

CLIENT **County of Oxford** DATUM **Local**

DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | **ASPHALT**, ~.150 m | | | | | | | |
| | 0.15 | | | | | | | | |
| | | **FILL**, ~Brown sand & gravel, damp, compact | | | | | | | |
| | 0.33 | | | | | | | | |
| | | **FILL**, Grey brown, sandy silt, trace clay, moist, compact | | | | S1 | 375 | 11 | |
| | 0.76 | | | | | | | | |
| 1 | | **SANDY SILT**, Grey/brown, trace clay, trace gravel, mottled, moist, stiff with fine sand seams | | | | S2 | 250 | 9 | |
| | | changes to light brown colour and becomes firm at bottom | | | | S3 | 50 | 8 | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

**SHEAR STRENGTH**
S Field Vane Test (#=Sensitivity)
Penetrometer Torvane
100 200 kPa

**Atterberg Limits and Moisture**
$W_P$ W $W_L$
SPT N Value Dynamic Cone
10 20 30 40

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
AS Auger Sample SS Split Spoon ST Shelby Tube
Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS
G Specific Gravity C Consolidation
H Hydrometer CD Consolidated Drained Triaxial
S Sieve Analysis CU Consolidated Undrained Triaxial
γ Unit Weight UU Unconsolidated Undrained Triaxial
P Field Permeability UC Unconfined Compression
K Lab Permeability DS Direct Shear

WATER LEVELS
Apparent Measured Artesian (see Notes)

**BH 8**
Sheet 1 of 1

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**
CLIENT **County of Oxford** DATUM **Local**
DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | **ASPHALT**, ~.150 m | | | | | | | |
| | 0.15 | | | | | | | | |
| | | **FILL**, ~Brown sand & gravel, damp, compact | | | | | | | |
| | 0.45 | | | | | S1 | 300 | 19 | |
| | | **FILL**, Brown to dark brown, sandy silt, trace fine gravel, trace organics, moist, compact | | | | | | | |
| 1 | | | | | | S2 | 225 | 11 | |
| | 1.52 | | | | | | | | |
| | | **SANDY SILT**, Grey/brown, trace clay, trace gravel, mottled, moist to very moist, firm | | | | | | | |
| | | | | | | S3 | 400 | 6 | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

**SHEAR STRENGTH**
✤ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
100 200 kPa

**Atterberg Limits and Moisture**
$W_P$ W $W_L$
● SPT N Value × Dynamic Cone
10 20 30 40

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▥ Rock Core (eg. BQ, NQ, etc.) ▣ VN Vane Sample

OTHER TESTS

| | |
|---|---|
| G Specific Gravity | C Consolidation |
| H Hydrometer | CD Consolidated Drained Triaxial |
| S Sieve Analysis | CU Consolidated Undrained Triaxial |
| γ Unit Weight | UU Unconsolidated Undrained Triaxial |
| P Field Permeability | UC Unconfined Compression |
| K Lab Permeability | DS Direct Shear |

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

**BH 9**
Sheet 1 of 1

# BOREHOLE LOG

PROJECT **Oxford County Roads** PROJECT NO. **KCH-00227972-GE**

CLIENT **County of Oxford** DATUM **Local**

DRILL TYPE/METHOD **Solid Stem** DATES: Boring **August 20, 2015** Water Level

| DEPTH (m) | ELEVATION (m) | STRATA DESCRIPTION | STRATA PLOT | WELL LOG | SAMPLES TYPE | SAMPLES NUMBER | SAMPLES RECOVERY (mm) or (%) | SAMPLES N VALUE (blows) or RQD (%) | BULK DENSITY (kN/m3) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| | 0.15 | **ASPHALT**, ~.150 m | | | | | | | |
| | | **FILL**, ~Brown sand & gravel, damp, compact | | | | | | | |
| | 0.50 | | | | | S1 | 350 | 22 | |
| | | **FILL**, Grey/brown, sandy silt, trace fine gravel, trace organics, trace clay, moist, compact | | | | | | | |
| | 0.76 | | | | | | | | |
| | | **SANDY SILT**, Grey/brown, trace clay, moist, firm | | | | | | | |
| 1 | | | | | | S2 | 300 | 7 | |
| | 1.52 | | | | | | | | |
| | | **SANDY SILT TILL**, Grey/brown, trace clay, trace gravel, moist, stiff | | | | | | | |
| | | | | | | S3 | | 13 | |
| | 1.98 | | | | | | | | |
| 2 | | **End of Borehole at 1.98 m depth** | | | | | | | |

**SHEAR STRENGTH**
✤ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
100 200 kPa

**Atterberg Limits and Moisture**
$W_P$ W $W_L$
● SPT N Value × Dynamic Cone
10 20 30 40

3.96 ▲

***NOTES***

1) Borehole interpretation requires assistance by exp before use by others. Borehole Logs must be read in conjunction with exp Report KCH-00223655-GE. For definition of terms used on logs, see sheets prior to logs.

2) Upon completion, borehole open to 1.98 m and dry.

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▥ Rock Core (eg. BQ, NQ, etc.) ▣ VN Vane Sample

OTHER TESTS

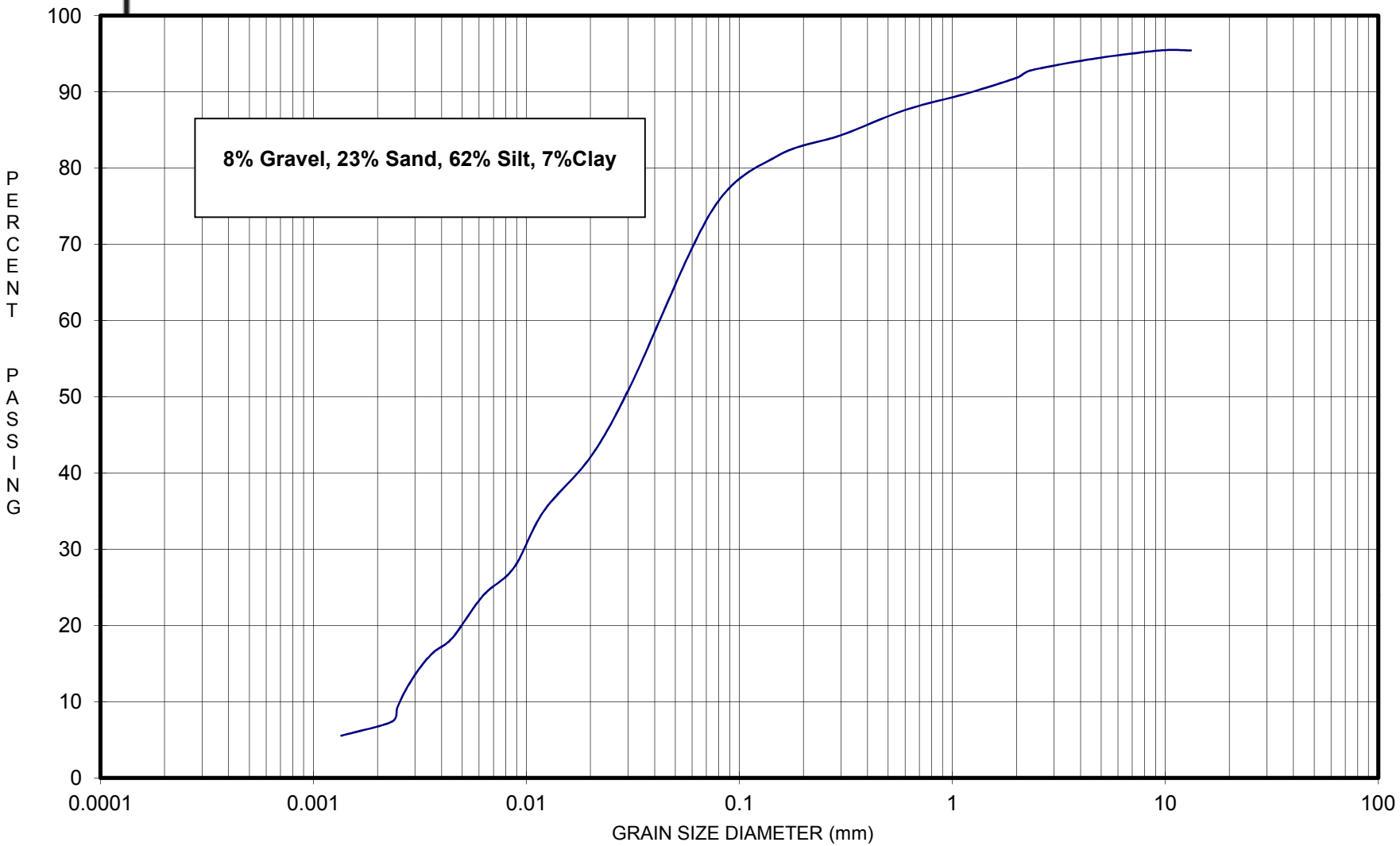
| | |
|---|---|
| G Specific Gravity | C Consolidation |
| H Hydrometer | CD Consolidated Drained Triaxial |
| S Sieve Analysis | CU Consolidated Undrained Triaxial |
| γ Unit Weight | UU Unconsolidated Undrained Triaxial |
| P Field Permeability | UC Unconfined Compression |
| K Lab Permeability | DS Direct Shear |

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

# Appendix C

Grain Size Analyses

# MECHANICAL GRAIN SIZE ANALYSIS




| CLAY | FINE | MEDIUM | COARSE | FINE | MEDIUM | COARSE | FINE | MEDIUM | COARSE | |
|---|---|---|---|---|---|---|---|---|---|---|
| | SILT | | | SAND | | | GRAVEL | | | |

MODIFIED M.I.T. CLASSIFICATION

**Sample Description: Oxford Road 16: BH 6 - SS 2 & BH 7 - SS 2**

**Oxford County Roads**
**Project: KCH-00227972-GE**

**Figure 2**

# Appendix D

Oxford County Pavement Design for Road 16

RS-1001-0-1985

# COUNTY OF OXFORD

COUNTY ROAD 16
CONC. XI, LOT 15&16
TOWNSHIP OF ZORRA


KEY PLAN

COUNTY OF OXFORD

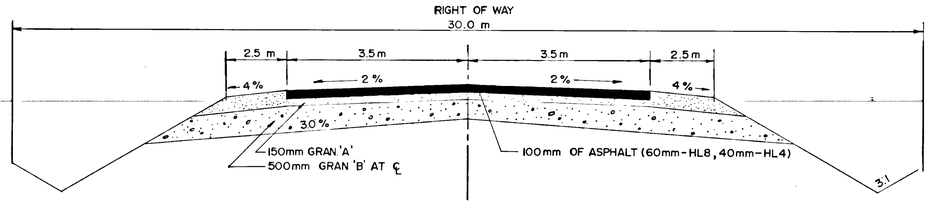
LABOR CONQUERS ALL THINGS

## CONTRACT Nº 68416

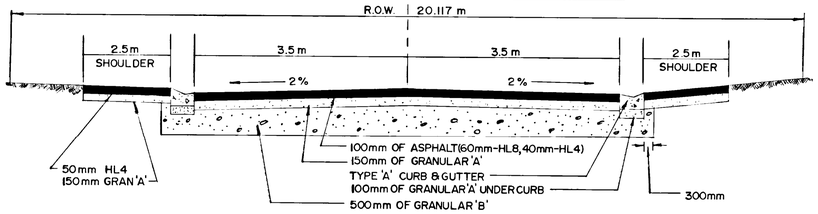
D.L. PRATT P. ENG.
DIRECTOR OF ENGINEERING

DWG. Nº 68416–1

RS-1001-2-1985

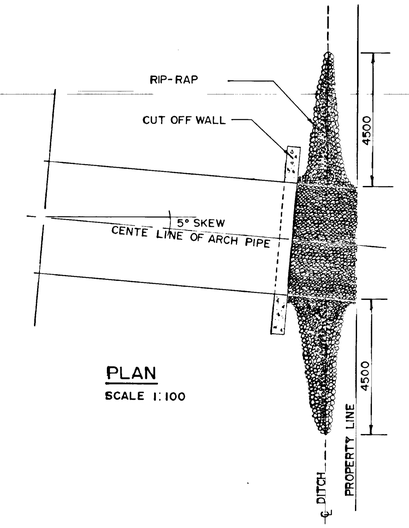



TYPICAL RURAL ROAD CROSS-SECTION




TYPICAL URBAN ROAD CROSS-SECTION

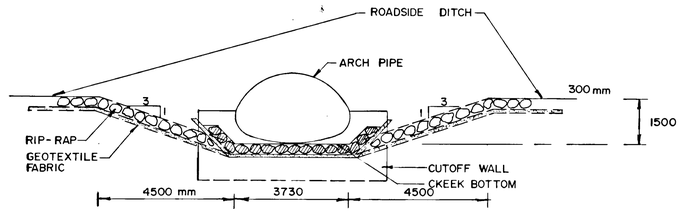
N.T.S.




PLAN

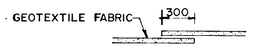
SCALE 1:100

## RIP-RAP DETAIL




SECTION

SCALE 1:100

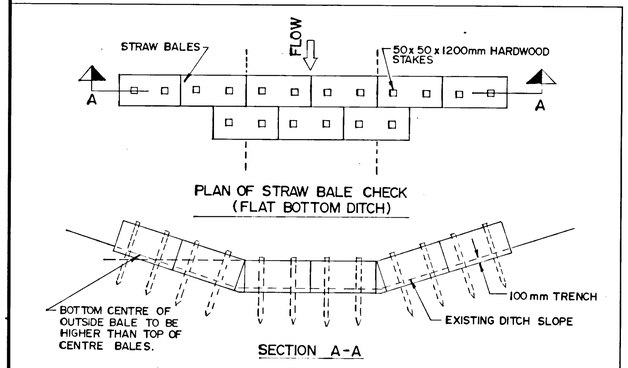



OVERLAP IN DIRECTION OF FLOW.

NOTES

A. RIP-RAP TO BE HAND LAID.

B. GEOTEXTILE FABRIC TO BE NONWOVEN WITH A UNIT WEIGHT OF 270 g/m²



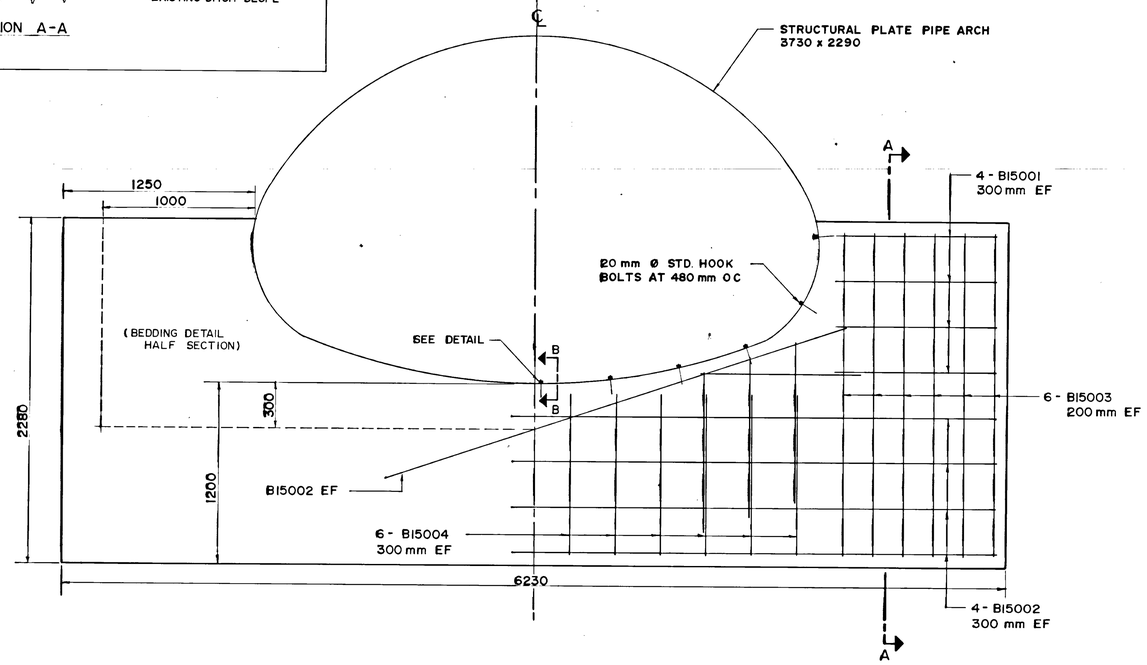

SECTION A-A

BAR LIST

| BAR Nº | QUANTITY | LENGTH (m) | COMMENTS |
|---|---|---|---|
| BI5001 | 20 | 1.06 | |
| BI5002 | 20 | 3.20 | |
| BI5003 | 24 | 2.13 | |
| BI5004 | 36 | 1.06 | |
| ANCHOR BOLTS | 12 | 0.15 | 20mmØ HOOK |

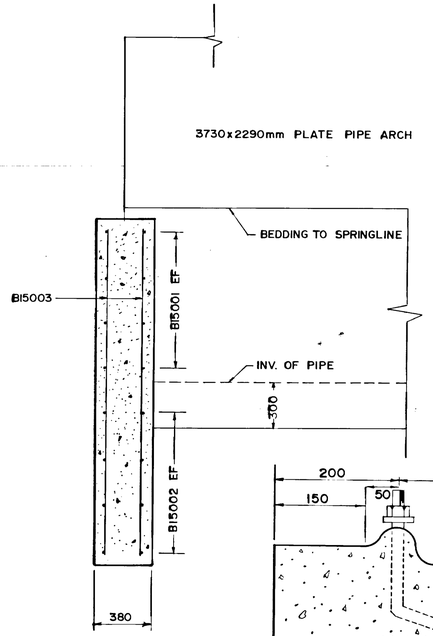
NOTES

A. REINFORCING STEEL CLEAR COVER: 75mm
B. E.F. DENOTES EACH FACE.
C. NUMBER OF BARS SHOWN ARE FOR ONE WALL ONLY
D. DESIGN FROM O.P.S.D.-812.01 TYPE 'A'
E. CUTOFF WALLS TO BE CONSTRUCTED AT BOTH ENDS OF THE PIPE.
F. F.F. DENOTES FRONT FACE.



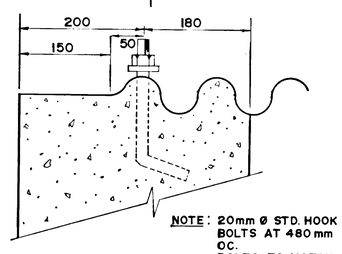

CUT OFF WALL ELEVATION

SCALE 1:20




SECTION A-A

SCALE 1:20




NOTE: 20mm Ø STD. HOOK BOLTS AT 480 mm OC. BOLTS TO MATCH HOLES IN PLATE.

SECTION B-B

SCALE 1:5

CONTRACT Nº: _____

COUNTY OF OXFORD

ENGINEERING DEPARTMENT

COUNTY ROAD

DESIGNED BY: _____

APPROVED BY: _____

DWN BY: D. HARRIS

CHECKED BY: T. DECOO C.E.T.

DATE: JAN 07/86

SCALE: HOR: AS SHOWN

VERT: _____

| DATE | REVISIONS & ADDITIONS | BY |
|---|---|---|
| | | |

DWG Nº: _____

TRANSLAR