

APPENDIX 'A'
GEOTECHNICAL INVESTIGATION REPORT



Stantec Consulting Ltd.
199 Henlow Bay
Winnipeg MB R3Y 1G4

February 26, 2024

Project/File: 123316892

Caleb Olfert
Dillon Consulting Ltd.
1558 Willson Place
Winnipeg, MB R3T 0Y4

Good day Caleb,

Reference: 24-R-06 Geotechnical Investigation

Stantec Consulting Ltd. (Stantec) was retained to undertake a factual geotechnical investigation for the Local Streets Package 24-R-06 in Winnipeg, Manitoba. Use of this report is subject to the Statement of General Conditions provided in **Appendix A**.

The subsurface coring and drilling sampling program was conducted from January 10, 2024, to January 25, 2024. Pavement coring was performed by our geotechnical field personnel, and drilling services were provided by Maple Leaf Drilling under the supervision of our personnel. The borehole locations are shown on the attached Borehole Location Plan provided in **Appendix B**. When subsurface drilling was required, the pavement cores were sampled with a 150 mm bit and boreholes were drilled with 125 mm solid stem augers. Geotechnical drilling boreholes were terminated at a depth of 2.0 m below the pavement, which resulted in borehole depths ranging from 2.07 m to 2.22 m below the surface. Soil samples were obtained directly from the auger flights at depths of 0.6 m, 0.9 m, 1.2 m, 1.6 m, and 2.0 m from the bottom of the existing pavement. Upon completion of drilling, the testholes were examined for evidence of sloughing and groundwater seepage. The borehole records are provided in **Appendix C**. The soil classification used in the borehole records is as per ASTM D2487 – *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)*. Core photographs are provided in **Appendix D**.

Reference: 24-R-06 Geotechnical Investigation

EXISTING PAVEMENT THICKNESS

The existing pavement thickness is provided in the following table:

Table 1 – Existing Pavement Thickness

| Street | Core ID | Asphalt Thickness (mm) | Concrete Thickness (mm) | Total Pavement Thickness (mm) |
|------------------|---------|------------------------|-------------------------|-------------------------------|
| Kanata St | BH-01 | 0 | 140 | 140 |
| Kanata St | BH-02 | 15 | 165 | 180 |
| Kanata St | BH-03 | 0 | 165 | 165 |
| Kanata St | BH-04 | 0 | 180 | 180 |
| Wabasha St | BH-05 | 0 | 145 | 145 |
| Wabasha St | BH-06 | 0 | 160 | 160 |
| Wabasha St | BH-07 | 0 | 165 | 165 |
| Wynford Backlane | BH-08 | 0 | 155 | 155 |
| Wynford Backlane | BH-09 | 30 | 140 | 170 |
| Wynford Backlane | BH-10 | 10 | 125 | 135 |
| Lilian Ave | BH-11 | 110 | 0 | 110 |
| Lilian Ave | BH-12 | 75 | 100 | 175 |
| Lilian Ave | BH-13 | 0 | 220 | 220 |
| Champlain St | BH-14 | 20 | 150 | 170 |
| Champlain St | BH-15 | 0 | 155 | 155 |
| Champlain St | BH-16 | 0 | 160 | 160 |
| Champlain St | BH-17 | 0 | 165 | 165 |
| Dumoulin St | BH-18 | 0 | 180 | 180 |
| Dumoulin St | BH-19 | 0 | 150 | 150 |
| Dumoulin St | BH-20 | 0 | 170 | 170 |
| Dumoulin St | BH-21 | 0 | 180 | 180 |
| Dumoulin St | BH-22 | 0 | 175 | 175 |
| McMahon Pl | BH-23 | 0 | 180 | 180 |
| McMahon Pl | BH-24 | 0 | 160 | 160 |
| Howard Kendel Pl | BH-25 | 0 | 130 | 130 |
| Howard Kendel Pl | BH-26 | 0 | 145 | 145 |
| Kern Dr | BH-27 | 0 | 155 | 155 |
| Kern Dr | BH-28 | 0 | 170 | 170 |

Reference: 24-R-06 Geotechnical Investigation

| Street | Core ID | Asphalt Thickness (mm) | Concrete Thickness (mm) | Total Pavement Thickness (mm) |
|--------------|---------|------------------------|-------------------------|-------------------------------|
| Kern Dr | BH-29 | 0 | 190 | 190 |
| Kern Dr | BH-30 | 0 | 160 | 160 |
| Kern Dr | BH-31 | 0 | 150 | 150 |
| Baywater Pl | BH-32 | 0 | 180 | 180 |
| Baywater Pl | BH-33 | 0 | 200 | 200 |
| Courtwood Pl | BH-34 | 0 | 160 | 160 |
| Courtwood Pl | BH-35 | 0 | 100 | 100 |
| Roanoke St | BH-36 | 30 | 100 | 130 |
| Roanoke St | BH-37 | 0 | 140 | 140 |
| Melrose Ave | BH-38 | 20 | 150 | 170 |
| Melrose Ave | BH-39 | 0 | 175 | 175 |

LABORATORY TESTING

The following laboratory tests were conducted on select soil samples:

- ASTM D2216 - *Laboratory Determination of Water (Moisture) Content of Soil by Mass*
- ASTM D4318 - *Liquid Limit, Plastic Limit, and Plasticity Index of Soils*
- ASTM D7928 - *Particle-Size Distribution of Fine-Grained Soils Using The Sedimentation Analysis*
- ASTM D698 - *Laboratory Compaction Characteristics of Soil Using Standard Effort*
- ASTM D1883 - *California Bearing Ratio (CBR) of Laboratory-Compacted Soils*
- CSA A23.2-14C – *Obtaining and testing drilled cores for compressive strength testing*

The CBR tests were performed at 95% maximum dry density under soaked conditions. Prior to testing the concrete core samples for compressive strength, the cores were conditioned in water at room temperature for 48 hours. The moisture content results are shown on the borehole records, and the laboratory test reports are provided in **Appendix E**.

Reference: 24-R-06 Geotechnical Investigation

CLOSURE

We appreciate the opportunity to assist you on this project. Please contact the undersigned if you have any questions regarding this report.

Regards,

STANTEC CONSULTING LTD.



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Attachment: Appendix A – Statement of General Conditions
Appendix B – Borehole Location Plan
Appendix C – Borehole Records
Appendix D – Core Photographs
Appendix E – Laboratory Test Reports

- Atterberg Limits Test Reports
- Particle-Size Analysis Reports
- Standard Proctor Test Reports
- CBR Test Reports
- Concrete Core Compressive Strength Test Results

APPENDIX A

Statement of General Conditions

STATEMENT OF GENERAL CONDITIONS

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Stantec and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Stantec's present understanding of the site-specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site-specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Stantec is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state or province of execution for the specific professional service provided to the Client. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Stantec at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock, and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Stantec must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Stantec will not be responsible to any party for damages incurred as a result of failing to notify Stantec that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Stantec, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc.), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Stantec cannot be responsible for site work carried out without being present.



APPENDIX B

Borehole Location Plan



KANATA ST

BH-01 ●

PANDORA AVEE



TITLE

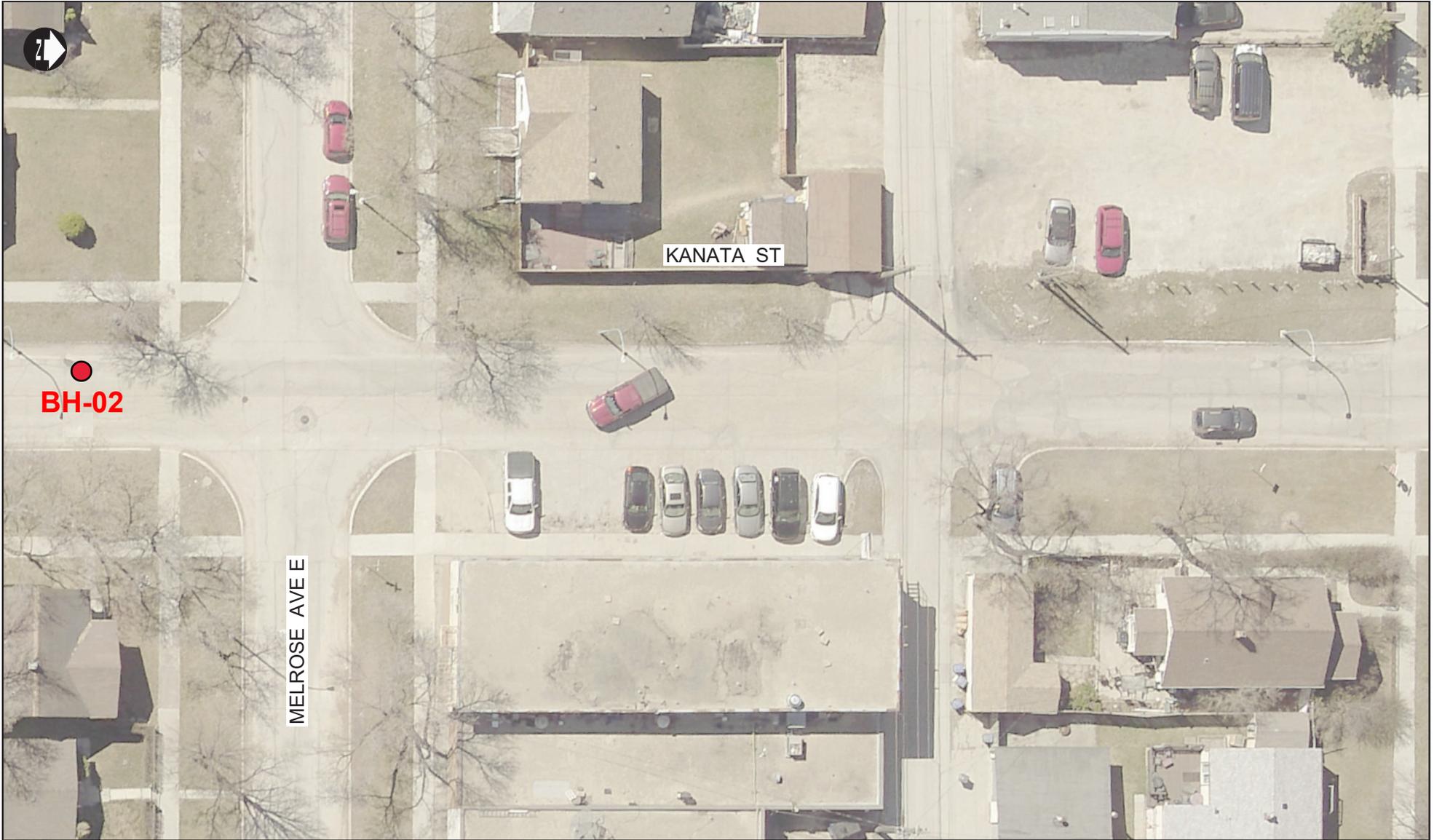
KANATA STREET
1 OF 5

PROJECT NO.

-

DRAWING NO.

-



BH-02

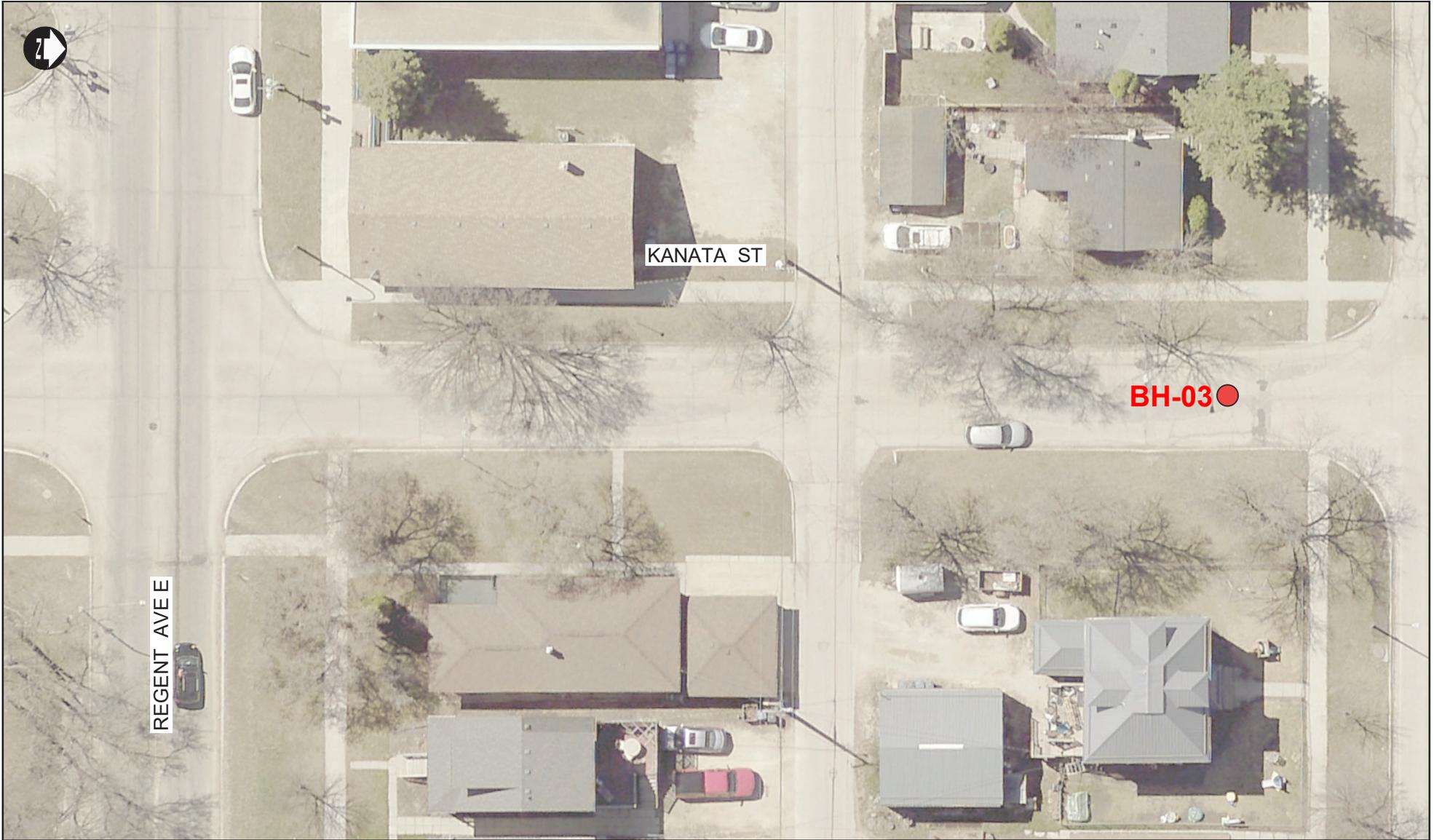
KANATA ST

MELROSE AVE E



TITLE
KANATA STREET
2 OF 5

PROJECT NO. -
DRAWING NO. -



KANATA ST

REGENT AVENUE

BH-03 ●



SCALE: 1:250

TITLE

KANATA STREET
3 OF 5

PROJECT NO.

-

DRAWING NO.

-



VICTORIA AVE E

KANATA ST

YALE AVE E



SCALE: 1:250

TITLE

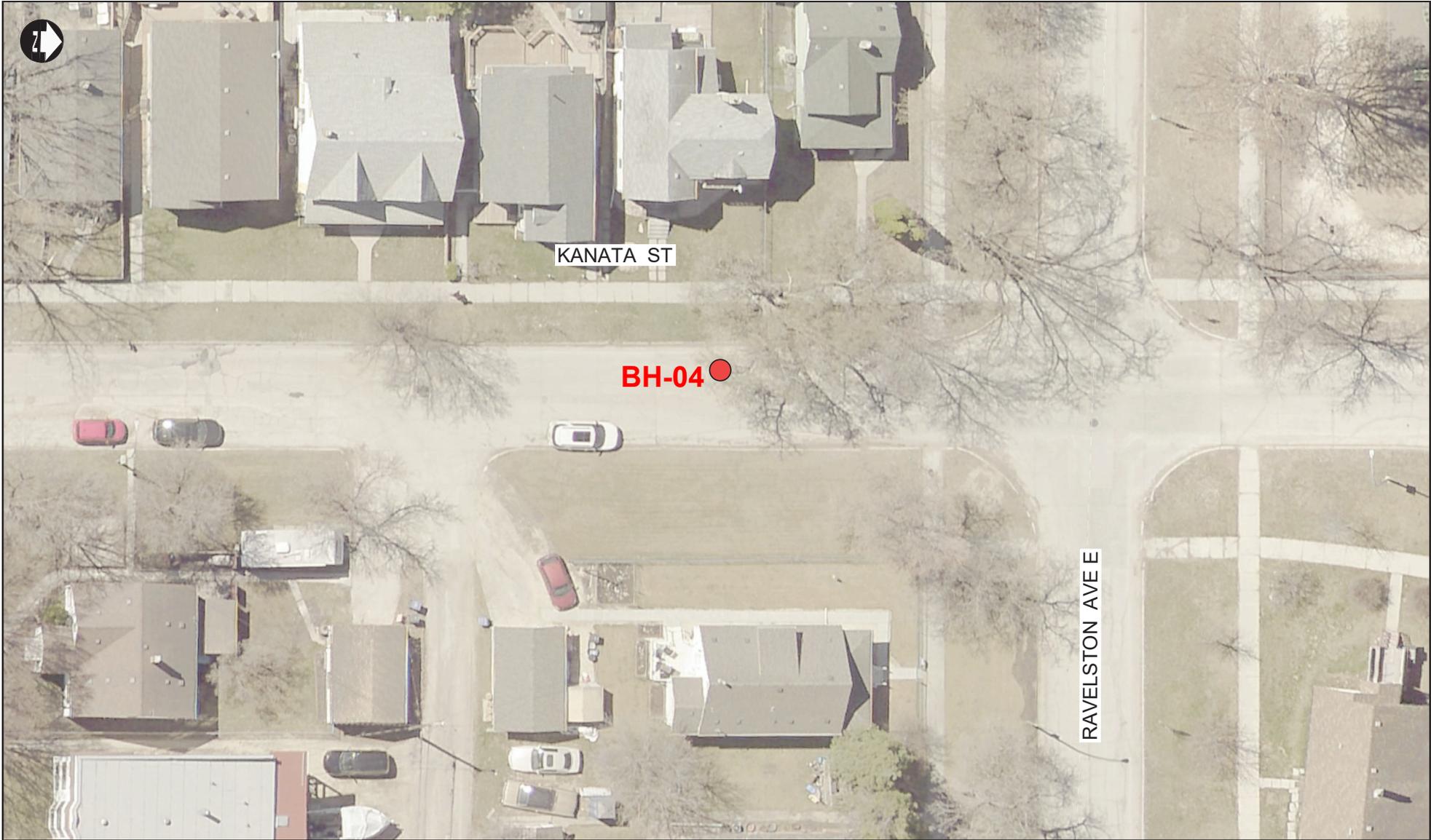
KANATA STREET
4 OF 5

PROJECT NO.

-

DRAWING NO.

-



KANATA ST

BH-04

RAVELSTON AVE E



TITLE
KANATA STREET
5 OF 5

| | |
|-------------|---|
| PROJECT NO. | - |
| DRAWING NO. | - |



WABASHA ST

PANDORA AVE E

BH-05

BH-06



SCALE: 1:250

TITLE

WABASHA STREET
1 OF 2

PROJECT NO.

-

DRAWING NO.

-



MELROSE AVE E

WABASHA ST

REGENT AVE E

BH-07 ●



SCALE: 1:250

TITLE

WABASHA STREET
2 OF 2

PROJECT NO.

-

DRAWING NO.

-



BH-08

AINSDALE WAY



| | |
|---------------------|-------------|
| TITLE | PROJECT NO. |
| WYNFORD DRIVE ALLEY | - |
| 1 OF 3 | DRAWING NO. |
| | - |



SCALE: 1:250

TITLE

WYNFORD DRIVE ALLEY
2 OF 3

PROJECT NO.

-

DRAWING NO.

-



SCALE: 1:250

TITLE

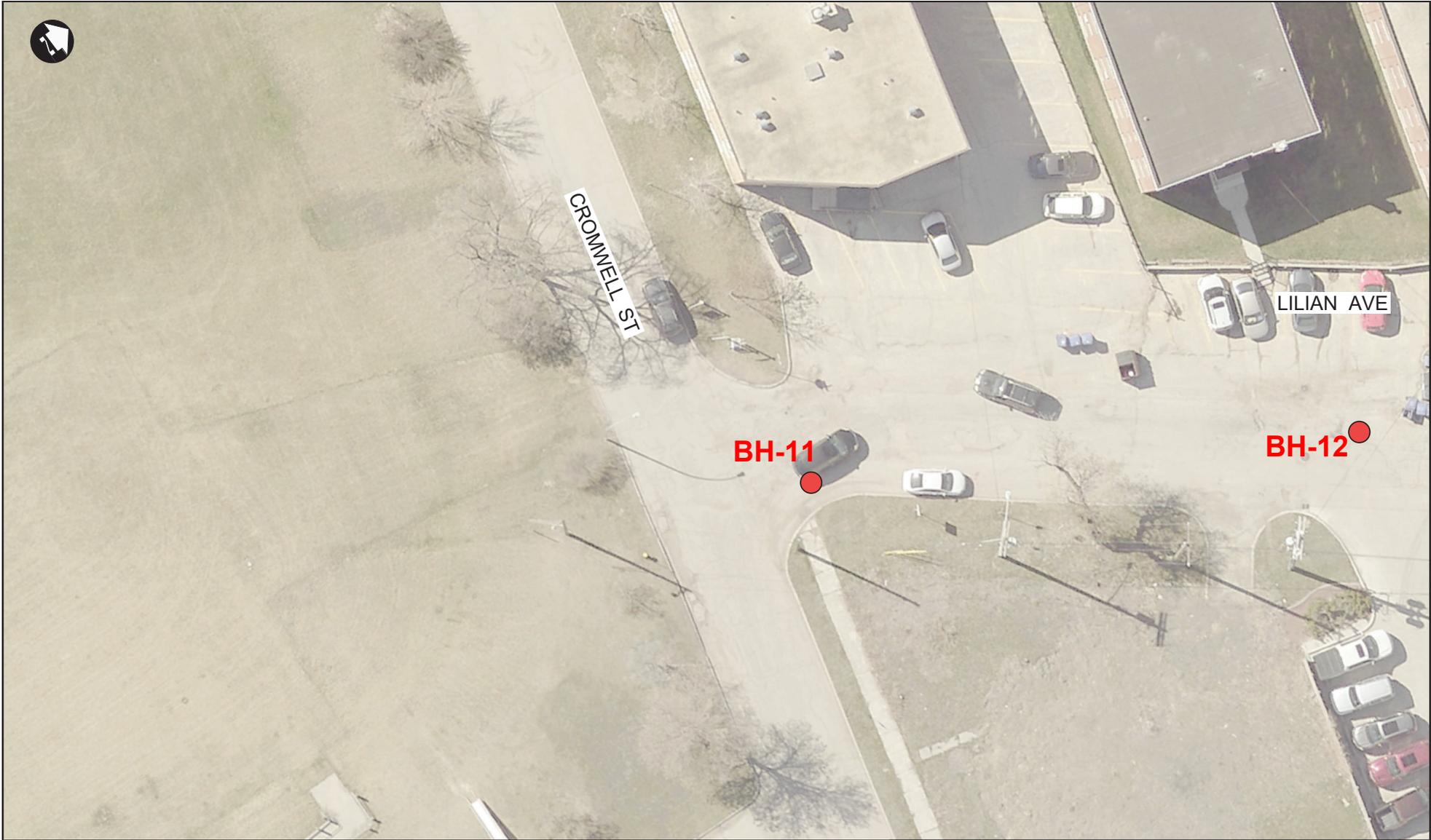
WYNFORD DRIVE ALLEY
3 OF 3

PROJECT NO.

-

DRAWING NO.

-



| | |
|-------|-------------------------|
| TITLE | LILIAN AVENUE 1 OF 2 |
|-------|-------------------------|

| | |
|-------------|---|
| PROJECT NO. | - |
| DRAWING NO. | - |



BH-13

LILIAN AVE

POULIN DR

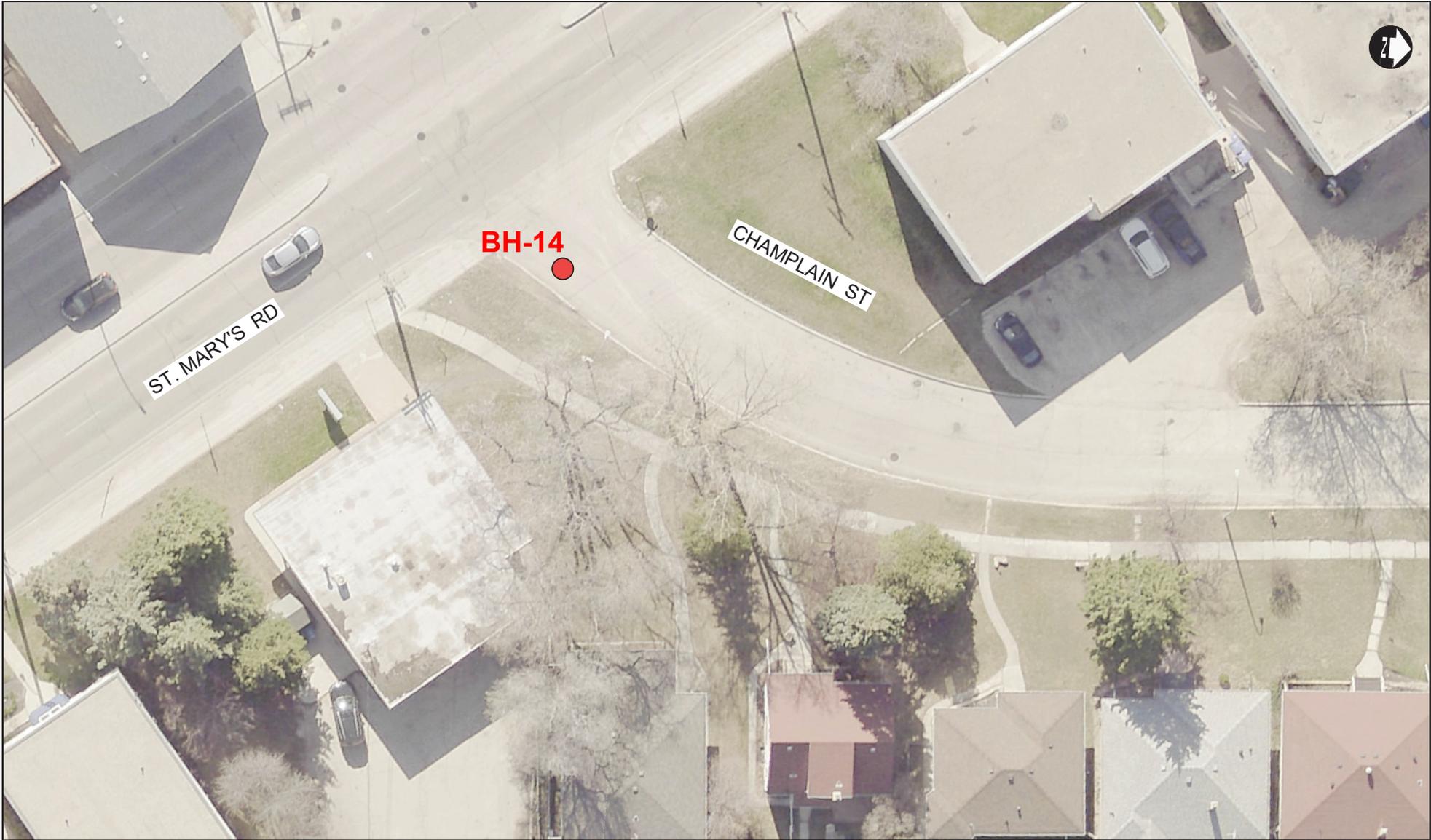
ST. MARY'S RD



TITLE
LILIAN AVENUE
2 OF 2

PROJECT NO.
-
DRAWING NO.
-

SCALE: 1:250



BH-14

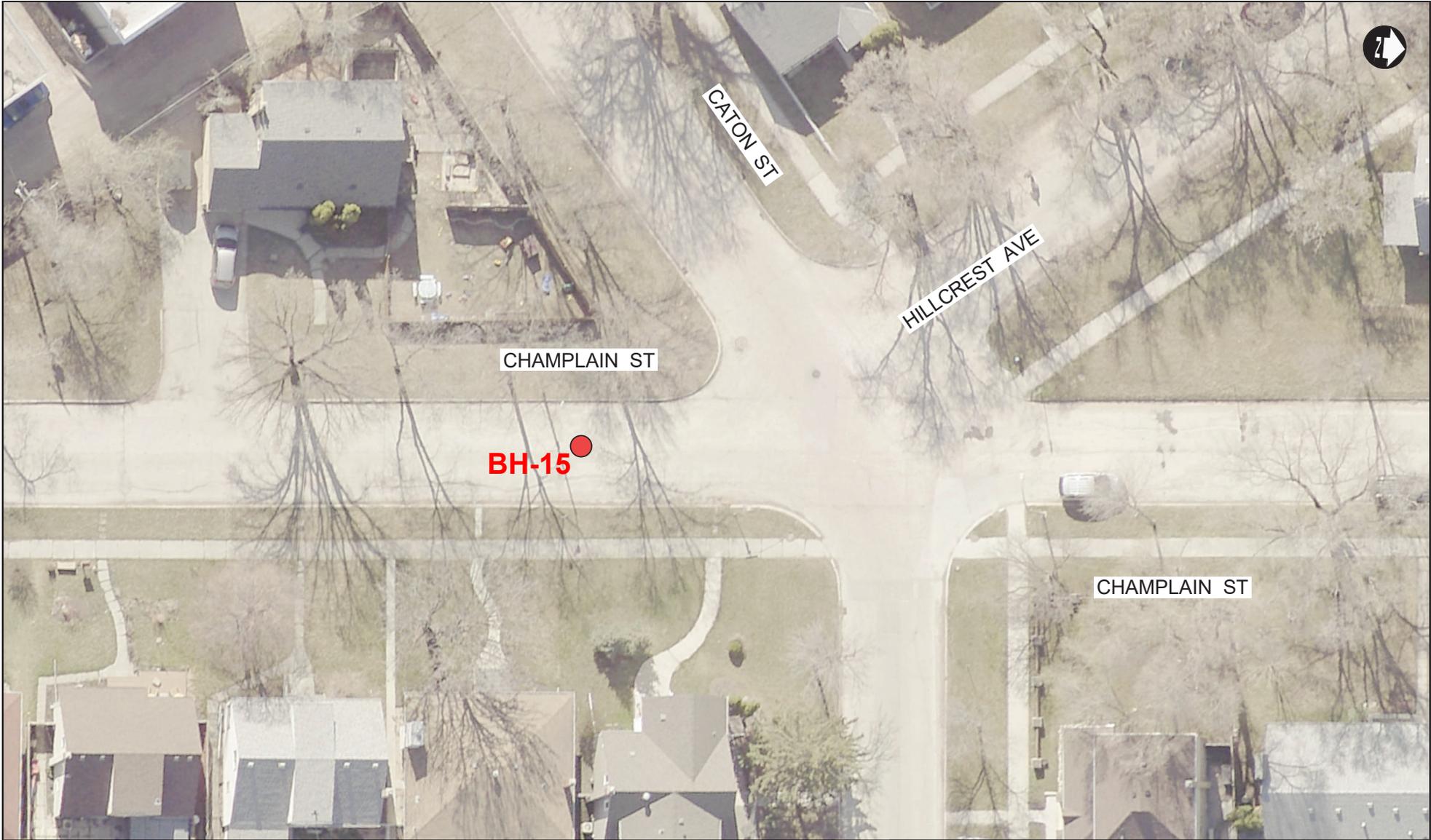
ST. MARY'S RD

CHAMPLAIN ST



| | |
|-------|----------------------------|
| TITLE | CHAMPLAIN STREET 1 OF 4 |
|-------|----------------------------|

| | |
|-------------|---|
| PROJECT NO. | - |
| DRAWING NO. | - |



CATON ST

HILLCREST AVE

CHAMPLAIN ST

BH-15

CHAMPLAIN ST



SCALE: 1:250

TITLE

CHAMPLAIN STREET
2 OF 4

PROJECT NO.

-

DRAWING NO.

-



CHAMPLAIN ST

BH-16



TITLE

CHAMPLAIN STREET
3 OF 4

PROJECT NO.

-

DRAWING NO.

-



CHAMPLAIN ST

NIVERVILLE AVE

BH-17



| | |
|-------|----------------------------|
| TITLE | CHAMPLAIN STREET 4 OF 4 |
|-------|----------------------------|

| | |
|-------------|---|
| PROJECT NO. | - |
| DRAWING NO. | - |



DUMOULIN ST

BH-18

LANGEVIN ST



SCALE: 1:250

TITLE

DUMOULIN STREET
1 OF 5

PROJECT NO.

-

DRAWING NO.

-



DUMOULIN ST

BH-19



SCALE: 1:250

TITLE

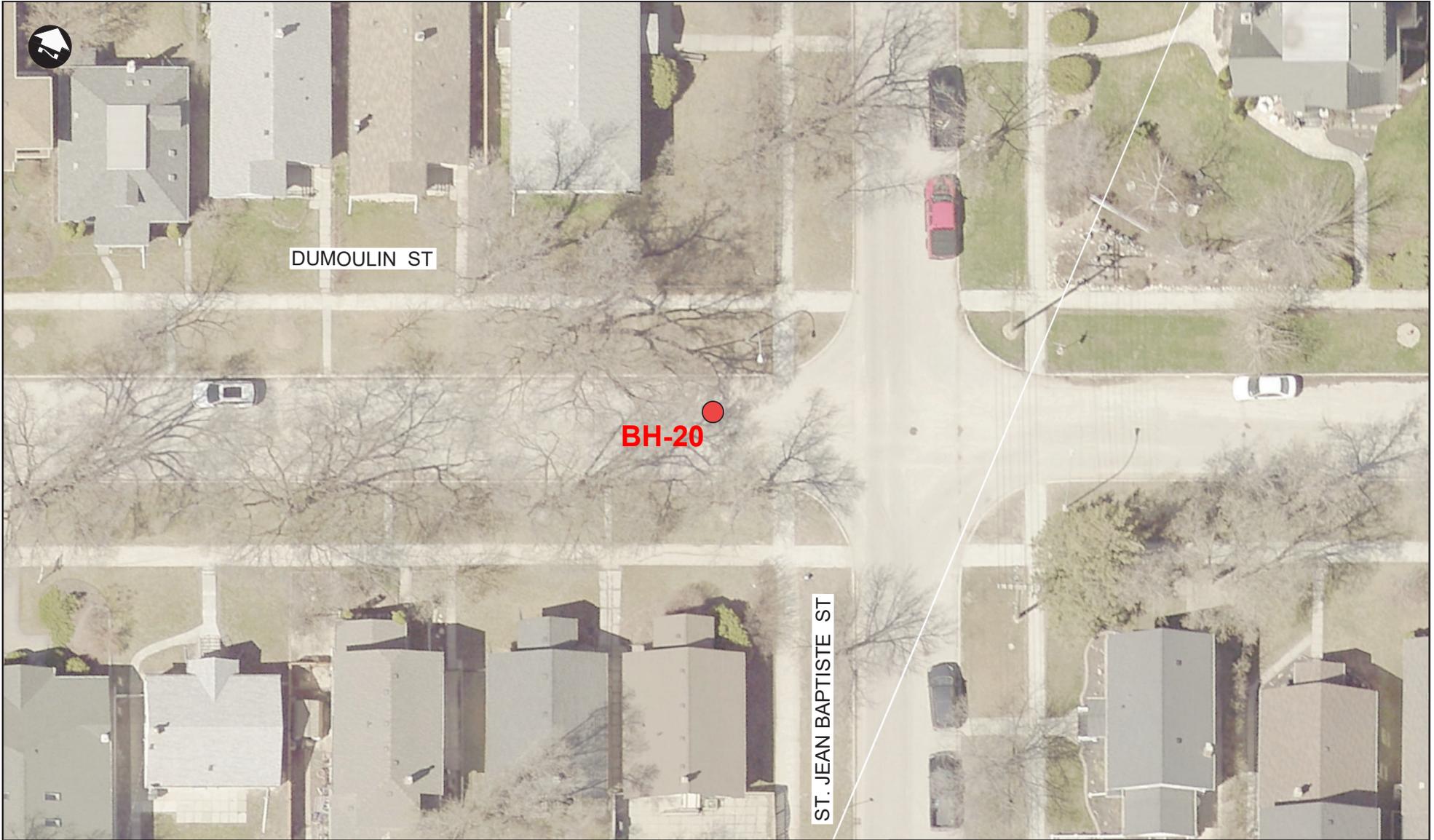
DUMOULIN STREET
2 OF 5

PROJECT NO.

-

DRAWING NO.

-



DUMOULIN ST

BH-20

ST. JEAN BAPTISTE ST



SCALE: 1:250

TITLE

DUMOULIN STREET
3 OF 5

PROJECT NO.

-

DRAWING NO.

-



DUMOULIN ST

BH-21



TITLE

DUMOULIN STREET
4 OF 5

SCALE: 1:250

PROJECT NO.

-

DRAWING NO.

-



DUMOULIN ST

THIBAUT ST

BH-22



SCALE: 1:250

TITLE

DUMOULIN STREET
5 OF 5

PROJECT NO.

-

DRAWING NO.

-



BH-23

BH-24

McMAHON PL

McLELLAN DR



TITLE

HOWARD KENDEL PLACE
1 OF 1

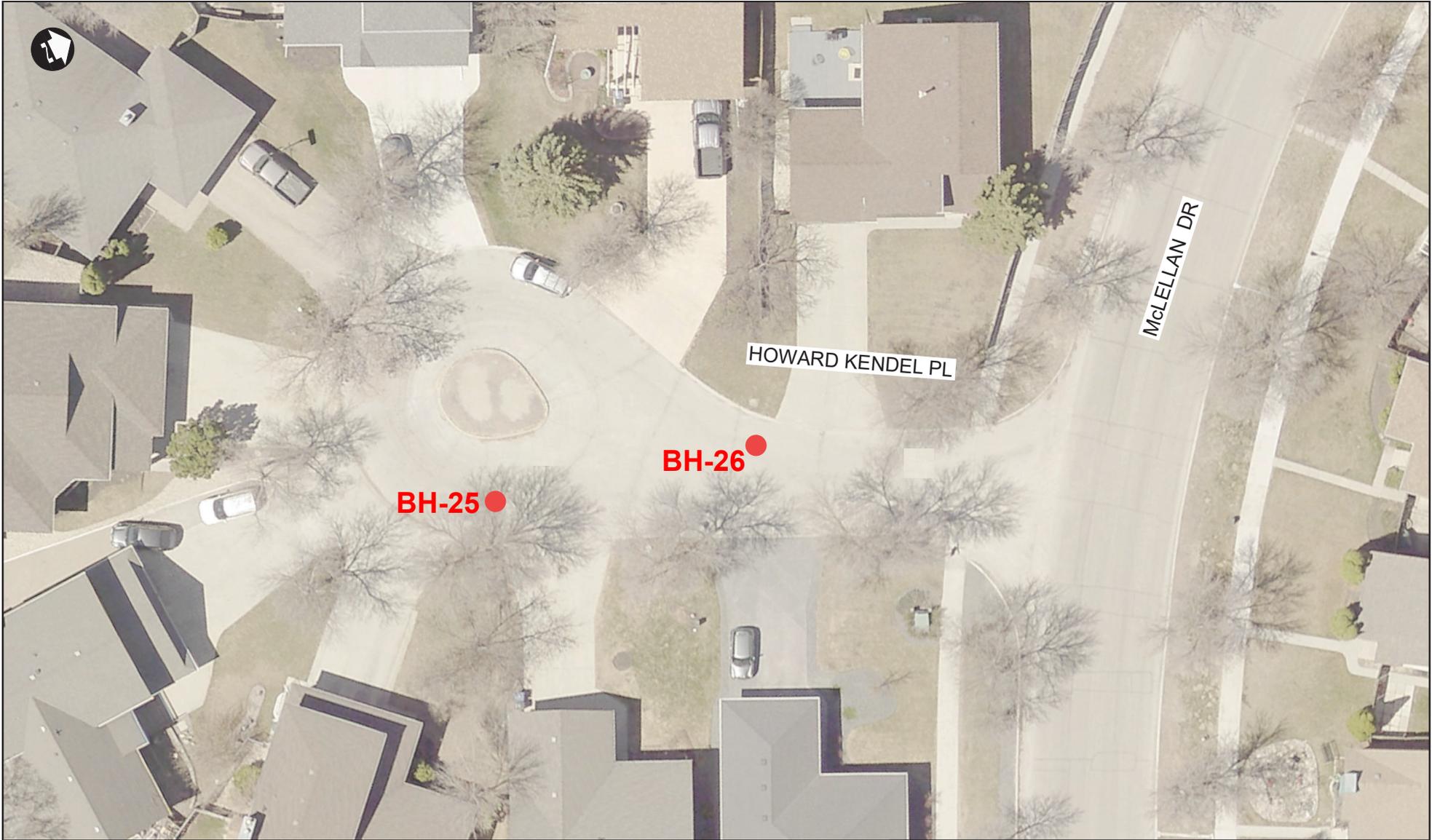
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PROJECT NO.

-

DRAWING NO.

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TITLE
HOWARD KENDEL PLACE
1 OF 1

PROJECT NO. -
DRAWING NO. -

SCALE: 1:250



TITLE

KERN DRIVE
1 OF 5

PROJECT NO.

-

DRAWING NO.

-



BH-28 ●

KERN DR



SCALE: 1:250

TITLE

KERN DRIVE
2 OF 5

PROJECT NO.

-

DRAWING NO.

-



BH-29

KERN DR

WABASHA ST



TITLE

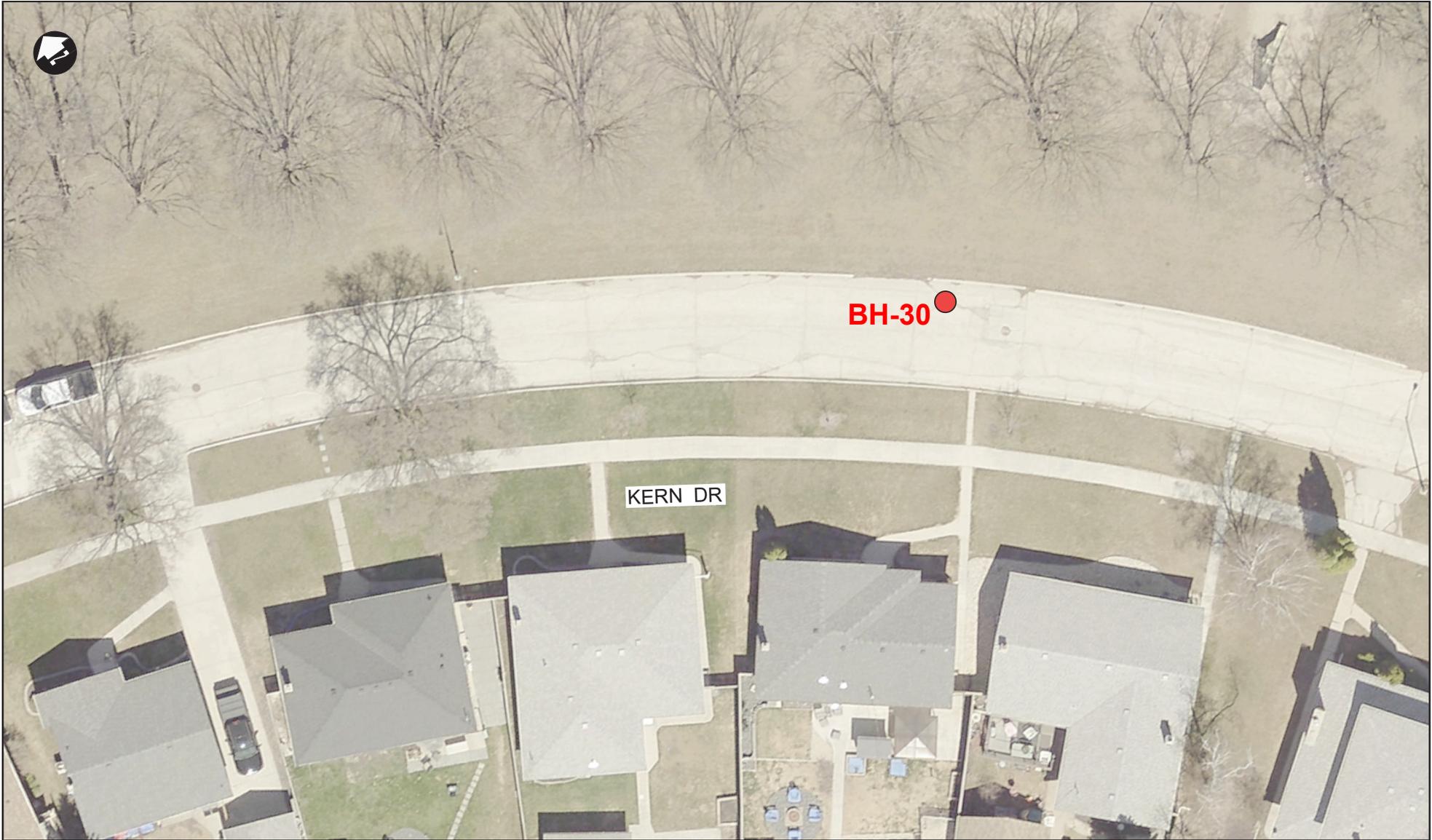
KERN DRIVE
3 OF 5

PROJECT NO.

-

DRAWING NO.

-



BH-30

KERN DR



TITLE

KERN DRIVE
4 OF 5

PROJECT NO.

-

DRAWING NO.

-

SCALE: 1:250



BH-31



TITLE

KERN DRIVE
4 OF 5

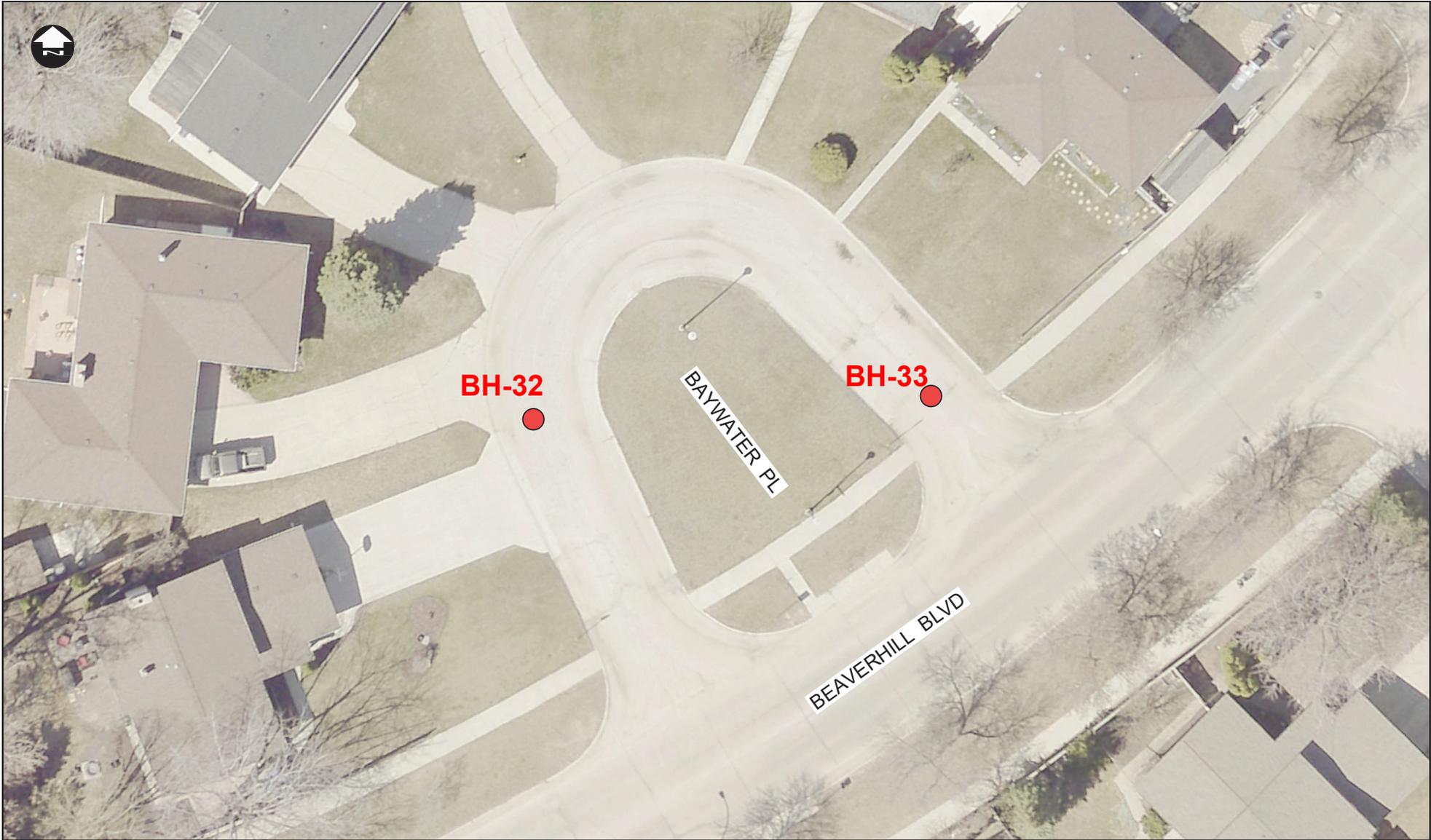
PROJECT NO.

-

DRAWING NO.

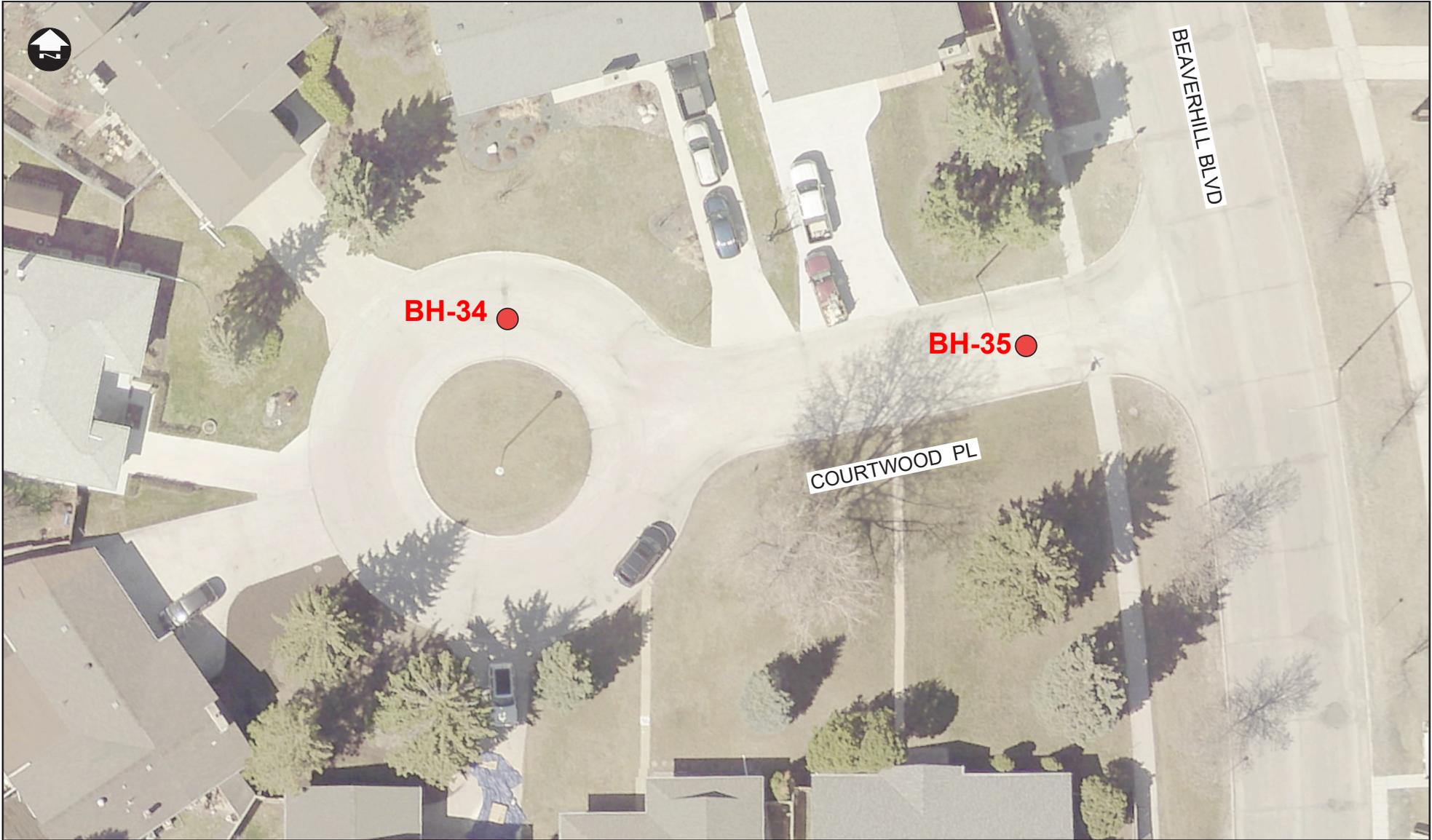
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SCALE: 1:250



| | |
|-------|--------------------------|
| TITLE | BAYWATER PLACE 1 OF 1 |
|-------|--------------------------|

| | |
|-------------|---|
| PROJECT NO. | - |
| DRAWING NO. | - |



BH-34



BH-35



BEAVERHILL BLVD

COURTWOOD PL



SCALE: 1:250

TITLE

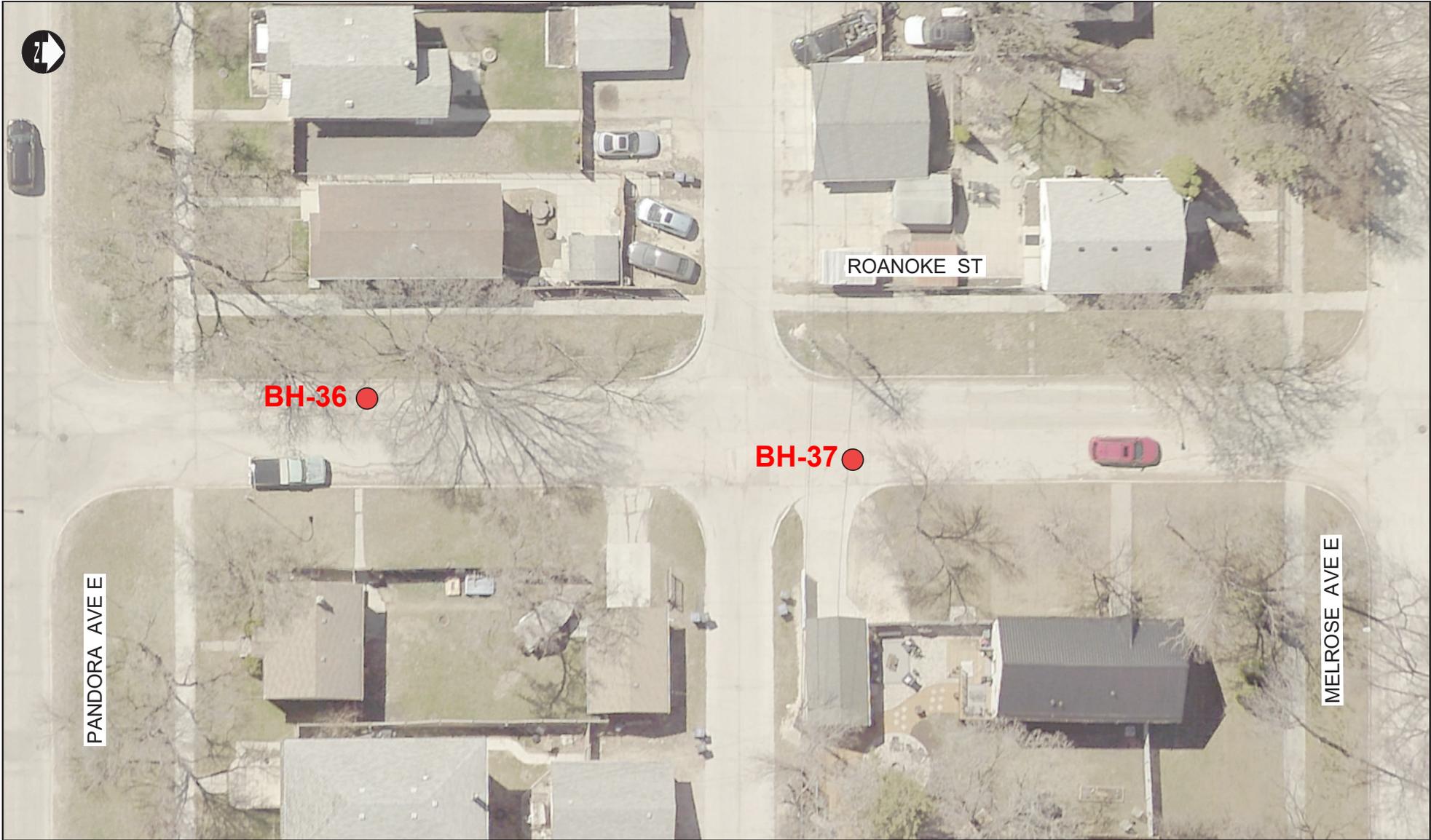
COURTWOOD PL
1 OF 1

PROJECT NO.

-

DRAWING NO.

-



BH-36 ●

BH-37 ●

PANDORA AVE E

ROANOKE ST

MELROSE AVE E



SCALE: 1:250

TITLE

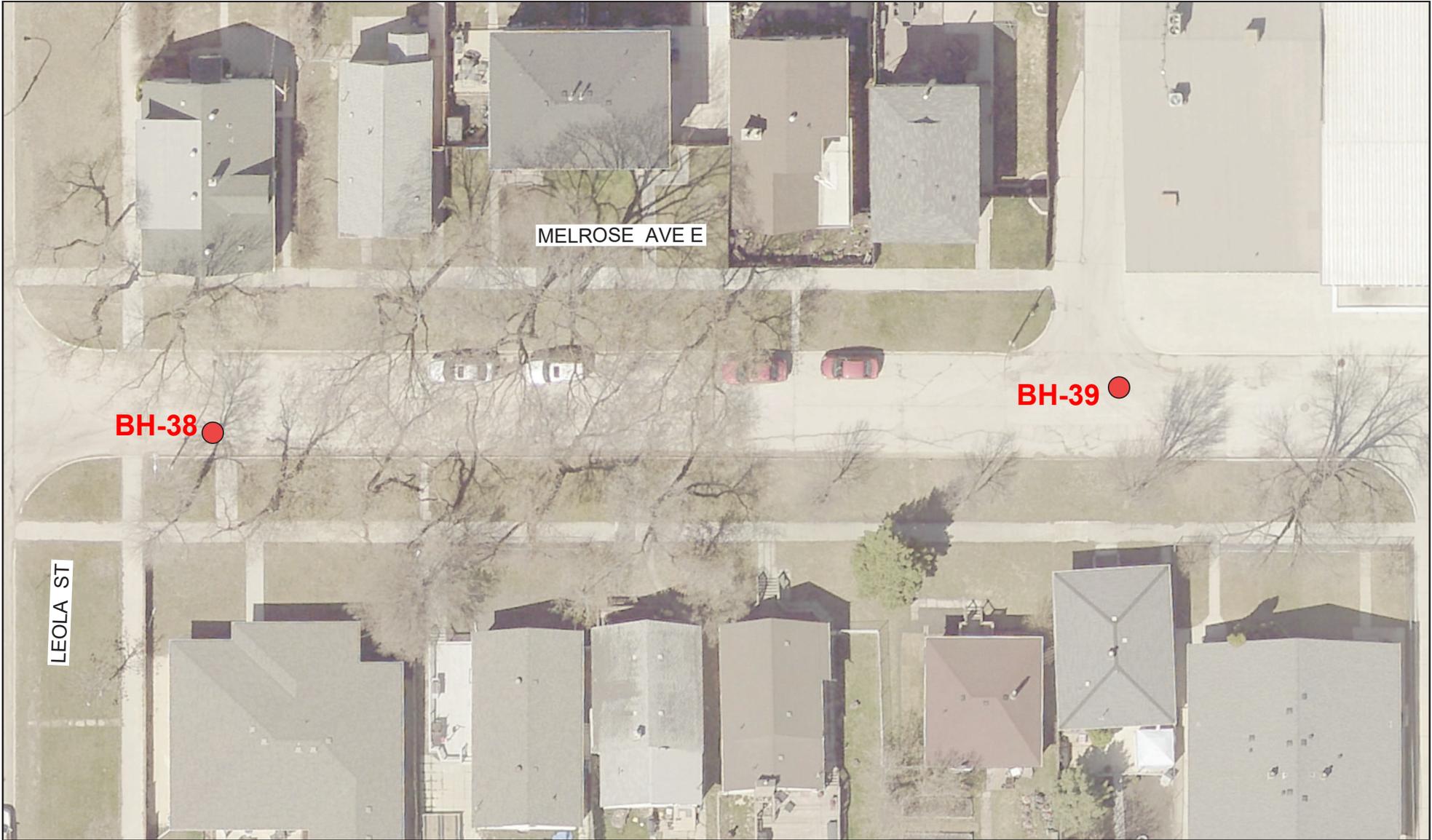
Roanoke St

PROJECT NO.

-

DRAWING NO.

-



LEOLA ST

MELROSE AVE E

BH-38

BH-39



TITLE

Melrose Ave E

SCALE: 1:250

PROJECT NO.

-

DRAWING NO.

-

APPENDIX C

Borehole Records

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

| | |
|----------------|---|
| <i>Rootmat</i> | - vegetation, roots and moss with organic matter and topsoil typically forming a mattress at the ground surface |
| <i>Topsoil</i> | - mixture of soil and humus capable of supporting vegetative growth |
| <i>Peat</i> | - mixture of visible and invisible fragments of decayed organic matter |
| <i>Till</i> | - unstratified glacial deposit which may range from clay to boulders |
| <i>Fill</i> | - material below the surface identified as placed by humans (excluding buried services) |

Terminology describing soil structure:

| | |
|-------------------|--|
| <i>Desiccated</i> | - having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc. |
| <i>Fissured</i> | - having cracks, and hence a blocky structure |
| <i>Varved</i> | - composed of regular alternating layers of silt and clay |
| <i>Stratified</i> | - composed of alternating successions of different soil types, e.g. silt and sand |
| <i>Layer</i> | - > 75 mm in thickness |
| <i>Seam</i> | - 2 mm to 75 mm in thickness |
| <i>Parting</i> | - < 2 mm in thickness |

Terminology describing soil types:

The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488) which excludes particles larger than 75 mm. For particles larger than 75 mm, and for defining percent clay fraction in hydrometer results, definitions proposed by Canadian Foundation Engineering Manual, 4th Edition are used. The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):

Terminology describing materials outside the USCS, (e.g. particles larger than 75 mm, visible organic matter, and construction debris) is based upon the proportion of these materials present:

| | |
|-----------------------------|---------------|
| <i>Trace, or occasional</i> | Less than 10% |
| <i>Some</i> | 10-20% |
| <i>Frequent</i> | > 20% |

Terminology describing compactness of cohesionless soils:

The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test (SPT) N-Value - also known as N-Index. The SPT N-Value is described further on page 3. A relationship between compactness condition and N-Value is shown in the following table.

| Compactness Condition | SPT N-Value |
|-----------------------|-------------|
| <i>Very Loose</i> | <4 |
| <i>Loose</i> | 4-10 |
| <i>Compact</i> | 10-30 |
| <i>Dense</i> | 30-50 |
| <i>Very Dense</i> | >50 |

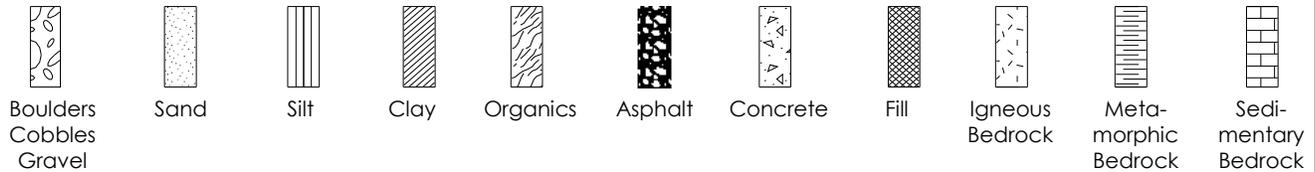
Terminology describing consistency of cohesive soils:

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests. Consistency may be crudely estimated from SPT N-Value based on the correlation shown in the following table (Terzaghi and Peck, 1967). The correlation to SPT N-Value is used with caution as it is only very approximate.

| Consistency | Undrained Shear Strength | | Approximate SPT N-Value |
|-------------------|--------------------------|-----------|-------------------------|
| | kips/sq.ft. | kPa | |
| <i>Very Soft</i> | <0.25 | <12.5 | <2 |
| <i>Soft</i> | 0.25 - 0.5 | 12.5 - 25 | 2-4 |
| <i>Firm</i> | 0.5 - 1.0 | 25 - 50 | 4-8 |
| <i>Stiff</i> | 1.0 - 2.0 | 50 - 100 | 8-15 |
| <i>Very Stiff</i> | 2.0 - 4.0 | 100 - 200 | 15-30 |
| <i>Hard</i> | >4.0 | >200 | >30 |

STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.



SAMPLE TYPE

| | |
|------------------|---|
| SS | Split spoon sample (obtained by performing the Standard Penetration Test) |
| ST | Shelby tube or thin wall tube |
| DP | Direct-Push sample (small diameter tube sampler hydraulically advanced) |
| PS | Piston sample |
| BS | Bulk sample |
| HQ, NQ, BQ, etc. | Rock core samples obtained with the use of standard size diamond coring bits. |

WATER LEVEL MEASUREMENT



measured in standpipe, piezometer, or well



inferred

RECOVERY

For soil samples, the recovery is recorded as the length of the soil sample recovered. For rock core, recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

N-VALUE

Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (63.5 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (300 mm) into the soil. In accordance with ASTM D1586, the N-Value equals the sum of the number of blows (N) required to drive the sampler over the interval of 6 to 18 in. (150 to 450 mm). However, when a 24 in. (610 mm) sampler is used, the number of blows (N) required to drive the sampler over the interval of 12 to 24 in. (300 to 610 mm) may be reported if this value is lower. For split spoon samples where insufficient penetration was achieved and N-Values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50/75). Some design methods make use of N-values corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to 'A' size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (300 mm) into the soil. The DCPT is used as a probe to assess soil variability.

OTHER TESTS

| | |
|----------|--|
| S | Sieve analysis |
| H | Hydrometer analysis |
| k | Laboratory permeability |
| γ | Unit weight |
| G_s | Specific gravity of soil particles |
| CD | Consolidated drained triaxial |
| CU | Consolidated undrained triaxial with pore pressure measurements |
| UU | Unconsolidated undrained triaxial |
| DS | Direct Shear |
| C | Consolidation |
| Q_u | Unconfined compression |
| l_p | Point Load Index (l_p on Borehole Record equals $l_p(50)$ in which the index is corrected to a reference diameter of 50 mm) |

| | |
|--|---|
| | Single packer permeability test; test interval from depth shown to bottom of borehole |
| | Double packer permeability test; test interval as indicated |
| | Falling head permeability test using casing |
| | Falling head permeability test using well point or piezometer |

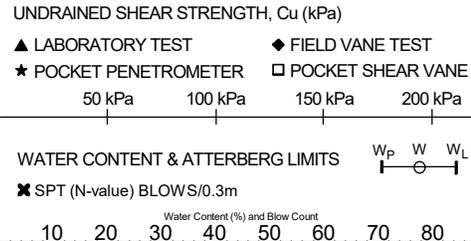
CLIENT: Dillon Consulting Ltd.
 PROJECT: 24-R-06 Geotechnical Investigation
 LOCATION: Kanata Street
 DATE BORED: January 15 2024

PROJECT NO.: 123316892
 BH ELEVATION: N/A
 DATUM: N/A

WATER LEVEL: N/A

| DEPTH (m) | ELEVATION (m) | SOIL DESCRIPTION (MUSCS) | STRATA PLOT | SAMPLES | | | | OTHER TESTS / REMARKS | UNDRAINED SHEAR STRENGTH, Cu (kPa) | | | | BACKFILL | ELEVATION (m) |
|-----------|---------------|---|-------------|---------|--------|------------------------|------------------|-----------------------|------------------------------------|---------|---------|---------|----------|---------------|
| | | | | TYPE | NUMBER | RECOVERY (mm) or TCR % | N-VALUE or RQD % | | 50 kPa | 100 kPa | 150 kPa | 200 kPa | | |
| 0 | | ASPHALT CONCRETE | | | | | | | | | | | | |
| | | Firm to stiff black fat CLAY (CH) - silty, trace sand | | | | | | | | | | | | |
| | | Soft tan lean CLAY (CL) | | | | | | | | | | | | |
| | | Firm brown fat CLAY (CH) | | | | | | | | | | | | |
| 2.180 | | End of Borehole • Borehole terminated at a depth of 2.180 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Borehole backfilled with auger cuttings and bentonite chips. • Borehole surface backfilled as per City of Winnipeg Street Cuts Manual. | | | | | | | | | | | | |

Sieve/Hydro at 0.8 m
 G S M C
 0% 1% 41% 58%



Printed Feb 8 2024 15:17:56 SOIL 123316892_24-R06-GEOTECHNICAL INVESTIGATION.GPJ NEW TEMPLATE TEST PROJECT.GPJ 2/8/24

BACKFILL SYMBOL: ASPHALT GROUT CONCRETE
 BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. Logged By: KV
 Drilling Method: 125 mm SSA Reviewed By: GB
 Completion Depth: 2.18 m Page 1 of 1

CLIENT: Dillon Consulting Ltd.
 PROJECT: 24-R-06 Geotechnical Investigation
 LOCATION: Kanata Street
 DATE BORED: January 15 2024

PROJECT NO.: 123316892
 BH ELEVATION: N/A
 DATUM: N/A
 WATER LEVEL: N/A

| DEPTH (m) | ELEVATION (m) | SOIL DESCRIPTION (MUSCS) | STRATA PLOT | SAMPLES | | | | OTHER TESTS / REMARKS | UNDRAINED SHEAR STRENGTH, Cu (kPa) | | | | BACKFILL | ELEVATION (m) |
|-----------|---------------|---|-------------|---------|--------|------------------------|------------------|-----------------------|------------------------------------|---------|---------|---------|----------|---------------|
| | | | | TYPE | NUMBER | RECOVERY (mm) or TCR % | N-VALUE or RQD % | | 50 kPa | 100 kPa | 150 kPa | 200 kPa | | |
| 0 | | CONCRETE | | | | | | | | | | | | |
| | | Firm to stiff black to brown fat CLAY (CH) - silty, trace sand | | | | | | | | | | | | |
| | | - grey below 1.2 m | | | | | | | | | | | | |
| 1 | | | AS | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| 2 | | | AS | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| | | End of Borehole • Borehole terminated at a depth of 2.165 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Borehole backfilled with auger cuttings and bentonite chips. • Borehole surface backfilled as per City of Winnipeg Street Cuts Manual. | | | | | | | | | | | | |

BACKFILL SYMBOL

| | | | | | |
|--|-----------|--|----------------|--|----------|
| | ASPHALT | | GROUT | | CONCRETE |
| | BENTONITE | | DRILL CUTTINGS | | SAND |
| | | | SLOUGH | | |

Drilling Contractor: Maple Leaf Drilling Ltd.
 Drilling Method: 125 mm SSA
 Completion Depth: 2.165 m
 Logged By: KV
 Reviewed By: GB
 Page 1 of 1

CLIENT: Dillon Consulting Ltd.
 PROJECT: 24-R-06 Geotechnical Investigation
 LOCATION: Kanata Street
 DATE BORED: January 15 2024

PROJECT NO.: 123316892
 BH ELEVATION: N/A
 DATUM: N/A

WATER LEVEL: N/A

| DEPTH (m) | ELEVATION (m) | SOIL DESCRIPTION (MUSCS) | STRATA PLOT | SAMPLES | | | | OTHER TESTS / REMARKS | UNDRAINED SHEAR STRENGTH, C_u (kPa) | | | | | | | | BACKFILL | ELEVATION (m) |
|-----------|---------------|--|-------------|---------|--------|------------------------|------------------|--|--|---------|---------|---------|----------------------------------|--|--|--|----------|---------------|
| | | | | TYPE | NUMBER | RECOVERY (mm) or TCR % | N-VALUE or RQD % | | 50 kPa | 100 kPa | 150 kPa | 200 kPa | WATER CONTENT & ATTERBERG LIMITS | | | | | |
| 0 | | CONCRETE | | | | | | | ▲ LABORATORY TEST ◆ FIELD VANE TEST ★ POCKET PENETROMETER □ POCKET SHEAR VANE ✕ SPT (N-value) BLOWS/0.3m | | | | | | | | | |
| | | Firm to stiff black to brown fat CLAY (CH) - silty, trace sand | | | | | | | Water Content (%) and Blow Count W _p W W _L | | | | | | | | | |
| 1 | | Soft brown lean CLAY (CL) | | AS | | | | Sieve/Hydro at 0.8 m G S M C 0% 3% 46% 51% | | | | | | | | | | |
| 2 | | | | AS | | | | | | | | | | | | | | |
| 3 | | | | AS | | | | | | | | | | | | | | |
| 4 | | | | AS | | | | | | | | | | | | | | |
| | | End of Borehole • Borehole terminated at a depth of 2.18 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Borehole backfilled with auger cuttings and bentonite chips. • Borehole surface backfilled as per City of Winnipeg Street Cuts Manual. | | | | | | | | | | | | | | | | |

BACKFILL SYMBOL ASPHALT GROUT CONCRETE
 BENTONITE DRILL CUTTINGS SAND SLOUGH

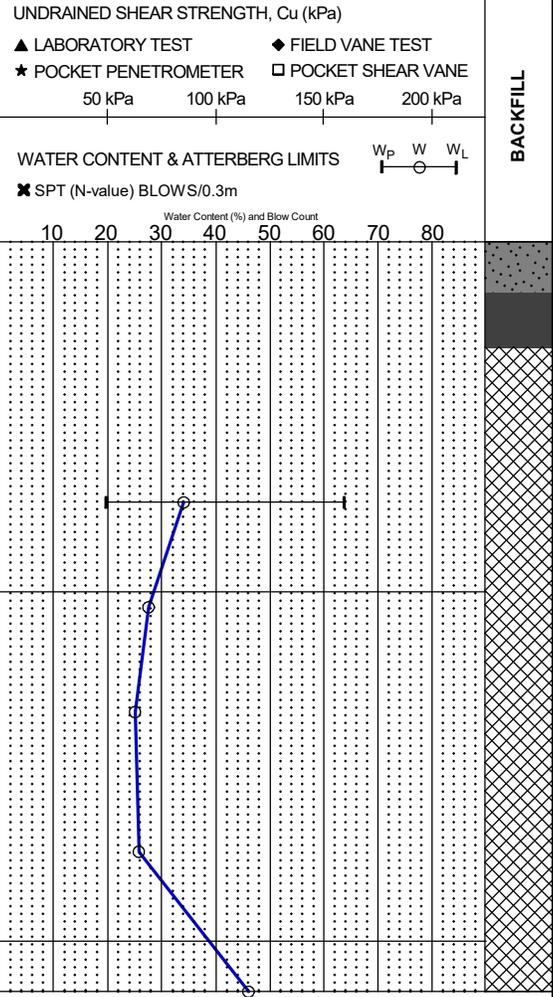
Drilling Contractor: Maple Leaf Drilling Ltd. Logged By: KV
 Drilling Method: 125 mm SSA Reviewed By: GB
 Completion Depth: 2.18 m Page 1 of 1

CLIENT: Dillon Consulting Ltd.
 PROJECT: 24-R-06 Geotechnical Investigation
 LOCATION: Wabasha Street
 DATE BORED: January 15 2024

PROJECT NO.: 123316892
 BH ELEVATION: N/A
 DATUM: N/A
 WATER LEVEL: N/A

| DEPTH (m) | ELEVATION (m) | SOIL DESCRIPTION (MUSCS) | STRATA PLOT | SAMPLES | | | | OTHER TESTS / REMARKS | UNDRAINED SHEAR STRENGTH, Cu (kPa) | | | | BACKFILL | ELEVATION (m) |
|-----------|---------------|---|-------------|---------|--------|------------------------|------------------|-----------------------|------------------------------------|---------|---------|---------|----------|---------------|
| | | | | TYPE | NUMBER | RECOVERY (mm) or TCR % | N-VALUE or RQD % | | 50 kPa | 100 kPa | 150 kPa | 200 kPa | | |
| 0 | | CONCRETE | | | | | | | | | | | | |
| | | Firm to stiff black fat CLAY (CH) - silty, trace sand | | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| 1 | | Soft tan lean CLAY (CL) | | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| 2 | | Firm brown fat CLAY (CH) | | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| | | End of Borehole • Borehole terminated at a depth of 2.145 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Borehole backfilled with auger cuttings and bentonite chips. • Borehole surface backfilled as per City of Winnipeg Street Cuts Manual. | | | | | | | | | | | | |

Sieve/Hydro at 0.7 m
 G S M C
 0% 3% 44% 53%

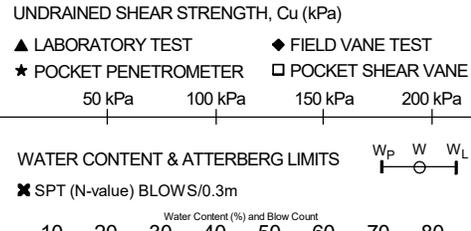


Printed Feb 8 2024 15:17:58 SOIL 123316892_24-R06-GEOTECHNICAL INVESTIGATION.GPJ NEW TEMPLATE TEST PROJECT.GPJ 2/8/24

CLIENT: Dillon Consulting Ltd.
 PROJECT: 24-R-06 Geotechnical Investigation
 LOCATION: Wabasha Street
 DATE BORED: January 15 2024

PROJECT NO.: 123316892
 BH ELEVATION: N/A
 DATUM: N/A
 WATER LEVEL: N/A

| DEPTH (m) | ELEVATION (m) | SOIL DESCRIPTION (MUSCS) | STRATA PLOT | SAMPLES | | | | OTHER TESTS / REMARKS | UNDRAINED SHEAR STRENGTH, Cu (kPa) | | | | BACKFILL | ELEVATION (m) |
|-----------|---------------|--|-------------|---------|--------|------------------------|------------------|-----------------------|------------------------------------|---------|---------|---------|----------|---------------|
| | | | | TYPE | NUMBER | RECOVERY (mm) or TCR % | N-VALUE or RQD % | | 50 kPa | 100 kPa | 150 kPa | 200 kPa | | |
| 0 | | CONCRETE | | | | | | | | | | | | |
| | | Firm to stiff black fat CLAY (CH) - silty, trace sand | | | | | | | | | | | | |
| | | Soft tan lean CLAY (CL) | | AS | | | | | | | | | | |
| | | | | AS | | | | | | | | | | |
| | | | | AS | | | | | | | | | | |
| | | Firm brown fat CLAY (CH) | | AS | | | | | | | | | | |
| | | | | AS | | | | | | | | | | |
| | | End of Borehole • Borehole terminated at a depth of 2.16 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Borehole backfilled with auger cuttings and bentonite chips. • Borehole surface backfilled as per City of Winnipeg Street Cuts Manual. | | | | | | | | | | | | |



Printed Feb 8 2024 15:17:59 SOIL 123316892_24-R06-GEOTECHNICAL INVESTIGATION.GPJ NEW TEMPLATE TEST PROJECT.GPJ 2/8/24

| | | | |
|----------------|---------|--------|----------|
| BENTONITE | ASPHALT | GROUT | CONCRETE |
| DRILL CUTTINGS | SAND | SLOUGH | |

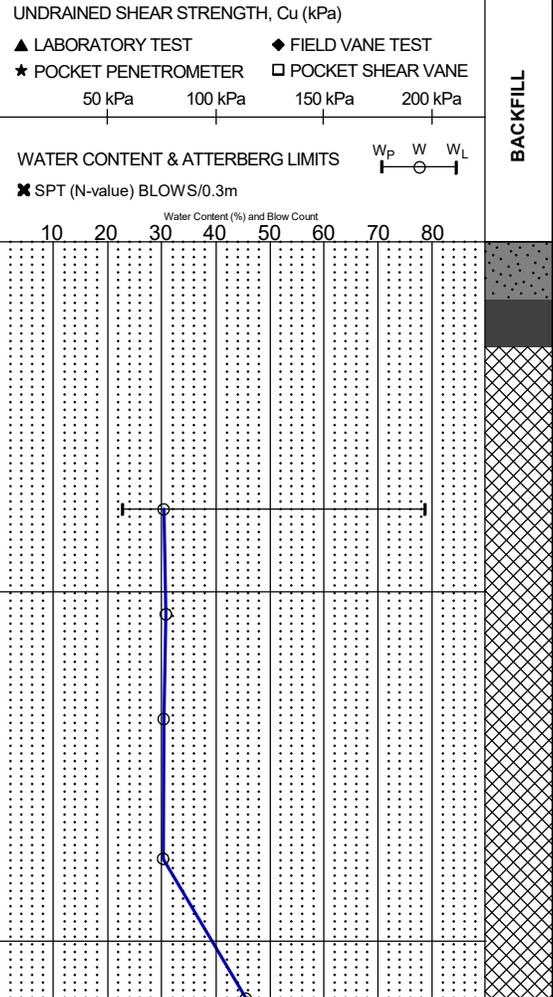
Drilling Contractor: Maple Leaf Drilling Ltd. Logged By: KV
 Drilling Method: 125 mm SSA Reviewed By: GB
 Completion Depth: 2.16 m Page 1 of 1

CLIENT: Dillon Consulting Ltd.
 PROJECT: 24-R-06 Geotechnical Investigation
 LOCATION: Wabasha Street
 DATE BORED: January 15 2024

PROJECT NO.: 123316892
 BH ELEVATION: N/A
 DATUM: N/A
 WATER LEVEL: N/A

| DEPTH (m) | ELEVATION (m) | SOIL DESCRIPTION (MUSCS) | STRATA PLOT | SAMPLES | | | | OTHER TESTS / REMARKS | UNDRAINED SHEAR STRENGTH, Cu (kPa) | | | | BACKFILL | ELEVATION (m) |
|-----------|---------------|---|-------------|---------|--------|------------------------|------------------|-----------------------|------------------------------------|---------|---------|---------|----------|---------------|
| | | | | TYPE | NUMBER | RECOVERY (mm) or TCR % | N-VALUE or RQD % | | 50 kPa | 100 kPa | 150 kPa | 200 kPa | | |
| 0 | | CONCRETE | | | | | | | | | | | | |
| | | Firm to stiff black to brown fat CLAY (CH) - silty, trace sand | | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| | | | AS | | | | | | | | | | | |
| 2 | | | AS | | | | | | | | | | | |
| | | End of Borehole • Borehole terminated at a depth of 2.165 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Borehole backfilled with auger cuttings and bentonite chips. • Borehole surface backfilled as per City of Winnipeg Street Cuts Manual. | | | | | | | | | | | | |

Sieve/Hydro at 0.8 m
 G S M C
 0% 2% 37% 61%



Printed Feb 8 2024 15:18:00 SOIL 123316892_24-R06-GEOTECHNICAL INVESTIGATION.GPJ NEW TEMPLATE TEST PROJECT.GPJ 2/8/24

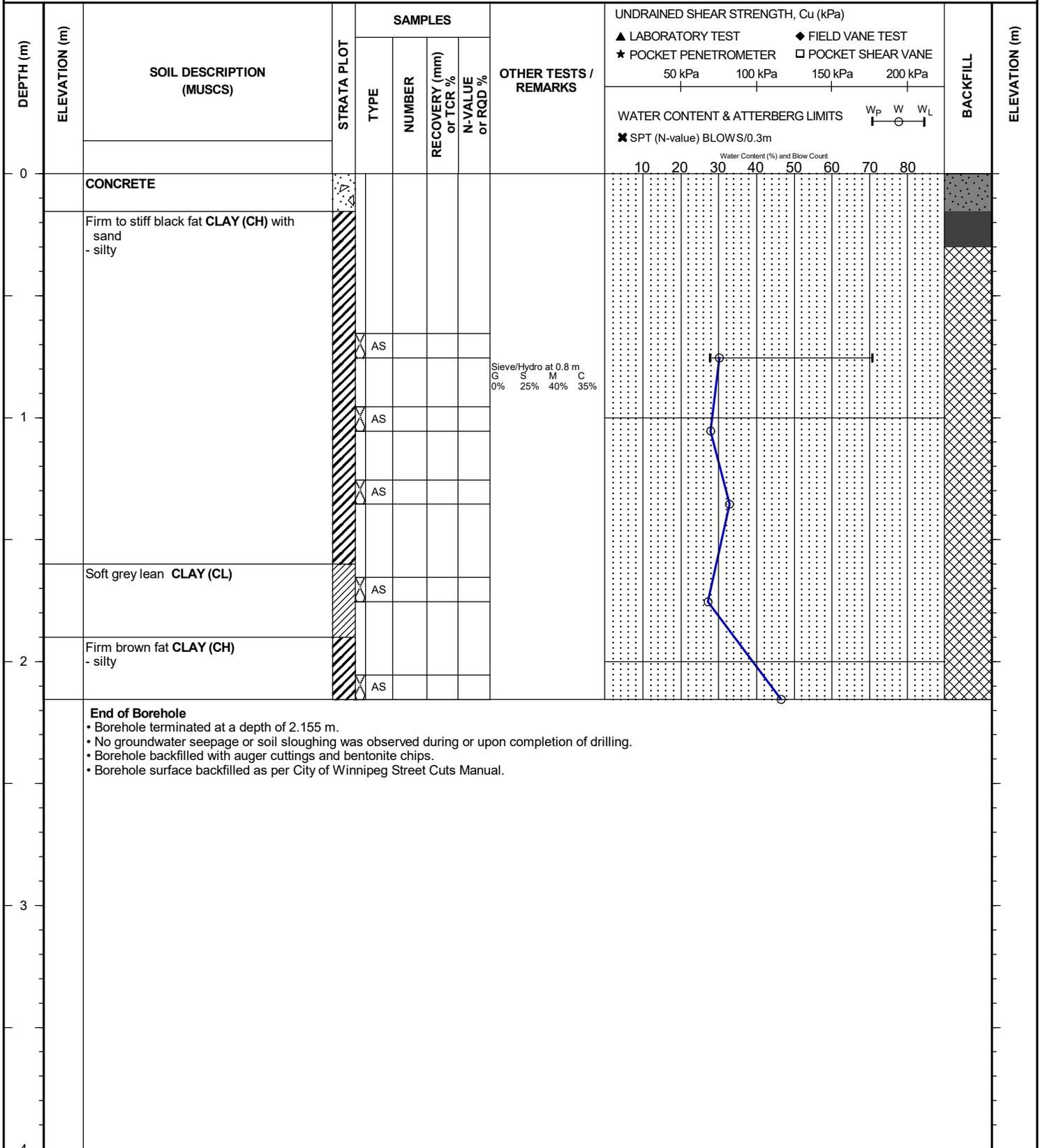
- | | | | |
|-----------------|----------------|-------|----------|
| BACKFILL SYMBOL | ASPHALT | GROUT | CONCRETE |
| BENTONITE | DRILL CUTTINGS | SAND | SLOUGH |

| | |
|---|-----------------|
| Drilling Contractor: Maple Leaf Drilling Ltd. | Logged By: KV |
| Drilling Method: 125 mm SSA | Reviewed By: GB |
| Completion Depth: 2.165 m | Page 1 of 1 |

CLIENT: Dillon Consulting Ltd.
 PROJECT: 24-R-06 Geotechnical Investigation
 LOCATION: Wynford Alley
 DATE BORED: January 16 2024

PROJECT NO.: 123316892
 BH ELEVATION: N/A
 DATUM: N/A

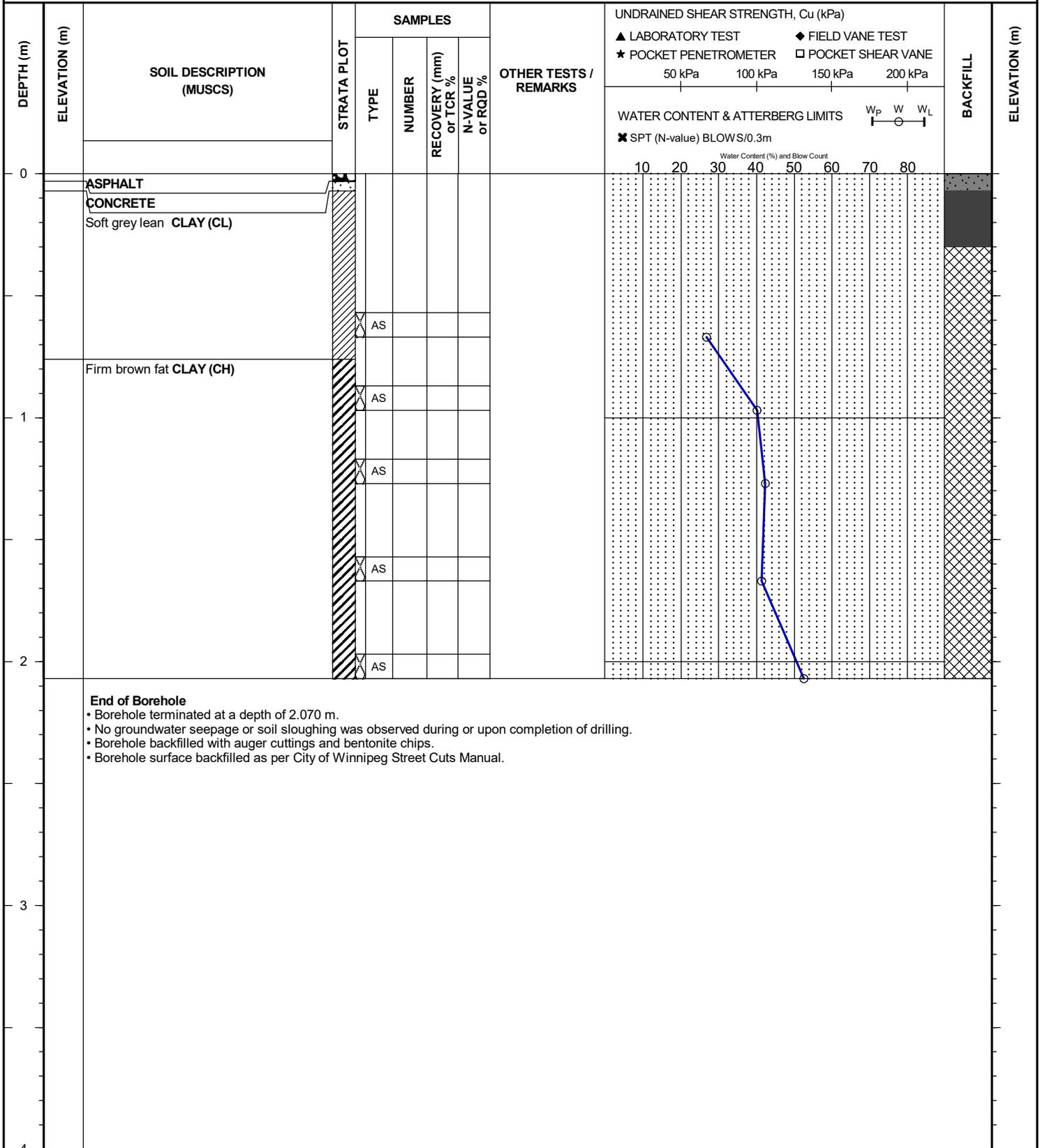
WATER LEVEL: N/A



CLIENT: Dillon Consulting Ltd.
 PROJECT: 24-R-06 Geotechnical Investigation
 LOCATION: Wynford Alley
 DATE BORED: January 16 2024

PROJECT NO.: 123316892
 BH ELEVATION: N/A
 DATUM: N/A

WATER LEVEL: N/A



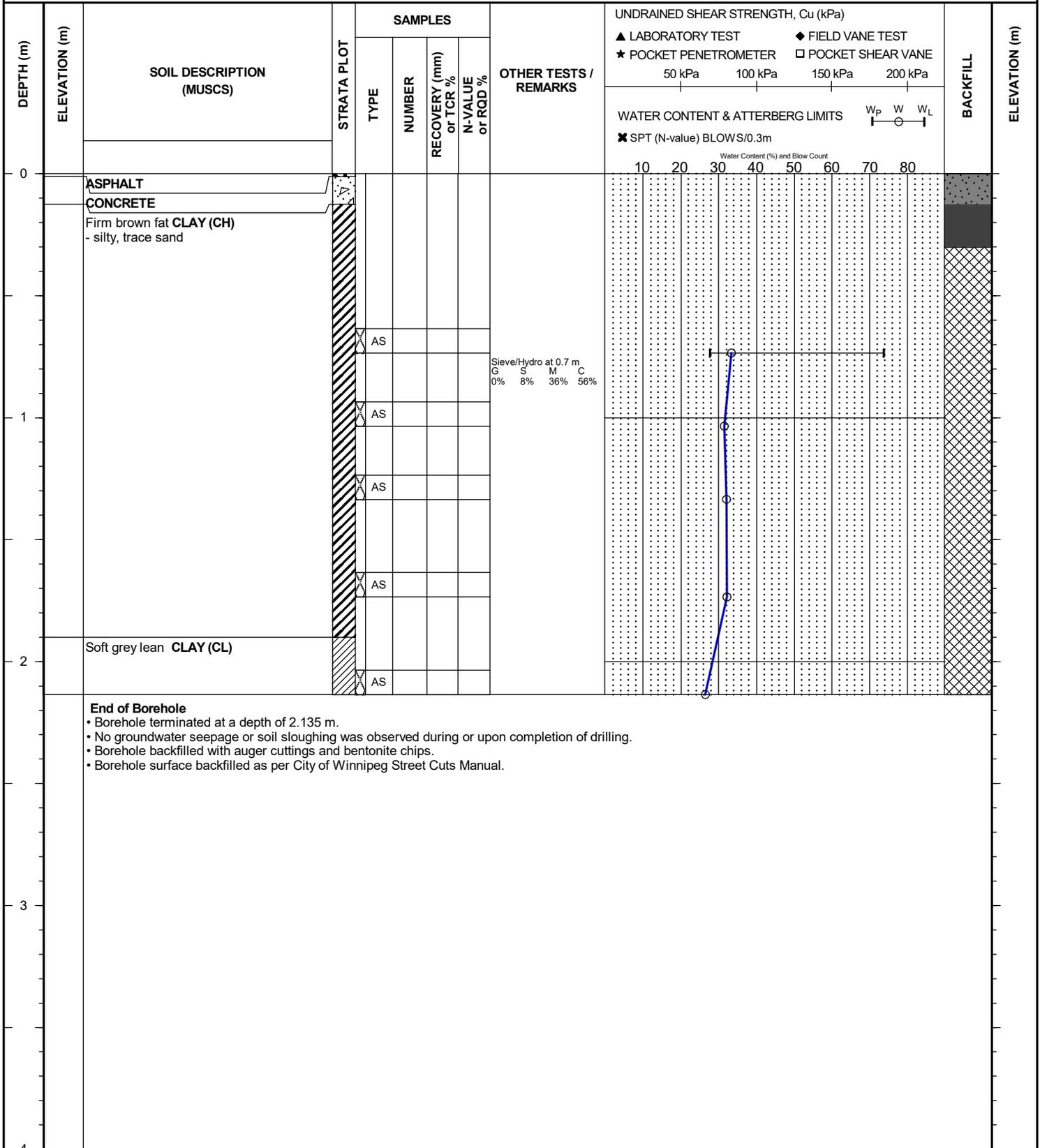
BACKFILL SYMBOL ASPHALT GROUT CONCRETE
 BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. Logged By: KV
 Drilling Method: 125 mm SSA Reviewed By: GB
 Completion Depth: 2.07 m Page 1 of 1

CLIENT: Dillon Consulting Ltd.
 PROJECT: 24-R-06 Geotechnical Investigation
 LOCATION: Wynford Alley
 DATE BORED: January 16 2024

PROJECT NO.: 123316892
 BH ELEVATION: N/A
 DATUM: N/A

WATER LEVEL: N/A



Sieve/Hydro at 0.7 m
 G S M C
 0% 8% 36% 56%

BACKFILL SYMBOL ASPHALT GROUT CONCRETE
 BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. Logged By: KV
 Drilling Method: 125 mm SSA Reviewed By: GB
 Completion Depth: 2.135 m Page 1 of 1

CLIENT: Dillon Consulting Ltd.
 PROJECT: 24-R-06 Geotechnical Investigation
 LOCATION: Lilian Avenue
 DATE BORED: January 17 2024

PROJECT NO.: 123316892
 BH ELEVATION: N/A
 DATUM: N/A

WATER LEVEL: N/A

| DEPTH (m) | ELEVATION (m) | SOIL DESCRIPTION (MUSCS) | STRATA PLOT | SAMPLES | | | | OTHER TESTS / REMARKS | UNDRAINED SHEAR STRENGTH, Cu (kPa) | | | | BACKFILL | ELEVATION (m) |
|--|---------------|---|-------------|---------|--------|------------------------|------------------|-----------------------|------------------------------------|---------|---------|---------|----------|---------------|
| | | | | TYPE | NUMBER | RECOVERY (mm) or TCR % | N-VALUE or RQD % | | 50 kPa | 100 kPa | 150 kPa | 200 kPa | | |
| 0 | | CONCRETE | AS | | | | | | | | | | | |
| | | Firm brown fat CLAY (CH) - silty, trace sand | AS | | | | | | | | | | | |
| <p>End of Borehole</p> <ul style="list-style-type: none"> • Auger refusal at a depth of 0.51 m on suspected concrete. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Borehole surface backfilled as per City of Winnipeg Street Cuts Manual. | | | | | | | | | | | | | | |

| | | | |
|-----------------|----------------|-------|----------|
| BACKFILL SYMBOL | ASPHALT | GROUT | CONCRETE |
| BENTONITE | DRILL CUTTINGS | SAND | SLOUGH |

| | |
|--|-----------------|
| Drilling Contractor: Paddock Drilling Ltd. | Logged By: RB |
| Drilling Method: 125 mm SSA | Reviewed By: GB |
| Completion Depth: 0.51 m | Page 1 of 1 |

APPENDIX D

Core Photographs



Figure 1 – Core No. 1 (Kanata St)



Figure 2 – Core No. 2 (Kanata St)



Figure 3 – Core no. 3 (Kanata St)



Figure 4 – Core No. 4 (Kanata St)

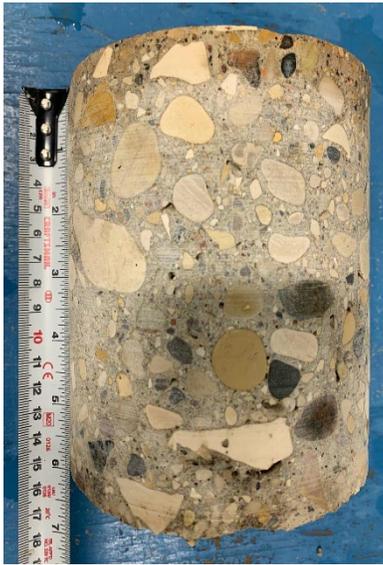


Figure 5 – Core No. 5 (Wabasha St)



Figure 6 – Core No. 6 (Wabasha St)



Figure 7 – Core No. 7 (Wabasha St)



Figure 8 – Core No. 8 (Wynford Alley)



Figure 9 – Core No. 9 (Wynford Alley)



Figure 10 – Core No. 10 (Wynford Alley)



Figure 11 – Core No. 11 (Lilian Ave)



Figure 12 – Core No. 12 (Lilian Ave)



Figure 13 – Core No. 13 (Lilian Ave)



Figure 14 – Core No. 14 (Champlain St)



Figure 15 – Core no. 15 (Champlain St)



Figure 16 – Core No. 16 (Champlain St)



Figure 17 – Core No.17 (Champlain St)



Figure 18 – Core No. 18 (Dumoulin St)



Figure 19 – Core No. 19 (Dumoulin St)



Figure 20 – Core No. 20 (Dumoulin St)



Figure 21 – Core No.21 (Dumoulin St)



Figure 22 – Core No. 22 (Dumoulin St)



Figure 23 – Core no. 23 (McMahon PI)



Figure 24 – Core No. 24 (McMahon PI)



Figure 25 – Core No.25 (Howard Kendel PI)



Figure 26 – Core No. 26 (Howard Kendel PI)



Figure 27 – Core No. 27 (Kern Dr)



Figure 28 – Core No. 28 (Kern Dr)



Figure 29 – Core No. 29 (Kern Dr)



Figure 30 – Core No. 30 (Kern Dr)



Figure 31 – Core No. 31 (Kern Dr)



Figure 32 – Core No. 32 (Baywater PI)



Figure 33 – Core No. 33 (Baywater Pl)



Figure 34 – Core No. 34 (Courtwood Pl)



Figure 35 – Core No. 35 (Courtwood Pl)



Figure 4 – Core No. 36 (Roanoke St)



Figure 2 – Core No.37 (Roanoke St)



Figure 2 – Core No. 38 (Melrose Ave)



Figure 3 – Core no. 39 (Melrose Ave)

APPENDIX E

Laboratory Test Reports

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Street Package - Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 1

DATE SAMPLED: 2024.Jan.15

DATE RECEIVED: 2024.Jan.15

DATE TESTED: 2024.Jan.26

SAMPLED BY: Stantec Consulting Ltd.

SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Carson Cockwell

MATERIAL IDENTIFICATION

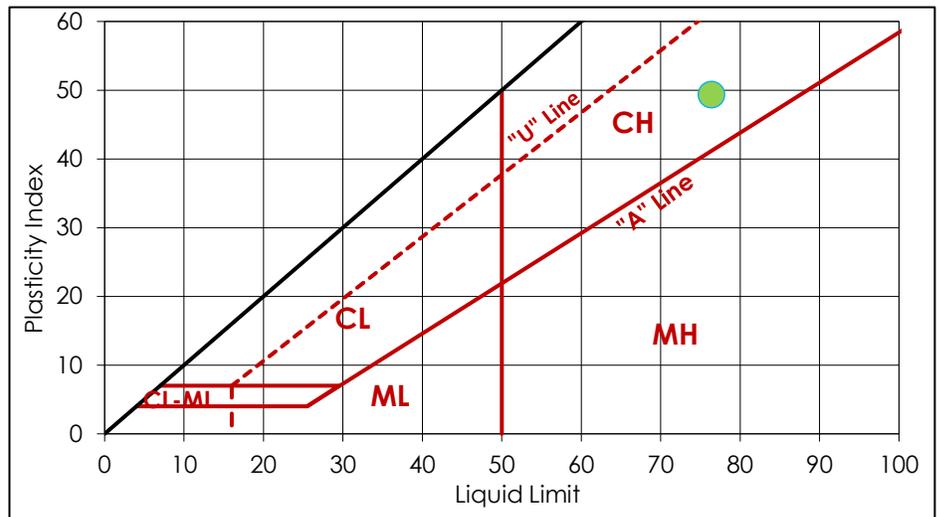
CLIENT FIELD ID BH-01, 740 mm

STANTEC SAMPLE NO. 2967

| TRIAL | LIQUID LIMIT | |
|--------|--------------|----|
| | 1 | 2 |
| BLOWS | 26 | 24 |
| MC (%) | 75 | 78 |

| TRIAL | PLASTIC LIMIT | |
|--------|---------------|----|
| | 1 | 2 |
| MC (%) | 28 | 26 |

| | |
|----------------------|-------|
| LIQUID LIMIT, LL | 76 |
| PLASTIC LIMIT, PL | 27 |
| PLASTICITY INDEX, PI | 49 |
| AS REC'D MC (%) | 36.23 |



COMMENTS
 No comments.



REPORT DATE 2024.Jan.29

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Street Package - Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 2

DATE SAMPLED: 2024.Jan.15
 SAMPLED BY: Stantec Consulting Ltd.

DATE RECEIVED: 2024.Jan.15
 SUBMITTED BY: Stantec Consulting Ltd.

DATE TESTED: 2024.Jan.26
 TESTED BY: Carson Cockwell

MATERIAL IDENTIFICATION

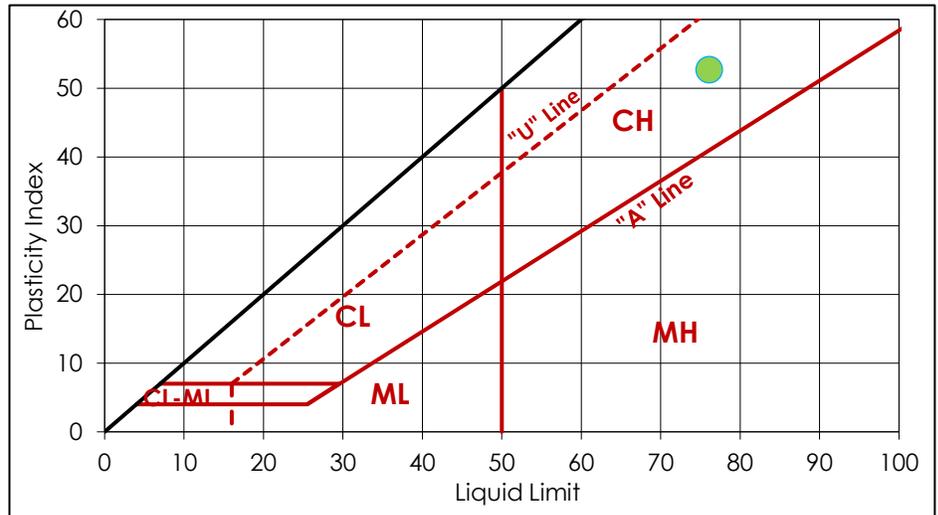
CLIENT FIELD ID BH-02, 780 mm

STANTEC SAMPLE NO. 2968

| TRIAL | LIQUID LIMIT | |
|--------|--------------|----|
| | 1 | 2 |
| BLOWS | 25 | 27 |
| MC (%) | 76 | 75 |

| TRIAL | PLASTIC LIMIT | |
|--------|---------------|----|
| | 1 | 2 |
| MC (%) | 23 | 24 |

| | |
|----------------------|-------|
| LIQUID LIMIT, LL | 76 |
| PLASTIC LIMIT, PL | 23 |
| PLASTICITY INDEX, PI | 53 |
| AS REC'D MC (%) | 36.02 |



COMMENTS
 No comments.

REPORT DATE 2024.Jan.29


 REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Street Package - Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 3

DATE SAMPLED: 2024.Jan.15
 SAMPLED BY: Stantec Consulting Ltd.

DATE RECEIVED: 2024.Jan.15
 SUBMITTED BY: Stantec Consulting Ltd.

DATE TESTED: 2024.Jan.26
 TESTED BY: Carson Cockwell

MATERIAL IDENTIFICATION

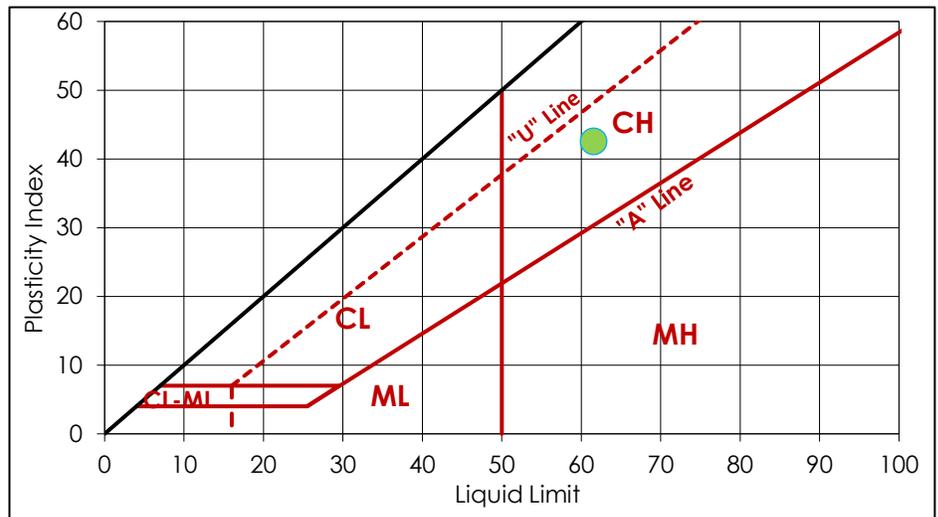
CLIENT FIELD ID BH-04, 780 mm

STANTEC SAMPLE NO. 2969

| | LIQUID LIMIT | |
|--------|--------------|----|
| TRIAL | 1 | 2 |
| BLOWS | 22 | 24 |
| MC (%) | 62 | 62 |

| | PLASTIC LIMIT | |
|--------|---------------|----|
| TRIAL | 1 | 2 |
| MC (%) | 19 | 19 |

| | |
|----------------------|-------|
| LIQUID LIMIT, LL | 62 |
| PLASTIC LIMIT, PL | 19 |
| PLASTICITY INDEX, PI | 43 |
| AS REC'D MC (%) | 30.68 |



COMMENTS
 No comments.



REPORT DATE 2024.Jan.29

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Street Package - Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 4

DATE SAMPLED: 2024.Jan.15
 SAMPLED BY: Stantec Consulting Ltd.

DATE RECEIVED: 2024.Jan.15
 SUBMITTED BY: Stantec Consulting Ltd.

DATE TESTED: 2024.Jan.26
 TESTED BY: Carson Cockwell

MATERIAL IDENTIFICATION

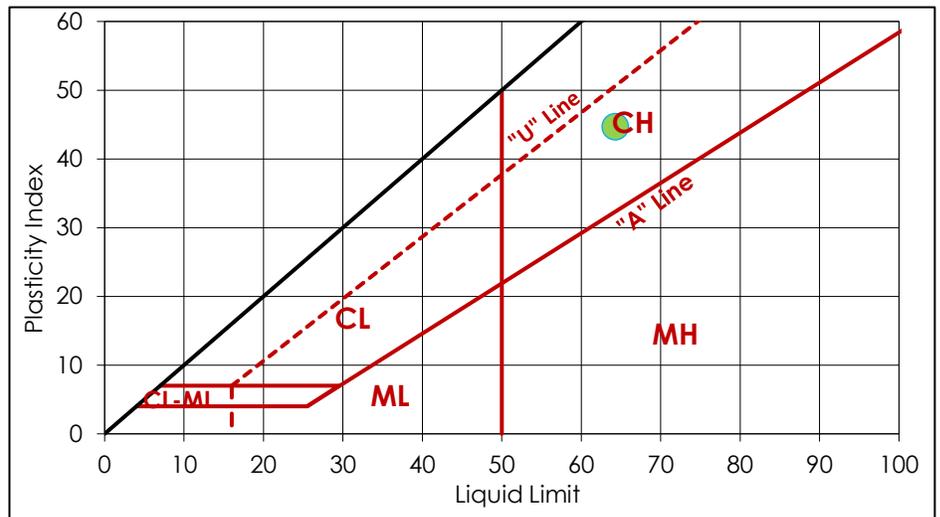
CLIENT FIELD ID BH-05, 745 mm

STANTEC SAMPLE NO. 2970

| | LIQUID LIMIT | |
|--------|--------------|----|
| TRIAL | 1 | 2 |
| BLOWS | 28 | 27 |
| MC (%) | 65 | 62 |

| | PLASTIC LIMIT | |
|--------|---------------|----|
| TRIAL | 1 | 2 |
| MC (%) | 20 | 19 |

| | |
|----------------------|-------|
| LIQUID LIMIT, LL | 64 |
| PLASTIC LIMIT, PL | 20 |
| PLASTICITY INDEX, PI | 45 |
| AS REC'D MC (%) | 34.60 |



COMMENTS
 No comments.



REPORT DATE 2024.Jan.29

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Street Package - Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 5

DATE SAMPLED: 2024.Jan.15
 SAMPLED BY: Stantec Consulting Ltd.

DATE RECEIVED: 2024.Jan.15
 SUBMITTED BY: Stantec Consulting Ltd.

DATE TESTED: 2024.Jan.26
 TESTED BY: Carson Cockwell

MATERIAL IDENTIFICATION

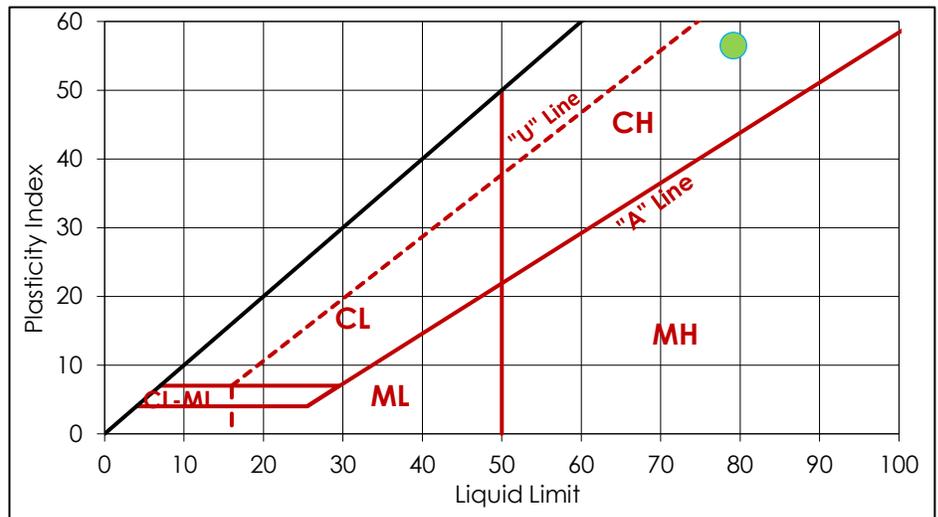
CLIENT FIELD ID BH-07, 765 mm

STANTEC SAMPLE NO. 2971

| TRIAL | LIQUID LIMIT | |
|--------|--------------|----|
| | 1 | 2 |
| BLOWS | 23 | 22 |
| MC (%) | 80 | 80 |

| TRIAL | PLASTIC LIMIT | |
|--------|---------------|----|
| | 1 | 2 |
| MC (%) | 22 | 23 |

| | |
|----------------------|-------|
| LIQUID LIMIT, LL | 79 |
| PLASTIC LIMIT, PL | 23 |
| PLASTICITY INDEX, PI | 56 |
| AS REC'D MC (%) | 30.88 |



COMMENTS
 No comments.



REPORT DATE 2024.Jan.29

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Street Package - Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 6

DATE SAMPLED: 2024.Jan.16
 SAMPLED BY: Stantec Consulting Ltd.

DATE RECEIVED: 2024.Jan.16
 SUBMITTED BY: Stantec Consulting Ltd.

DATE TESTED: 2024.Jan.30
 TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

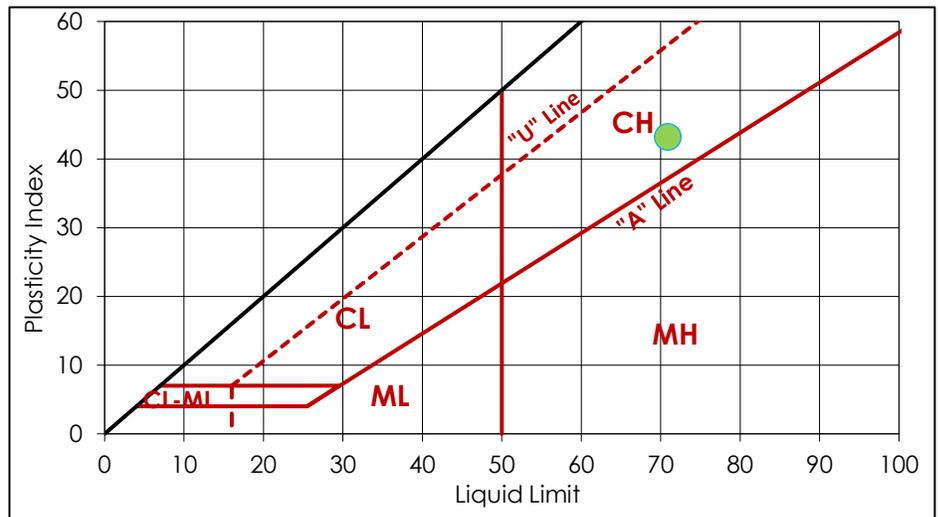
CLIENT FIELD ID BH-08, 755 mm

STANTEC SAMPLE NO. 2984

| TRIAL | LIQUID LIMIT | |
|--------|--------------|----|
| | 1 | 2 |
| BLOWS | 22 | 21 |
| MC (%) | 72 | 72 |

| TRIAL | PLASTIC LIMIT | |
|--------|---------------|----|
| | 1 | 2 |
| MC (%) | 28 | 27 |

| | |
|----------------------|-------|
| LIQUID LIMIT, LL | 71 |
| PLASTIC LIMIT, PL | 28 |
| PLASTICITY INDEX, PI | 43 |
| AS REC'D MC (%) | 30.75 |



COMMENTS
 No comments.

REPORT DATE 2024.Jan.31

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Street Package - Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 7

DATE SAMPLED: 2024.Jan.16

DATE RECEIVED: 2024.Jan.16

DATE TESTED: 2024.Jan.30

SAMPLED BY: Stantec Consulting Ltd.

SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

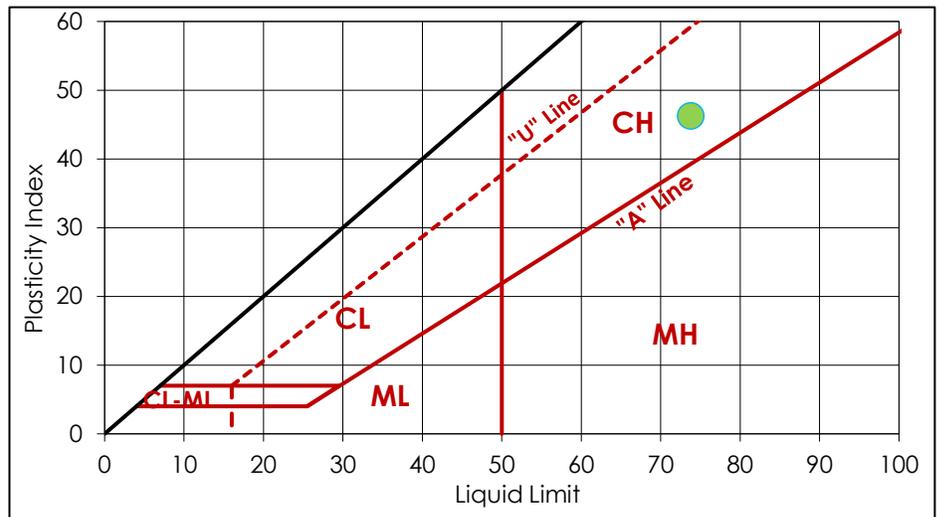
CLIENT FIELD ID BH-10, 735 mm

STANTEC SAMPLE NO. 2985

| TRIAL | LIQUID LIMIT | |
|--------|--------------|----|
| | 1 | 2 |
| BLOWS | 22 | 22 |
| MC (%) | 74 | 75 |

| TRIAL | PLASTIC LIMIT | |
|--------|---------------|----|
| | 1 | 2 |
| MC (%) | 28 | 27 |

| | |
|----------------------|-------|
| LIQUID LIMIT, LL | 74 |
| PLASTIC LIMIT, PL | 28 |
| PLASTICITY INDEX, PI | 46 |
| AS REC'D MC (%) | 33.93 |



COMMENTS
 No comments.



REPORT DATE 2024.Jan.31

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Street Package - Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 8

DATE SAMPLED: 2024.Jan.17
 SAMPLED BY: Stantec Consulting Ltd.

DATE RECEIVED: 2024.Jan.17
 SUBMITTED BY: Stantec Consulting Ltd.

DATE TESTED: 2024.Jan.31
 TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

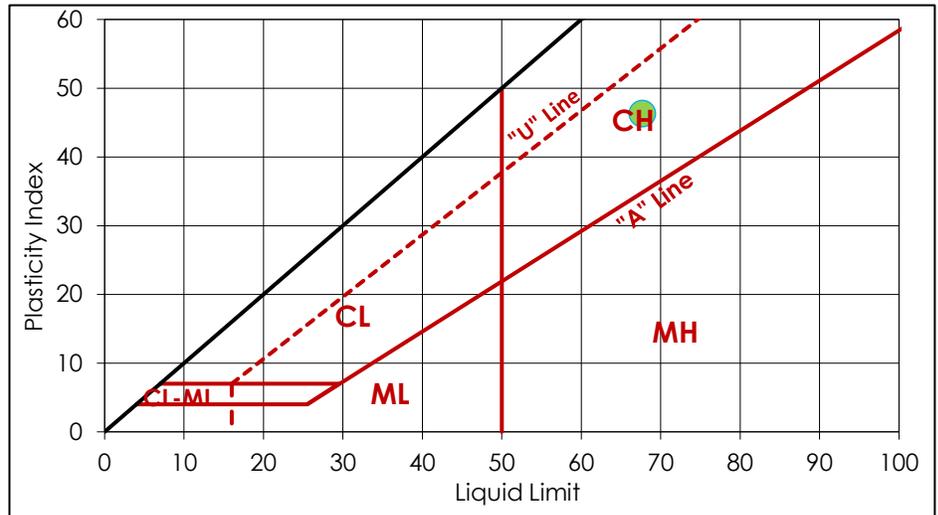
CLIENT FIELD ID BH-11, 710 mm

STANTEC SAMPLE NO. 4000

| TRIAL | LIQUID LIMIT | |
|--------|--------------|----|
| | 1 | 2 |
| BLOWS | 27 | 28 |
| MC (%) | 63 | 71 |

| TRIAL | PLASTIC LIMIT | |
|--------|---------------|----|
| | 1 | 2 |
| MC (%) | 22 | 21 |

| | |
|----------------------|-------|
| LIQUID LIMIT, LL | 68 |
| PLASTIC LIMIT, PL | 21 |
| PLASTICITY INDEX, PI | 46 |
| AS REC'D MC (%) | 31.60 |



COMMENTS
 No comments.



REPORT DATE 2024.Feb.01

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D4318 - LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (LL METHOD B - ONE-POINT)

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Street Package - Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 9

DATE SAMPLED: 2024.Jan.16

DATE RECEIVED: 2024.Jan.16

DATE TESTED: 2024.Jan.30

SAMPLED BY: Stantec Consulting Ltd.

SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

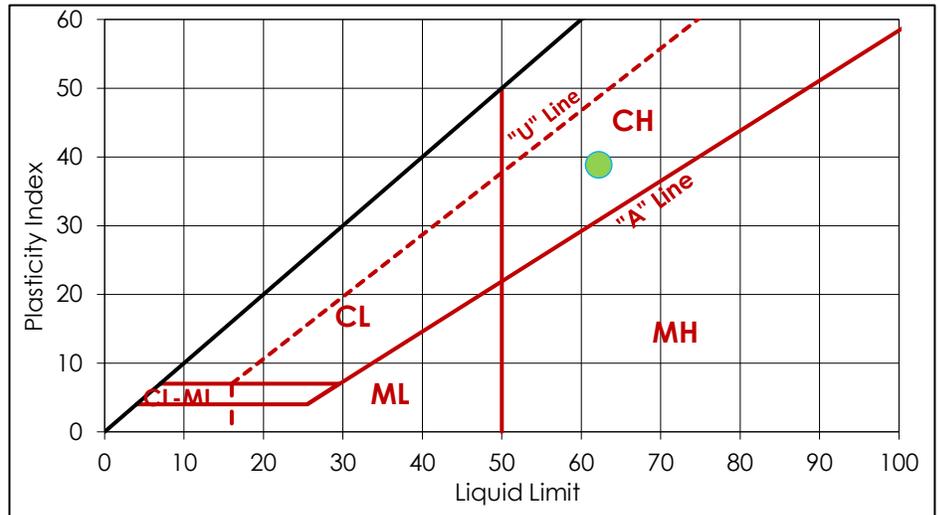
CLIENT FIELD ID BH-12, 775 mm

STANTEC SAMPLE NO. 4001

| TRIAL | LIQUID LIMIT | |
|--------|--------------|----|
| | 1 | 2 |
| BLOWS | 22 | 22 |
| MC (%) | 63 | 63 |

| TRIAL | PLASTIC LIMIT | |
|--------|---------------|----|
| | 1 | 2 |
| MC (%) | 24 | 22 |

| | |
|----------------------|-------|
| LIQUID LIMIT, LL | 62 |
| PLASTIC LIMIT, PL | 23 |
| PLASTICITY INDEX, PI | 39 |
| AS REC'D MC (%) | 30.87 |



COMMENTS
 No comments.

REPORT DATE 2024.Jan.31

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D7928 - PARTICLE-SIZE DISTRIBUTION OF FINE-GRAINED SOILS USING THE SEDIMENTATION ANALYSIS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 1

DATE SAMPLED: 2024.Jan.15

DATE RECEIVED: 2024.Jan.15

DATE TESTED: 2024.Jan.25

SAMPLED BY: Stantec Consulting Ltd.

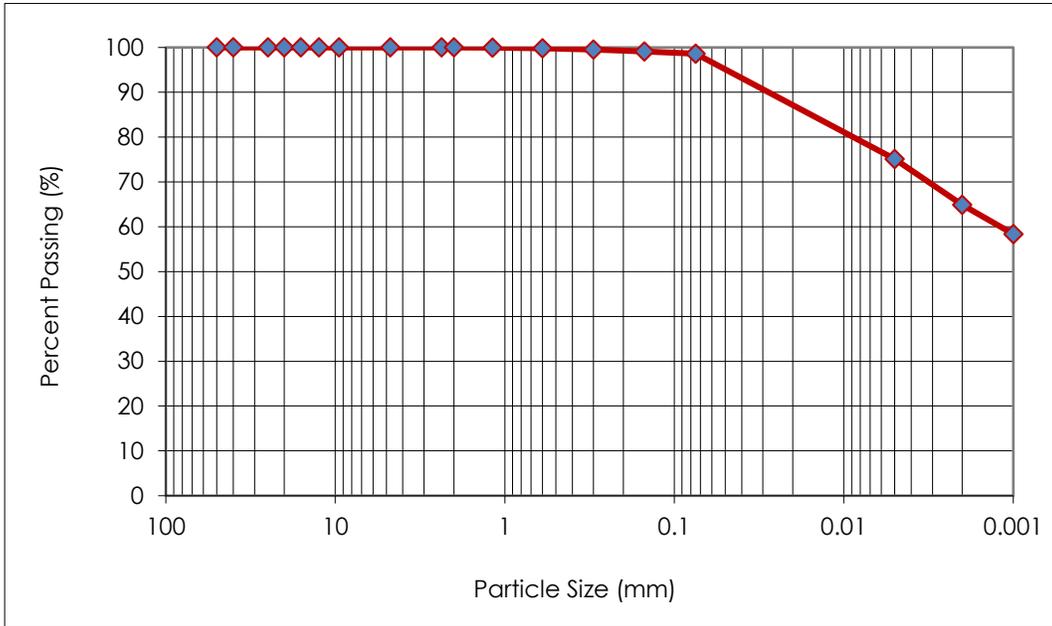
SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

CLIENT FIELD ID BH-01, 740 mm

STANTEC SAMPLE NO. 2967



| Sieve Size (mm) | % Passing |
|-----------------|-----------|
| 50.0 | 100.0 |
| 40.0 | 100.0 |
| 25.0 | 100.0 |
| 20.0 | 100.0 |
| 16.0 | 100.0 |
| 12.5 | 100.0 |
| 9.5 | 100.0 |
| 4.75 | 100.0 |
| 2.36 | 100.0 |
| 2.00 | 100.0 |
| 1.18 | 100.0 |
| 0.600 | 99.8 |
| 0.300 | 99.5 |
| 0.150 | 99.1 |
| 0.075 | 98.6 |
| 0.005 | 75.1 |
| 0.002 | 64.9 |
| 0.001 | 58.4 |

| Gravel | Sand | | | Silt | Clay | Colloids |
|--------|--------|--------|------|------|------|----------|
| | Coarse | Medium | Fine | | | |
| 0.0 | 0.0 | 0.3 | 1.1 | 33.7 | 64.9 | 58.4 |

COMMENTS
 No comments.



REPORT DATE 2024.Jan.29

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D7928 - PARTICLE-SIZE DISTRIBUTION OF FINE-GRAINED SOILS USING THE SEDIMENTATION ANALYSIS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 2

DATE SAMPLED: 2024.Jan.15

DATE RECEIVED: 2024.Jan.15

DATE TESTED: 2024.Jan.25

SAMPLED BY: Stantec Consulting Ltd.

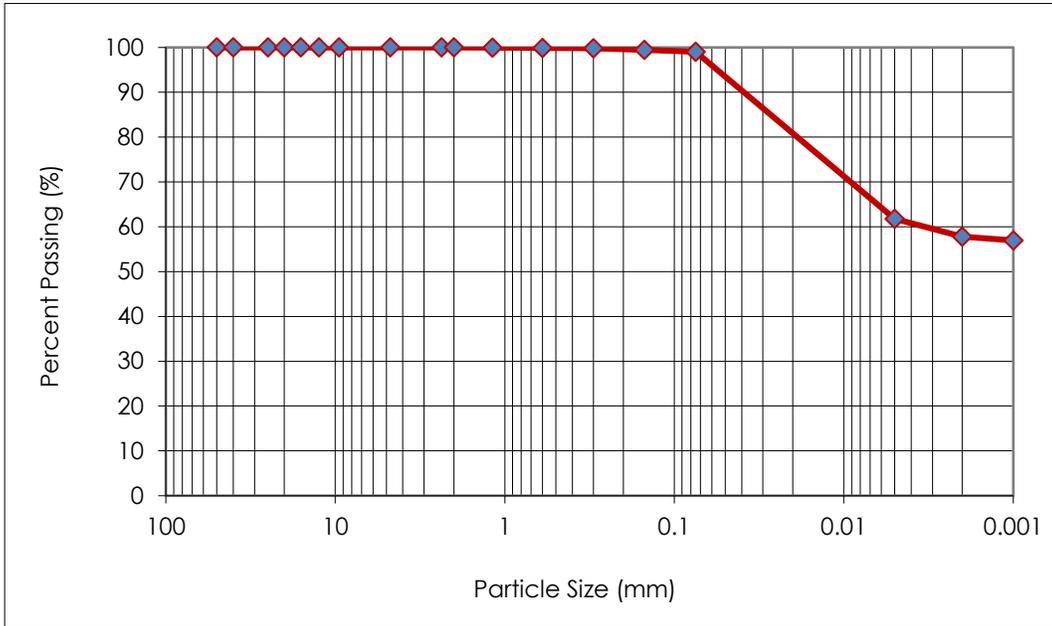
SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

CLIENT FIELD ID BH-02, 780 mm

STANTEC SAMPLE NO. 2968



| Sieve Size (mm) | % Passing |
|-----------------|-----------|
| 50.0 | 100.0 |
| 40.0 | 100.0 |
| 25.0 | 100.0 |
| 20.0 | 100.0 |
| 16.0 | 100.0 |
| 12.5 | 100.0 |
| 9.5 | 100.0 |
| 4.75 | 100.0 |
| 2.36 | 100.0 |
| 2.00 | 100.0 |
| 1.18 | 100.0 |
| 0.600 | 99.9 |
| 0.300 | 99.8 |
| 0.150 | 99.5 |
| 0.075 | 99.0 |
| 0.005 | 61.8 |
| 0.002 | 57.8 |
| 0.001 | 57.0 |

| Gravel | Sand | | | Silt | Clay | Colloids |
|--------|--------|--------|------|------|------|----------|
| | Coarse | Medium | Fine | | | |
| 0.0 | 0.0 | 0.2 | 0.8 | 41.2 | 57.8 | 57.0 |

COMMENTS
 No comments.



REPORT DATE 2024.Jan.29

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D7928 - PARTICLE-SIZE DISTRIBUTION OF FINE-GRAINED SOILS USING THE SEDIMENTATION ANALYSIS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 3

DATE SAMPLED: 2024.Jan.15

DATE RECEIVED: 2024.Jan.15

DATE TESTED: 2024.Jan.25

SAMPLED BY: Stantec Consulting Ltd.

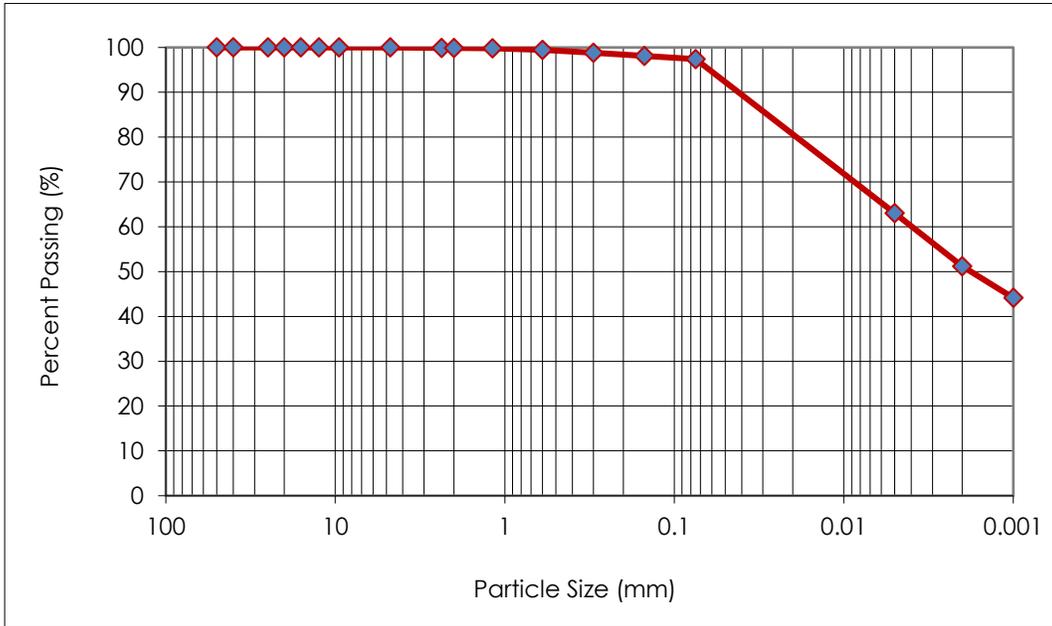
SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

CLIENT FIELD ID BH-04, 780 mm

STANTEC SAMPLE NO. 2969



| Sieve Size (mm) | % Passing |
|-----------------|-----------|
| 50.0 | 100.0 |
| 40.0 | 100.0 |
| 25.0 | 100.0 |
| 20.0 | 100.0 |
| 16.0 | 100.0 |
| 12.5 | 100.0 |
| 9.5 | 100.0 |
| 4.75 | 100.0 |
| 2.36 | 99.9 |
| 2.00 | 99.9 |
| 1.18 | 99.8 |
| 0.600 | 99.5 |
| 0.300 | 98.8 |
| 0.150 | 98.1 |
| 0.075 | 97.4 |
| 0.005 | 63.1 |
| 0.002 | 51.2 |
| 0.001 | 44.1 |

| Gravel | Sand | | | Silt | Clay | Colloids |
|--------|--------|--------|------|------|------|----------|
| | Coarse | Medium | Fine | | | |
| 0.0 | 0.1 | 0.8 | 1.7 | 46.2 | 51.2 | 44.1 |

COMMENTS
 No comments.



REPORT DATE 2024.Jan.29

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D7928 - PARTICLE-SIZE DISTRIBUTION OF FINE-GRAINED SOILS USING THE SEDIMENTATION ANALYSIS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 4

DATE SAMPLED: 2024.Jan.15

DATE RECEIVED: 2024.Jan.15

DATE TESTED: 2024.Jan.25

SAMPLED BY: Stantec Consulting Ltd.

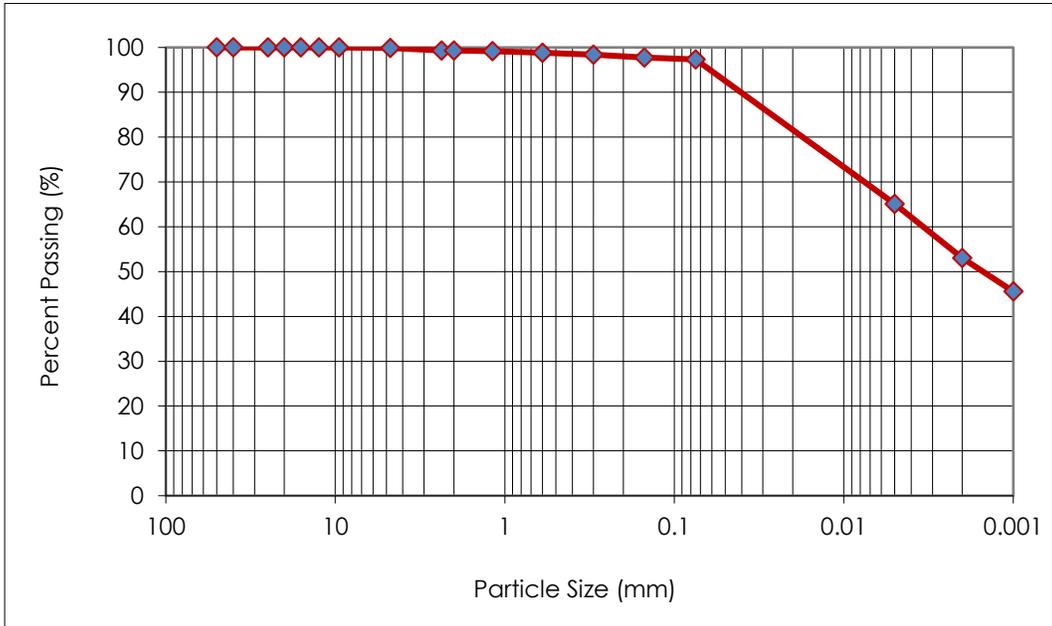
SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

CLIENT FIELD ID BH-05, 745 mm

STANTEC SAMPLE NO. 2970



| Sieve Size (mm) | % Passing |
|-----------------|-----------|
| 50.0 | 100.0 |
| 40.0 | 100.0 |
| 25.0 | 100.0 |
| 20.0 | 100.0 |
| 16.0 | 100.0 |
| 12.5 | 100.0 |
| 9.5 | 100.0 |
| 4.75 | 99.9 |
| 2.36 | 99.3 |
| 2.00 | 99.3 |
| 1.18 | 99.2 |
| 0.600 | 98.8 |
| 0.300 | 98.4 |
| 0.150 | 97.8 |
| 0.075 | 97.3 |
| 0.005 | 65.1 |
| 0.002 | 53.0 |
| 0.001 | 45.6 |

| Gravel | Sand | | | Silt | Clay | Colloids |
|--------|--------|--------|------|------|------|----------|
| | Coarse | Medium | Fine | | | |
| 0.1 | 0.6 | 0.7 | 1.3 | 44.3 | 53.0 | 45.6 |

COMMENTS
 No comments.



REPORT DATE 2024.Jan.29

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D7928 - PARTICLE-SIZE DISTRIBUTION OF FINE-GRAINED SOILS USING THE SEDIMENTATION ANALYSIS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 5

DATE SAMPLED: 2024.Jan.15

DATE RECEIVED: 2024.Jan.15

DATE TESTED: 2024.Jan.25

SAMPLED BY: Stantec Consulting Ltd.

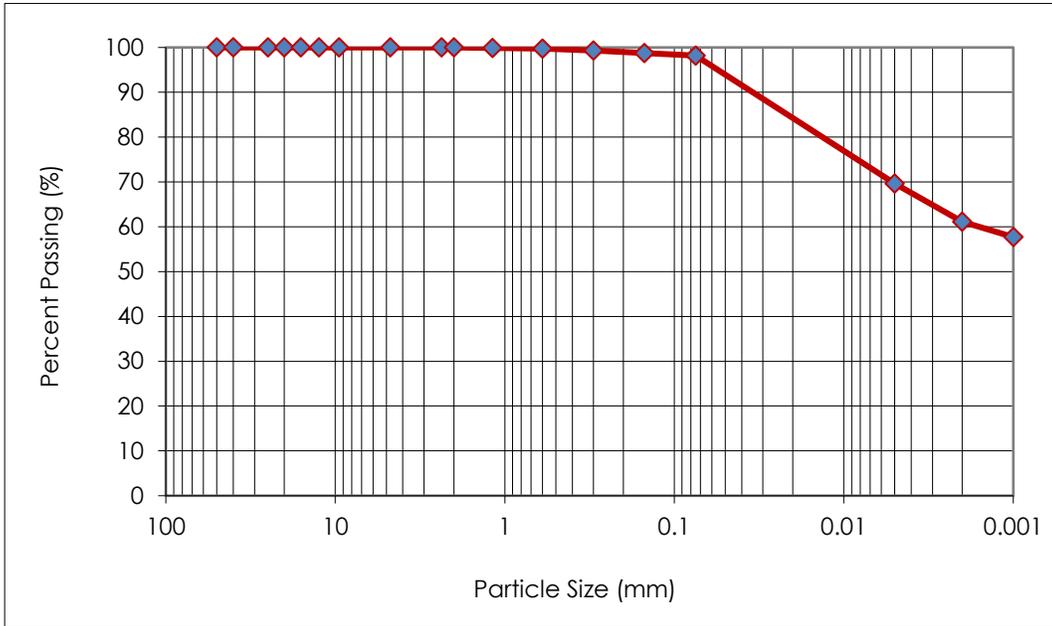
SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

CLIENT FIELD ID BH-07, 765 mm

STANTEC SAMPLE NO. 2971



| Sieve Size (mm) | % Passing |
|-----------------|-----------|
| 50.0 | 100.0 |
| 40.0 | 100.0 |
| 25.0 | 100.0 |
| 20.0 | 100.0 |
| 16.0 | 100.0 |
| 12.5 | 100.0 |
| 9.5 | 100.0 |
| 4.75 | 100.0 |
| 2.36 | 100.0 |
| 2.00 | 100.0 |
| 1.18 | 99.9 |
| 0.600 | 99.7 |
| 0.300 | 99.3 |
| 0.150 | 98.8 |
| 0.075 | 98.2 |
| 0.005 | 69.6 |
| 0.002 | 61.1 |
| 0.001 | 57.7 |

| Gravel | Sand | | | Silt | Clay | Colloids |
|--------|--------|--------|------|------|------|----------|
| | Coarse | Medium | Fine | | | |
| 0.0 | 0.0 | 0.5 | 1.3 | 37.1 | 61.1 | 57.7 |

COMMENTS
 No comments.



REPORT DATE 2024.Jan.29

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D7928 - PARTICLE-SIZE DISTRIBUTION OF FINE-GRAINED SOILS USING THE SEDIMENTATION ANALYSIS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 6

DATE SAMPLED: 2024.Jan.16

DATE RECEIVED: 2024.Jan.16

DATE TESTED: 2024.Jan.18

SAMPLED BY: Stantec Consulting Ltd.

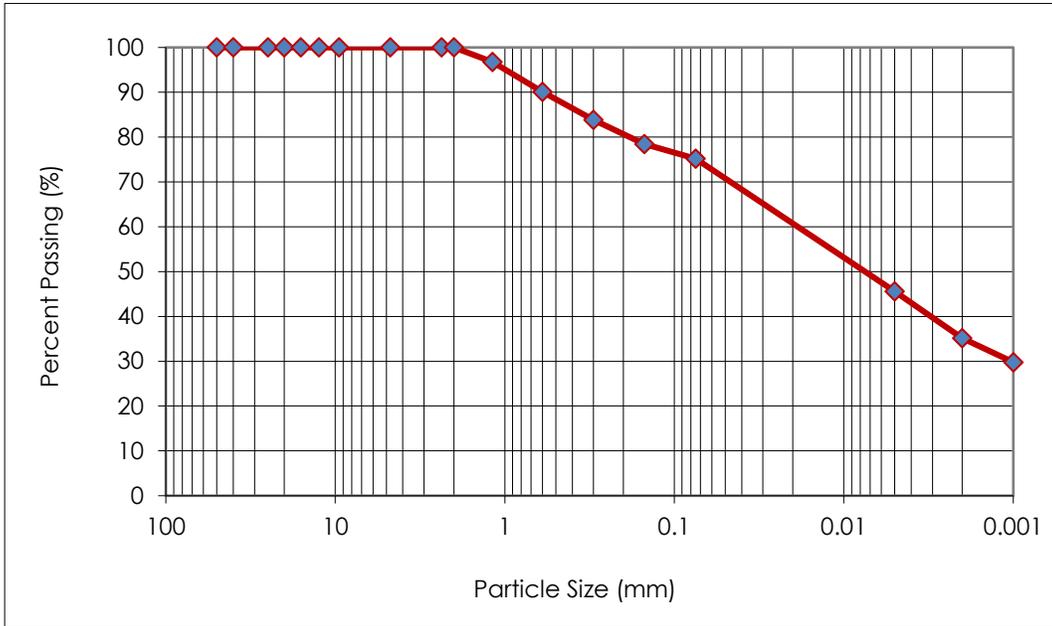
SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

CLIENT FIELD ID BH-08, 755 mm

STANTEC SAMPLE NO. 2984



| Sieve Size (mm) | % Passing |
|-----------------|-----------|
| 50.0 | 100.0 |
| 40.0 | 100.0 |
| 25.0 | 100.0 |
| 20.0 | 100.0 |
| 16.0 | 100.0 |
| 12.5 | 100.0 |
| 9.5 | 100.0 |
| 4.75 | 100.0 |
| 2.36 | 100.0 |
| 2.00 | 100.0 |
| 1.18 | 96.8 |
| 0.600 | 90.1 |
| 0.300 | 83.8 |
| 0.150 | 78.5 |
| 0.075 | 75.2 |
| 0.005 | 45.6 |
| 0.002 | 35.2 |
| 0.001 | 29.8 |

| Gravel | Sand | | | Silt | Clay | Colloids |
|--------|--------|--------|------|------|------|----------|
| | Coarse | Medium | Fine | | | |
| 0.0 | 0.0 | 13.6 | 11.2 | 40.0 | 35.2 | 29.8 |

COMMENTS
 No comments.



REPORT DATE 2024.Jan.22

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D7928 - PARTICLE-SIZE DISTRIBUTION OF FINE-GRAINED SOILS USING THE SEDIMENTATION ANALYSIS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 7

DATE SAMPLED: 2024.Jan.16

DATE RECEIVED: 2024.Jan.16

DATE TESTED: 2024.Jan.18

SAMPLED BY: Stantec Consulting Ltd.

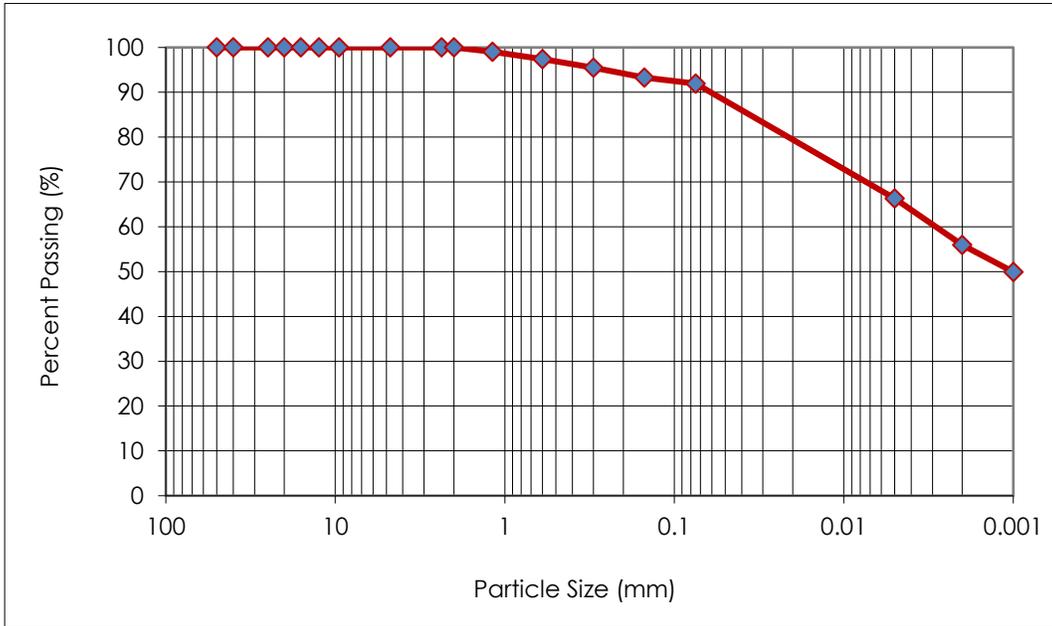
SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

CLIENT FIELD ID BH-10, 735 mm

STANTEC SAMPLE NO. 2985



| Sieve Size (mm) | % Passing |
|-----------------|-----------|
| 50.0 | 100.0 |
| 40.0 | 100.0 |
| 25.0 | 100.0 |
| 20.0 | 100.0 |
| 16.0 | 100.0 |
| 12.5 | 100.0 |
| 9.5 | 100.0 |
| 4.75 | 100.0 |
| 2.36 | 100.0 |
| 2.00 | 100.0 |
| 1.18 | 99.1 |
| 0.600 | 97.4 |
| 0.300 | 95.5 |
| 0.150 | 93.3 |
| 0.075 | 91.9 |
| 0.005 | 66.3 |
| 0.002 | 56.0 |
| 0.001 | 49.9 |

| Gravel | Sand | | | Silt | Clay | Colloids |
|--------|--------|--------|------|------|------|----------|
| | Coarse | Medium | Fine | | | |
| 0.0 | 0.0 | 3.7 | 4.4 | 35.9 | 56.0 | 49.9 |

COMMENTS
 No comments.



REPORT DATE 2024.Jan.22

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D7928 - PARTICLE-SIZE DISTRIBUTION OF FINE-GRAINED SOILS USING THE SEDIMENTATION ANALYSIS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 8

DATE SAMPLED: 2024.Jan.17

DATE RECEIVED: 2024.Jan.17

DATE TESTED: 2024.Jan.23

SAMPLED BY: Stantec Consulting Ltd.

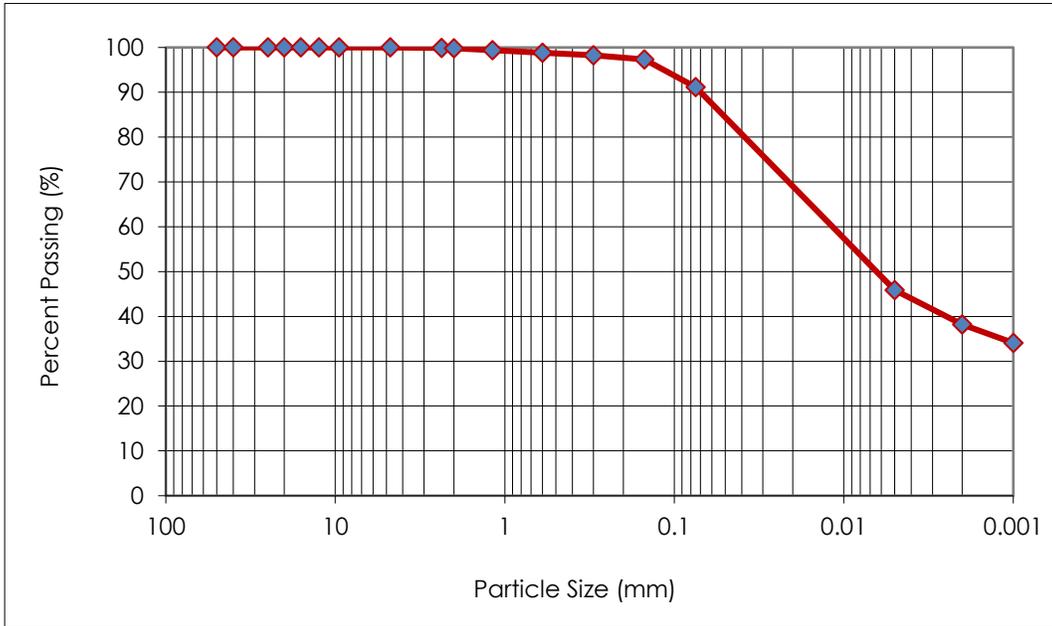
SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

CLIENT FIELD ID BH-11, 710 mm

STANTEC SAMPLE NO. 4000



| Sieve Size (mm) | % Passing |
|-----------------|-----------|
| 50.0 | 100.0 |
| 40.0 | 100.0 |
| 25.0 | 100.0 |
| 20.0 | 100.0 |
| 16.0 | 100.0 |
| 12.5 | 100.0 |
| 9.5 | 100.0 |
| 4.75 | 100.0 |
| 2.36 | 99.9 |
| 2.00 | 99.8 |
| 1.18 | 99.4 |
| 0.600 | 98.8 |
| 0.300 | 98.3 |
| 0.150 | 97.3 |
| 0.075 | 91.1 |
| 0.005 | 45.9 |
| 0.002 | 38.2 |
| 0.001 | 34.1 |

| Gravel | Sand | | | Silt | Clay | Colloids |
|--------|--------|--------|------|------|------|----------|
| | Coarse | Medium | Fine | | | |
| 0.0 | 0.2 | 1.3 | 7.4 | 52.9 | 38.2 | 34.1 |

COMMENTS
 No comments.



REPORT DATE 2024.Jan.25

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

ASTM D7928 - PARTICLE-SIZE DISTRIBUTION OF FINE-GRAINED SOILS USING THE SEDIMENTATION ANALYSIS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Caleb Olfert

REPORT NO. 9

DATE SAMPLED: 2024.Jan.17

DATE RECEIVED: 2024.Jan.17

DATE TESTED: 2024.Jan.23

SAMPLED BY: Stantec Consulting Ltd.

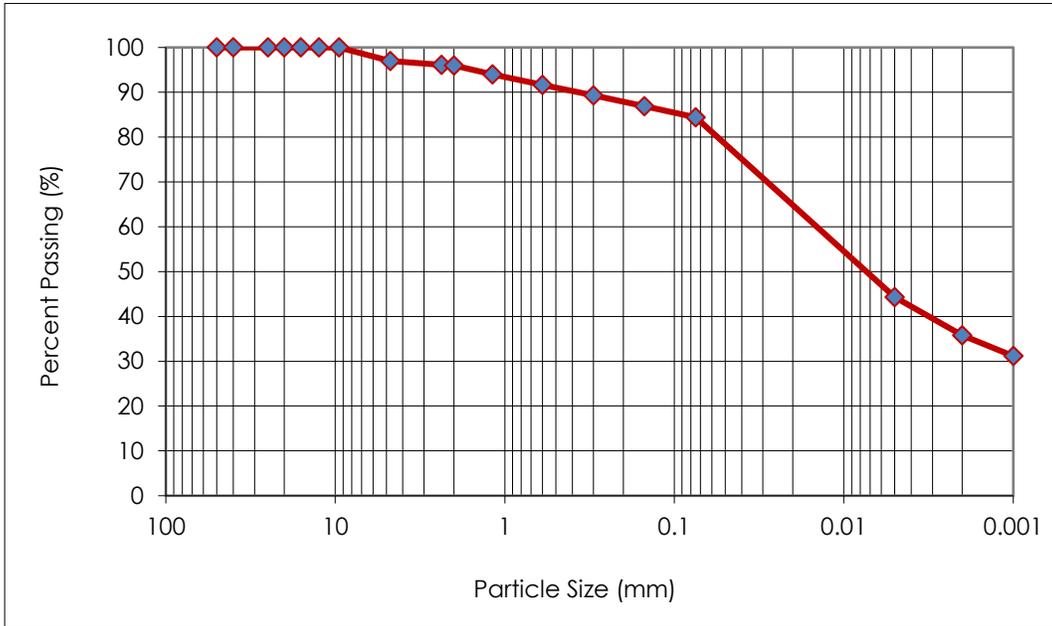
SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Larry Presado

MATERIAL IDENTIFICATION

CLIENT FIELD ID BH-12, 775 mm

STANTEC SAMPLE NO. 4001



| Sieve Size (mm) | % Passing |
|-----------------|-----------|
| 50.0 | 100.0 |
| 40.0 | 100.0 |
| 25.0 | 100.0 |
| 20.0 | 100.0 |
| 16.0 | 100.0 |
| 12.5 | 100.0 |
| 9.5 | 100.0 |
| 4.75 | 97.0 |
| 2.36 | 96.2 |
| 2.00 | 96.0 |
| 1.18 | 94.0 |
| 0.600 | 91.6 |
| 0.300 | 89.3 |
| 0.150 | 86.9 |
| 0.075 | 84.4 |
| 0.005 | 44.3 |
| 0.002 | 35.8 |
| 0.001 | 31.2 |

| Gravel | Sand | | | Silt | Clay | Colloids |
|--------|--------|--------|------|------|------|----------|
| | Coarse | Medium | Fine | | | |
| 3.0 | 1.0 | 5.7 | 5.9 | 48.6 | 35.8 | 31.2 |

COMMENTS
 No comments.



REPORT DATE 2024.Jan.25

REVIEWED BY Guillaume Beauce, P.Eng.
 Geotechnical Engineer - Materials Testing Services

PROCTOR TEST REPORT

TO Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

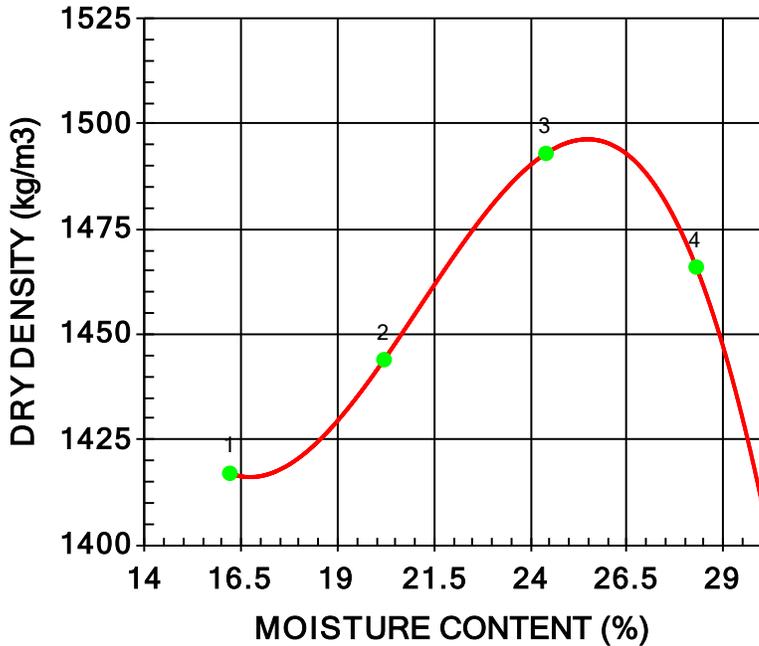
CLIENT Dillon Consulting Ltd.
 C.C.

ATTN: Ali Campbell

PROJECT 24-R-06 - Local Streets Package

PROJECT NO. 123316892
 PROCTOR NO. 1 DATE SAMPLED 2024.Jan.15 DATE RECEIVED 2024.Jan.15 DATE TESTED 2024.Jan.19

| | | | |
|-------------------------|--------------------------------|----------------------------|------------------------------------|
| INSITU MOISTURE | 36.7 % | COMPACTION STANDARD | Standard Proctor, ASTM |
| TESTED BY | Donald Eliazar | | D698 |
| MATERIAL IDENTIFICATION | | COMPACTION PROCEDURE | A: 101.6mm Mold, Passing 4.75mm |
| MAJOR COMPONENT | Backfill | RAMMER TYPE | Manual |
| SIZE | Fat Clay (CH) | PREPARATION | Moist |
| DESCRIPTION | | OVERSIZE CORRECTION METHOD | None |
| SUPPLIER | Existing Materials | RETAINED 4.75mm SCREEN | N/A % |
| SOURCE | Kanata Street - BH-01, 0.740 m | | |



| TRIAL NUMBER | WET DENSITY (kg/m³) | DRY DENSITY (kg/m³) | MOISTURE CONTENT (%) |
|--------------|---------------------|---------------------|----------------------|
| 1 | 1646 | 1417 | 16.2 |
| 2 | 1736 | 1444 | 20.2 |
| 3 | 1857 | 1493 | 24.4 |
| 4 | 1881 | 1466 | 28.3 |

| | MAXIMUM DRY DENSITY (kg/m³) | OPTIMUM MOISTURE CONTENT (%) |
|--------------------|-----------------------------|------------------------------|
| CALCULATED | 1500 | 25.5 |
| OVERSIZE CORRECTED | | |

COMMENTS

Stantec Sample No. 2967.

PROCTOR TEST REPORT

TO Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

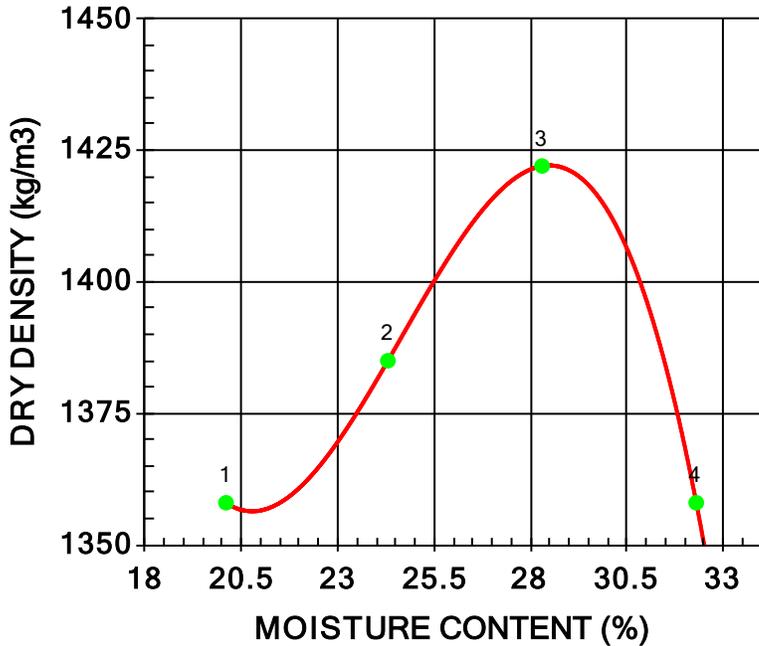
CLIENT Dillon Consulting Ltd.
 C.C.

ATTN: Ali Campbell

PROJECT 24-R-06 - Local Streets Package

PROJECT NO. 123316892
 PROCTOR NO. 2 DATE SAMPLED 2024.Jan.15 DATE RECEIVED 2024.Jan.15 DATE TESTED 2024.Jan.22

| | | | |
|-------------------------|---------------------------------|----------------------------|------------------------------------|
| INSITU MOISTURE | 46.2 % | COMPACTION STANDARD | Standard Proctor, ASTM |
| TESTED BY | Donald Eliazar | | D698 |
| MATERIAL IDENTIFICATION | | COMPACTION PROCEDURE | A: 101.6mm Mold, Passing 4.75mm |
| MAJOR COMPONENT | Subgrade | RAMMER TYPE | Manual |
| SIZE | Fat Clay (CH) | PREPARATION | Moist |
| DESCRIPTION | | OVERSIZE CORRECTION METHOD | None |
| SUPPLIER | Existing Materials | RETAINED 4.75mm SCREEN | N/A % |
| SOURCE | Kanata Street - BH-02 , 0.780 m | | |



| TRIAL NUMBER | WET DENSITY (kg/m³) | DRY DENSITY (kg/m³) | MOISTURE CONTENT (%) |
|--------------|---------------------|---------------------|----------------------|
| 1 | 1631 | 1358 | 20.1 |
| 2 | 1722 | 1385 | 24.3 |
| 3 | 1824 | 1422 | 28.3 |
| 4 | 1796 | 1358 | 32.3 |

| | MAXIMUM DRY DENSITY (kg/m³) | OPTIMUM MOISTURE CONTENT (%) |
|--------------------|-----------------------------|------------------------------|
| CALCULATED | 1420 | 28.5 |
| OVERSIZE CORRECTED | | |

COMMENTS

Stantec Sample No. 2968.

PROCTOR TEST REPORT

TO Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

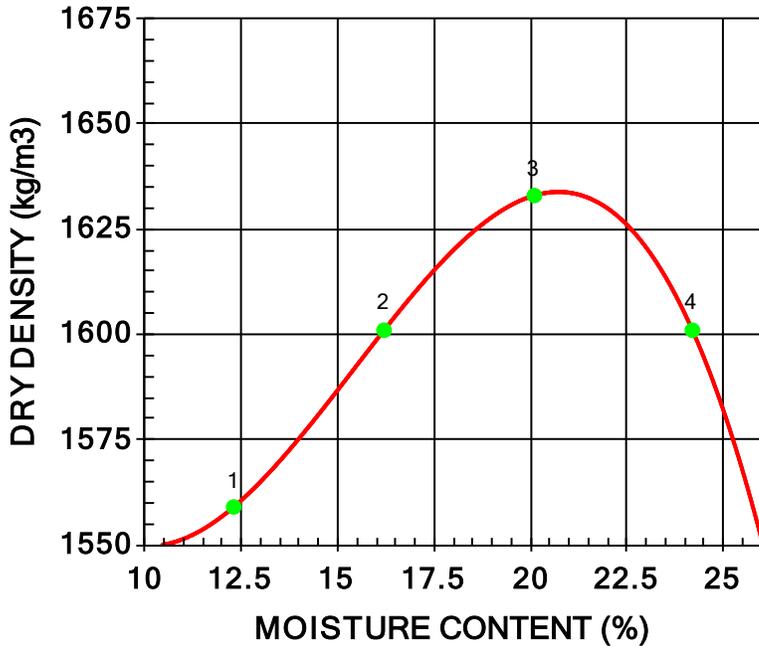
CLIENT Dillon Consulting Ltd.
 C.C.

ATTN: Ali Campbell

PROJECT 24-R-06 - Local Streets Package

PROJECT NO. 123316892
 PROCTOR NO. 3 DATE SAMPLED 2024.Jan.15 DATE RECEIVED 2024.Jan.15 DATE TESTED 2024.Jan.23

| | | | |
|-------------------------|--------------------------------|----------------------------|------------------------------------|
| INSITU MOISTURE | 33.5 % | COMPACTION STANDARD | Standard Proctor, ASTM |
| TESTED BY | Donald Eliazar | | D698 |
| MATERIAL IDENTIFICATION | | COMPACTION PROCEDURE | A: 101.6mm Mold, Passing 4.75mm |
| MAJOR COMPONENT | Backfill | RAMMER TYPE | Manual |
| SIZE | Fat Clay (CH) | PREPARATION | Moist |
| DESCRIPTION | | OVERSIZE CORRECTION METHOD | None |
| SUPPLIER | Existing Materials | RETAINED 4.75mm SCREEN | N/A % |
| SOURCE | Kanata Street - BH-04, 0.780 m | | |



| TRIAL NUMBER | WET DENSITY (kg/m³) | DRY DENSITY (kg/m³) | MOISTURE CONTENT (%) |
|--------------|---------------------|---------------------|----------------------|
| 1 | 1751 | 1559 | 12.3 |
| 2 | 1860 | 1601 | 16.2 |
| 3 | 1961 | 1633 | 20.1 |
| 4 | 1989 | 1601 | 24.2 |

| | MAXIMUM DRY DENSITY (kg/m³) | OPTIMUM MOISTURE CONTENT (%) |
|--------------------|-----------------------------|------------------------------|
| CALCULATED | 1630 | 20.5 |
| OVERSIZE CORRECTED | | |

COMMENTS

Stantec Sample No. 2969.

PROCTOR TEST REPORT

TO Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

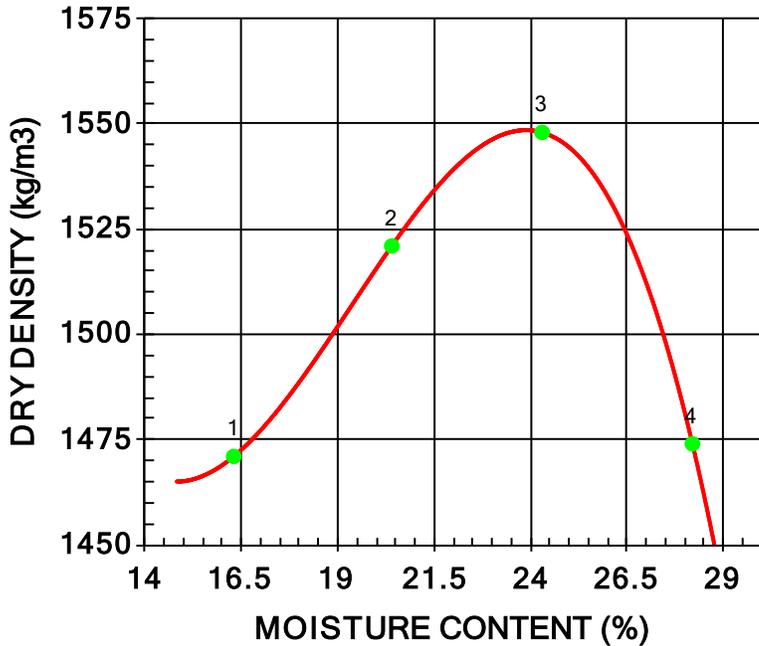
CLIENT Dillon Consulting Ltd.
 C.C.

ATTN: Ali Campbell

PROJECT 24-R-06 - Local Streets Package

PROJECT NO. 123316892
 PROCTOR NO. 4 DATE SAMPLED 2024.Jan.15 DATE RECEIVED 2024.Jan.15 DATE TESTED 2024.Jan.23

| | | | |
|-------------------------|---------------------------------|----------------------------|---------------------------------|
| INSITU MOISTURE | 27.9 % | COMPACTION STANDARD | Standard Proctor, ASTM D698 |
| TESTED BY | Pervez Safdar | COMPACTION PROCEDURE | A: 101.6mm Mold, Passing 4.75mm |
| MATERIAL IDENTIFICATION | | RAMMER TYPE | Manual |
| MAJOR COMPONENT | Backfill | PREPARATION | Moist |
| SIZE | Fat Clay (CH) | OVERSIZE CORRECTION METHOD | None |
| DESCRIPTION | | RETAINED 4.75mm SCREEN | N/A % |
| SUPPLIER | Existing Materials | | |
| SOURCE | Wabasha Street - BH-05, 0.745 m | | |



| TRIAL NUMBER | WET DENSITY (kg/m³) | DRY DENSITY (kg/m³) | MOISTURE CONTENT (%) |
|--------------|---------------------|---------------------|----------------------|
| 1 | 1711 | 1471 | 16.3 |
| 2 | 1831 | 1521 | 20.4 |
| 3 | 1924 | 1548 | 24.3 |
| 4 | 1890 | 1474 | 28.2 |

| | MAXIMUM DRY DENSITY (kg/m³) | OPTIMUM MOISTURE CONTENT (%) |
|--------------------|-----------------------------|------------------------------|
| CALCULATED | 1550 | 24.0 |
| OVERSIZE CORRECTED | | |

COMMENTS

Stantec Sample No. 2970.

PROCTOR TEST REPORT

TO Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

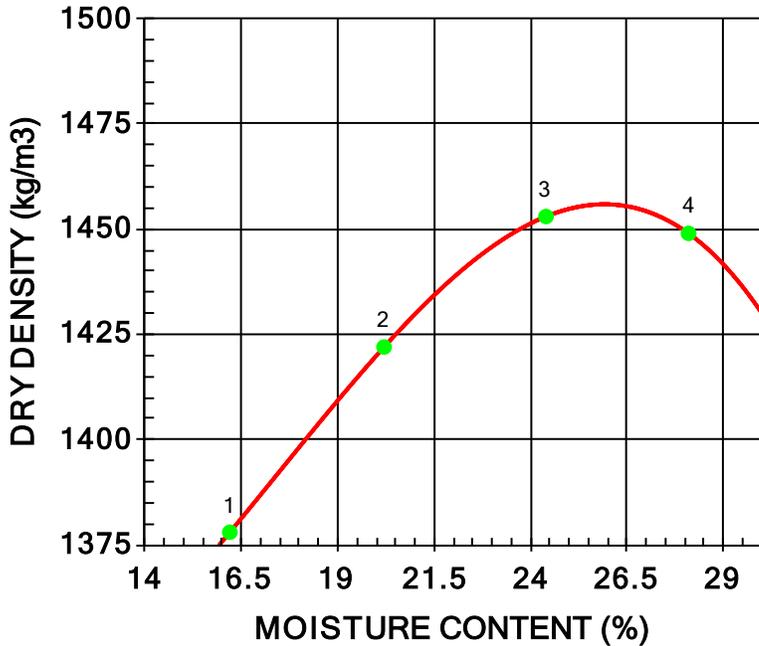
CLIENT Dillon Consulting Ltd.
 C.C.

ATTN: Ali Campbell

PROJECT 24-R-06 - Local Streets Package

PROJECT NO. 123316892
 PROCTOR NO. 5 DATE SAMPLED 2024.Jan.15 DATE RECEIVED 2024.Jan.15 DATE TESTED 2024.Jan.23

| | | | |
|-------------------------|---------------------------------|----------------------------|------------------------------------|
| INSITU MOISTURE | 33.9 % | COMPACTION STANDARD | Standard Proctor, ASTM |
| TESTED BY | Donald Eliazar | | D698 |
| MATERIAL IDENTIFICATION | | COMPACTION PROCEDURE | A: 101.6mm Mold, Passing 4.75mm |
| MAJOR COMPONENT | Backfill | RAMMER TYPE | Manual |
| SIZE | Fat Clay (CH) | PREPARATION | Moist |
| DESCRIPTION | | OVERSIZE CORRECTION METHOD | None |
| SUPPLIER | Existing Materials | RETAINED 4.75mm SCREEN | N/A % |
| SOURCE | Wabasha Street - BH-07, 0.765 m | | |



| TRIAL NUMBER | WET DENSITY (kg/m³) | DRY DENSITY (kg/m³) | MOISTURE CONTENT (%) |
|--------------|---------------------|---------------------|----------------------|
| 1 | 1601 | 1378 | 16.2 |
| 2 | 1709 | 1422 | 20.2 |
| 3 | 1807 | 1453 | 24.4 |
| 4 | 1856 | 1449 | 28.1 |

| | MAXIMUM DRY DENSITY (kg/m³) | OPTIMUM MOISTURE CONTENT (%) |
|--------------------|-----------------------------|------------------------------|
| CALCULATED | 1460 | 26.0 |
| OVERSIZE CORRECTED | | |

COMMENTS

Stantec Sample No. 2971.

PROCTOR TEST REPORT

TO Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

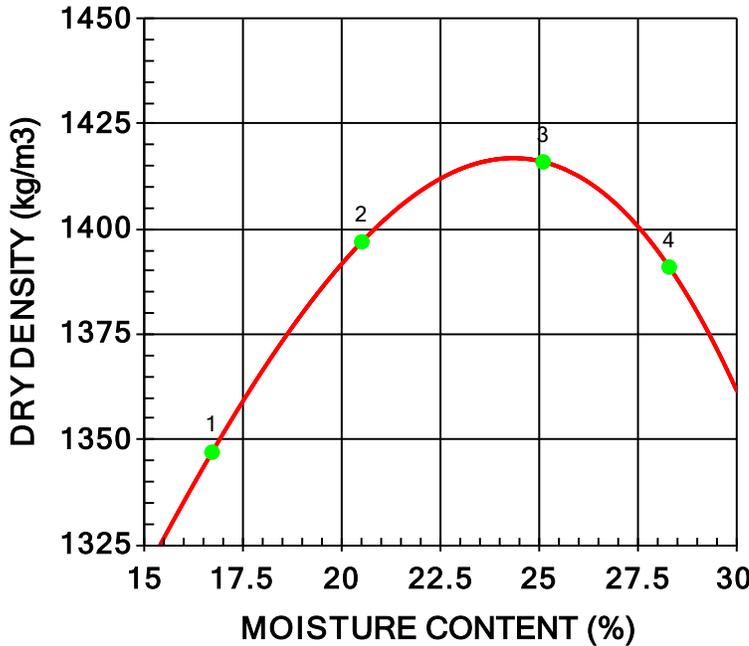
CLIENT Dillon Consulting Ltd.
 C.C.

ATTN: Ali Campbell

PROJECT 24-R-06 - Local Streets Package

PROJECT NO. 123316892
 PROCTOR NO. 6 DATE SAMPLED 2024.Jan.16 DATE RECEIVED 2024.Jan.16 DATE TESTED 2024.Jan.26

| | | | |
|-------------------------|-------------------------------|----------------------------|---------------------------------|
| INSITU MOISTURE | 39.0 % | COMPACTION STANDARD | Standard Proctor, ASTM D698 |
| TESTED BY | Donald Eliazar | COMPACTION PROCEDURE | A: 101.6mm Mold, Passing 4.75mm |
| MATERIAL IDENTIFICATION | | RAMMER TYPE | Automatic |
| MAJOR COMPONENT | Subgrade | PREPARATION | Dry |
| SIZE | | OVERSIZE CORRECTION METHOD | None |
| DESCRIPTION | Fat Clay with sand (CH) | RETAINED 4.75mm SCREEN | N/A % |
| SUPPLIER | Existing Material | | |
| SOURCE | Wynford Alley, BH-08, 0.755 m | | |



| TRIAL NUMBER | WET DENSITY (kg/m³) | DRY DENSITY (kg/m³) | MOISTURE CONTENT (%) |
|--------------|---------------------|---------------------|----------------------|
| 1 | 1572 | 1347 | 16.7 |
| 2 | 1683 | 1397 | 20.5 |
| 3 | 1771 | 1416 | 25.1 |
| 4 | 1785 | 1391 | 28.3 |

| | MAXIMUM DRY DENSITY (kg/m³) | OPTIMUM MOISTURE CONTENT (%) |
|--------------------|-----------------------------|------------------------------|
| CALCULATED | 1420 | 24.5 |
| OVERSIZE CORRECTED | | |

COMMENTS

Stantec Sample no. 2984.

PROCTOR TEST REPORT

TO Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

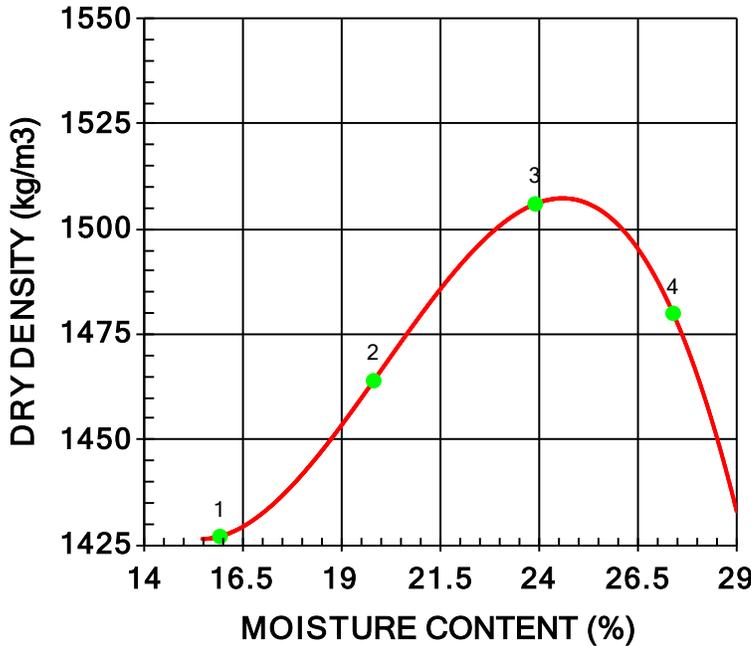
CLIENT Dillon Consulting Ltd.
 C.C.

ATTN: Ali Campbell

PROJECT 24-R-06 - Local Streets Package

PROJECT NO. 123316892
 PROCTOR NO. 7 DATE SAMPLED 2024.Jan.16 DATE RECEIVED 2024.Jan.16 DATE TESTED 2024.Jan.26

| | | | |
|-------------------------|-------------------------------|----------------------------|---------------------------------|
| INSITU MOISTURE | 31.5 % | COMPACTION STANDARD | Standard Proctor, ASTM D698 |
| TESTED BY | Donald Eliazar | COMPACTION PROCEDURE | A: 101.6mm Mold, Passing 4.75mm |
| MATERIAL IDENTIFICATION | | RAMMER TYPE | Manual |
| MAJOR COMPONENT | Subgrade | PREPARATION | Moist |
| SIZE | Fat Clay (CH) | OVERSIZE CORRECTION METHOD | None |
| DESCRIPTION | | RETAINED 4.75mm SCREEN | N/A % |
| SUPPLIER | Existing Materials | | |
| SOURCE | Wynford Alley, BH-10, 0.735 m | | |



| TRIAL NUMBER | WET DENSITY (kg/m³) | DRY DENSITY (kg/m³) | MOISTURE CONTENT (%) |
|--------------|---------------------|---------------------|----------------------|
| 1 | 1654 | 1427 | 15.9 |
| 2 | 1754 | 1464 | 19.8 |
| 3 | 1866 | 1506 | 23.9 |
| 4 | 1886 | 1480 | 27.4 |

| | MAXIMUM DRY DENSITY (kg/m³) | OPTIMUM MOISTURE CONTENT (%) |
|--------------------|-----------------------------|------------------------------|
| CALCULATED | 1510 | 24.5 |
| OVERSIZE CORRECTED | | |

COMMENTS

Stantec Sample No. 2985.

PROCTOR TEST REPORT

TO Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

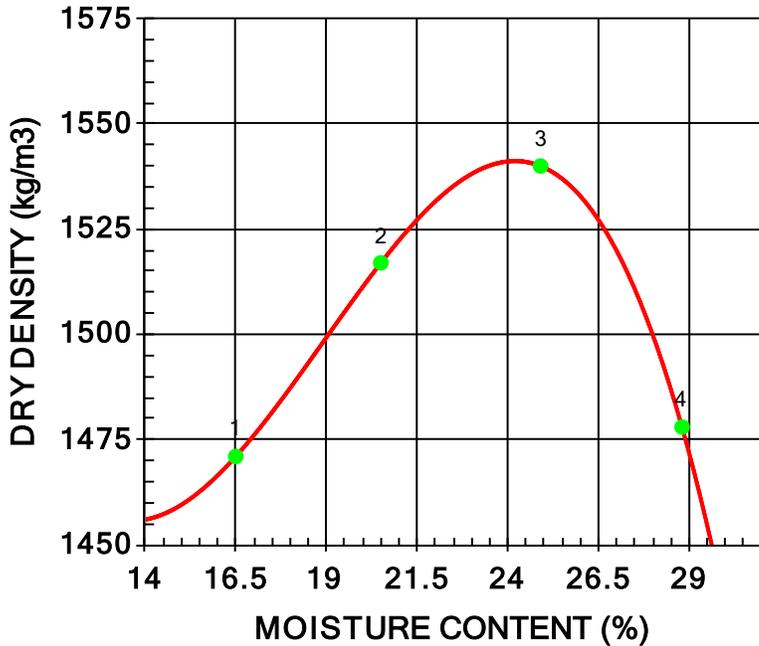
CLIENT Dillon Consulting Ltd.
 C.C.

ATTN: Ali Campbell

PROJECT 24-R-06 - Local Streets Package

PROJECT NO. 123316892
 PROCTOR NO. 8 DATE SAMPLED 2024.Jan.17 DATE RECEIVED 2024.Jan.17 DATE TESTED 2024.Feb.05

| | | | |
|-------------------------|-----------------------------|----------------------------|------------------------------------|
| INSITU MOISTURE | 27.8 % | COMPACTION STANDARD | Standard Proctor, ASTM |
| TESTED BY | Donald Eliazar | | D698 |
| MATERIAL IDENTIFICATION | | COMPACTION PROCEDURE | A: 101.6mm Mold, Passing 4.75mm |
| MAJOR COMPONENT | Subgrade | RAMMER TYPE | Manual |
| SIZE | Fat Clay (CH) | PREPARATION | Moist |
| DESCRIPTION | | OVERSIZE CORRECTION METHOD | None |
| SUPPLIER | Existing Materials | RETAINED 4.75mm SCREEN | N/A % |
| SOURCE | Lilian Ave - BH-11, 0.710 m | | |



| TRIAL NUMBER | WET DENSITY (kg/m³) | DRY DENSITY (kg/m³) | MOISTURE CONTENT (%) |
|--------------|---------------------|---------------------|----------------------|
| 1 | 1714 | 1471 | 16.5 |
| 2 | 1828 | 1517 | 20.5 |
| 3 | 1923 | 1540 | 24.9 |
| 4 | 1904 | 1478 | 28.8 |

| | MAXIMUM DRY DENSITY (kg/m³) | OPTIMUM MOISTURE CONTENT (%) |
|--------------------|-----------------------------|------------------------------|
| CALCULATED | 1540 | 24.0 |
| OVERSIZE CORRECTED | | |

COMMENTS

Stantec Sample No. 4000.

PROCTOR TEST REPORT

TO Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

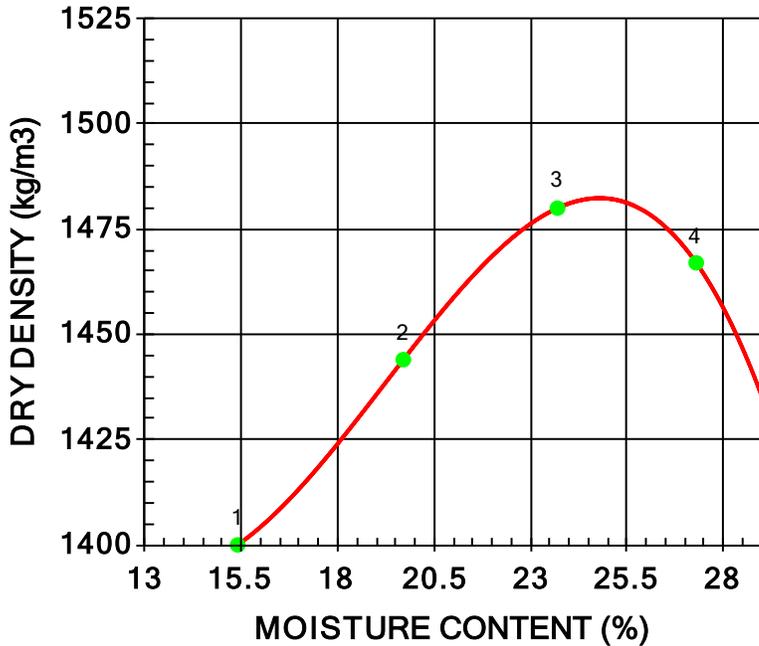
CLIENT Dillon Consulting Ltd.
 C.C.

ATTN: Ali Campbell

PROJECT 24-R-06 - Local Streets Package

PROJECT NO. 123316892
 PROCTOR NO. 9 DATE SAMPLED 2024.Jan.17 DATE RECEIVED 2024.Jan.17 DATE TESTED 2024.Feb.05

| | | | |
|-------------------------|-----------------------------|----------------------------|---------------------------------|
| INSITU MOISTURE | 36.6 % | COMPACTION STANDARD | Standard Proctor, ASTM D698 |
| TESTED BY | Donald Eliazar | COMPACTION PROCEDURE | A: 101.6mm Mold, Passing 4.75mm |
| MATERIAL IDENTIFICATION | | RAMMER TYPE | Manual |
| MAJOR COMPONENT | Subgrade | PREPARATION | Moist |
| SIZE | Fat Clay with Sand (CH) | OVERSIZE CORRECTION METHOD | None |
| DESCRIPTION | Existing Materials | RETAINED 4.75mm SCREEN | N/A % |
| SUPPLIER | Lilian Ave - BH-12, 0.775 m | | |



| TRIAL NUMBER | WET DENSITY (kg/m³) | DRY DENSITY (kg/m³) | MOISTURE CONTENT (%) |
|--------------|---------------------|---------------------|----------------------|
| 1 | 1616 | 1400 | 15.4 |
| 2 | 1729 | 1444 | 19.7 |
| 3 | 1831 | 1480 | 23.7 |
| 4 | 1867 | 1467 | 27.3 |

| | MAXIMUM DRY DENSITY (kg/m³) | OPTIMUM MOISTURE CONTENT (%) |
|--------------------|-----------------------------|------------------------------|
| CALCULATED | 1480 | 25.0 |
| OVERSIZE CORRECTED | | |

COMMENTS

Stantec Sample No. 4001.

ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Ali Campbell

REPORT NO. 1

DATE SAMPLED: 2024.Jan.15

DATE RECEIVED: 2024.Jan.15

DATE TESTED: 2024.Jan.25

SAMPLED BY: Stantec Consulting Ltd.

SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Donald Eliazar

MATERIAL IDENTIFICATION

MATERIAL USE Subgrade
 MAX. NOMINAL SIZE 4.75 mm
 MATERIAL TYPE Fat Clay (CH)
 SPECIFICATION ID Not Applicable

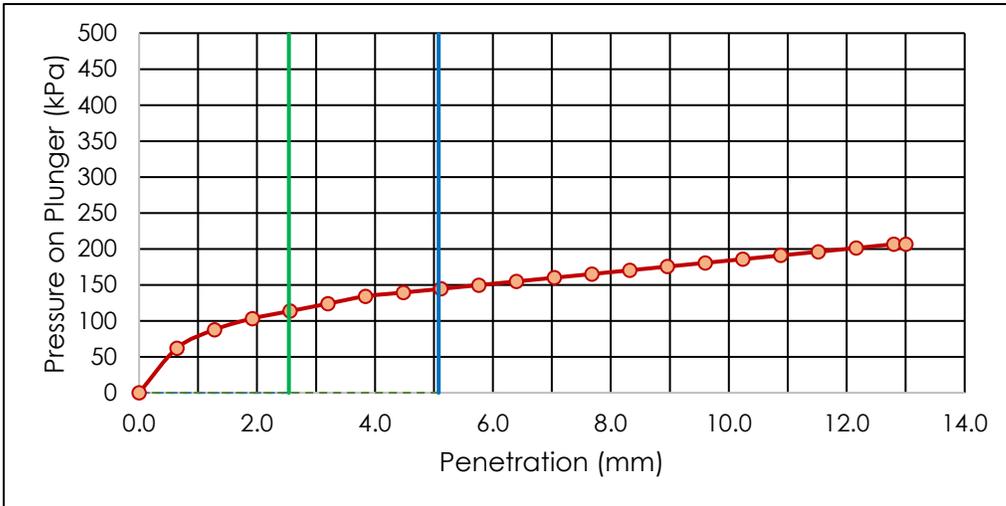
SUPPLIER Existing Material
 SOURCE Existing Material
 SAMPLE LOCATION BH-01, 0.740 m
 STANTEC SAMPLE NO. 2967

IMMERSION PERIOD 96 ± 2 hr
 CONDITION OF SAMPLE Soaked
 SURCHARGE MASS 4.54 kg

TARGET MAX. DRY DENSITY 1500 kg/m³
 TARGET OPTIMUM MOISTURE 25.5 %

+19 mm OVERSIZE 0 %
 SWELL OF SAMPLE 4.64 %
 POST-TEST MOISTURE 39.0 %

AS-COMPACTED DRY DENSITY 1426 kg/m³
 AS-COMPACTED MOISTURE 25.5 %
 AS-COMPACTED % COMPACTION 95 %



**CBR VALUE AT 2.54 mm
 PENETRATION**
 1.6

**CBR VALUE AT 5.08 mm
 PENETRATION**
 1.4

COMMENTS

Sample prepared to 95% of the maximum dry density at the optimum moisture content as determined from ASTM D698.

REPORT DATE 2024.Feb.12

REVIEWED BY  Jason Thompson, C.E.T.
 Principal - Manager of Materials Testing Services

ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Ali Campbell

REPORT NO. 2

DATE SAMPLED: 2024.Jan.15

DATE RECEIVED: 2024.Jan.15

DATE TESTED: 2024.Jan.25

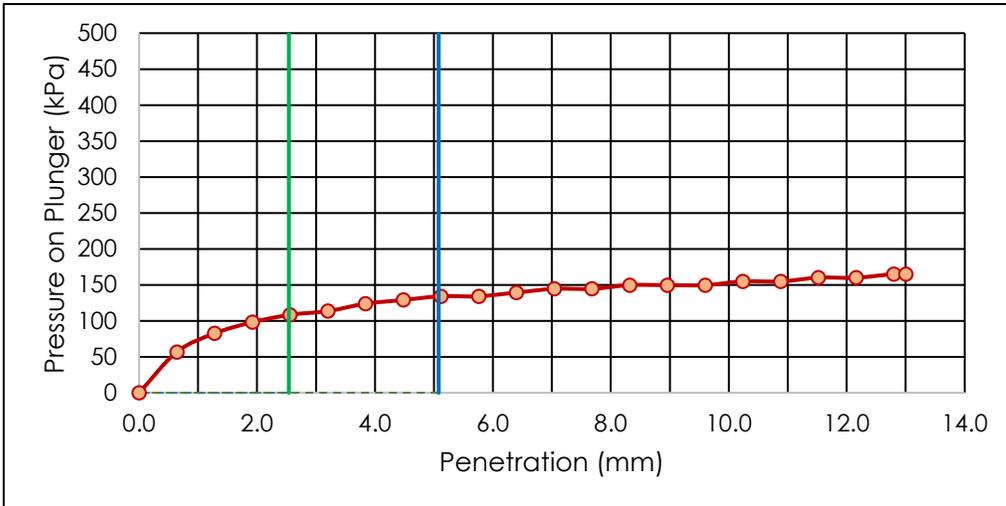
SAMPLED BY: Stantec Consulting Ltd.

SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Donald Eliazar

MATERIAL IDENTIFICATION

| | | | |
|---------------------|----------------|---------------------------|------------------------|
| MATERIAL USE | Subgrade | SUPPLIER | Existing Material |
| MAX. NOMINAL SIZE | 4.75 mm | SOURCE | Existing Material |
| MATERIAL TYPE | Fat Clay (CH) | SAMPLE LOCATION | BH-02, 0.780 m |
| SPECIFICATION ID | Not Applicable | STANTEC SAMPLE NO. | 2968 |
| IMMERSION PERIOD | 96 ± 2 hr | TARGET MAX. DRY DENSITY | 1420 kg/m ³ |
| CONDITION OF SAMPLE | Soaked | TARGET OPTIMUM MOISTURE | 28.5 % |
| SURCHARGE MASS | 4.54 kg | | |
| +19 mm OVERSIZE | 0 % | AS-COMPACTED DRY DENSITY | 1350 kg/m ³ |
| SWELL OF SAMPLE | 7.03 % | AS-COMPACTED MOISTURE | 28.4 % |
| POST-TEST MOISTURE | 45.6 % | AS-COMPACTED % COMPACTION | 95 % |



**CBR VALUE AT 2.54 mm
PENETRATION**
1.6

**CBR VALUE AT 5.08 mm
PENETRATION**
1.3

COMMENTS

Sample prepared to 95% of the maximum dry density at the optimum moisture content as determined from ASTM D698.

REPORT DATE 2024.Feb.12

REVIEWED BY  Jason Thompson, C.E.T.
 Principal - Manager of Materials Testing Services

ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Ali Campbell

REPORT NO. 3

DATE SAMPLED: 2024.Jan.15

DATE RECEIVED: 2024.Jan.15

DATE TESTED: 2024.Jan.29

SAMPLED BY: Stantec Consulting Ltd.

SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Donald Eliazar

MATERIAL IDENTIFICATION

MATERIAL USE Subgrade
 MAX. NOMINAL SIZE 4.75 mm
 MATERIAL TYPE Fat Clay (CH)
 SPECIFICATION ID Not Applicable

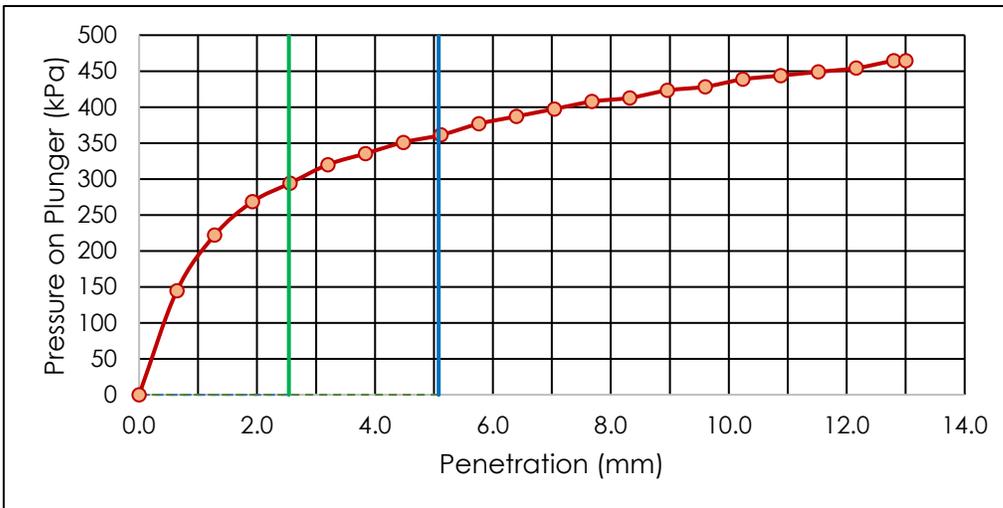
SUPPLIER Existing Material
 SOURCE Existing Material
 SAMPLE LOCATION BH-04, 0.780 m
 STANTEC SAMPLE NO. 2969

IMMERSION PERIOD 96 ± 2 hr
 CONDITION OF SAMPLE Soaked
 SURCHARGE MASS 4.54 kg

TARGET MAX. DRY DENSITY 1630 kg/m³
 TARGET OPTIMUM MOISTURE 20.5 %

+19 mm OVERSIZE 0 %
 SWELL OF SAMPLE 1.83 %
 POST-TEST MOISTURE 24.8 %

AS-COMPACTED DRY DENSITY 1548 kg/m³
 AS-COMPACTED MOISTURE 20.5 %
 AS-COMPACTED % COMPACTION 95 %



**CBR VALUE AT 2.54 mm
PENETRATION
4.3**

**CBR VALUE AT 5.08 mm
PENETRATION
3.6**

COMMENTS

Sample prepared to 95% of the maximum dry density at the optimum moisture content as determined from ASTM D698.

REPORT DATE 2024.Feb.12

REVIEWED BY 
 Jason Thompson, C.E.T.
 Principal - Manager of Materials Testing Services

ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Ali Campbell

REPORT NO. 4

DATE SAMPLED: 2024.Jan.15

DATE RECEIVED: 2024.Jan.15

DATE TESTED: 2024.Jan.29

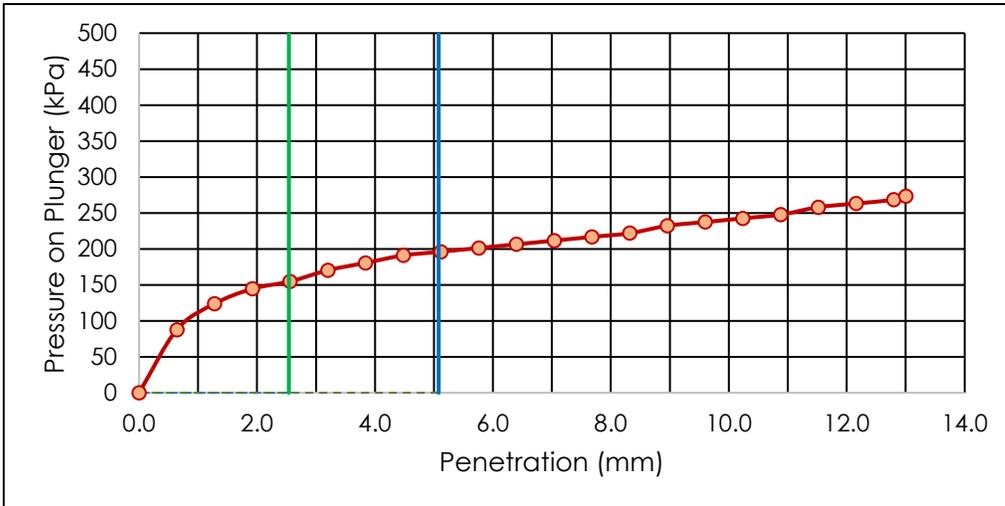
SAMPLED BY: Stantec Consulting Ltd.

SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Donald Eliazar

MATERIAL IDENTIFICATION

| | | | |
|---------------------|----------------|---------------------------|------------------------|
| MATERIAL USE | Subgrade | SUPPLIER | Existing Material |
| MAX. NOMINAL SIZE | 4.75 mm | SOURCE | Existing Material |
| MATERIAL TYPE | Fat Clay (CH) | SAMPLE LOCATION | BH-05, 0.745 m |
| SPECIFICATION ID | Not Applicable | STANTEC SAMPLE NO. | 2970 |
| IMMERSION PERIOD | 96 ± 2 hr | TARGET MAX. DRY DENSITY | 1550 kg/m ³ |
| CONDITION OF SAMPLE | Soaked | TARGET OPTIMUM MOISTURE | 24.0 % |
| SURCHARGE MASS | 4.54 kg | | |
| +19 mm OVERSIZE | 0 % | AS-COMPACTED DRY DENSITY | 1467 kg/m ³ |
| SWELL OF SAMPLE | 3.78 % | AS-COMPACTED MOISTURE | 24.4 % |
| POST-TEST MOISTURE | 33.6 % | AS-COMPACTED % COMPACTION | 95 % |



**CBR VALUE AT 2.54 mm
 PENETRATION
 2.2**

**CBR VALUE AT 5.08 mm
 PENETRATION
 2.0**

COMMENTS

Sample prepared to 95% of the maximum dry density at the optimum moisture content as determined from ASTM D698.

REPORT DATE 2024.Feb.12

REVIEWED BY  Jason Thompson, C.E.T.
 Principal - Manager of Materials Testing Services

ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Ali Campbell

REPORT NO. 5

DATE SAMPLED: 2024.Jan.15

DATE RECEIVED: 2024.Jan.15

DATE TESTED: 2024.Jan.29

SAMPLED BY: Stantec Consulting Ltd.

SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Donald Eliazar

MATERIAL IDENTIFICATION

MATERIAL USE Subgrade
 MAX. NOMINAL SIZE 4.75 mm
 MATERIAL TYPE Fat Clay (CH)
 SPECIFICATION ID Not Applicable

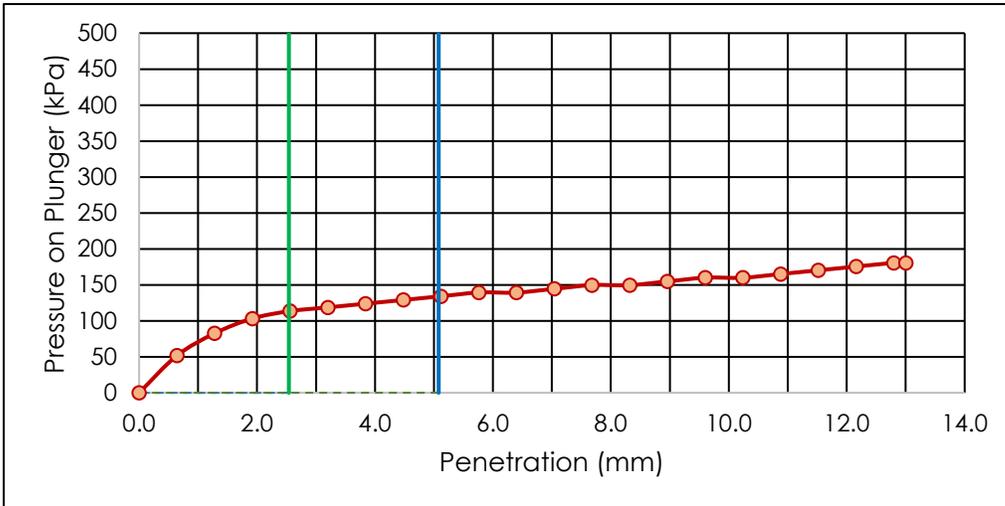
SUPPLIER Existing Material
 SOURCE Existing Material
 SAMPLE LOCATION BH-07, 0.765 m
 STANTEC SAMPLE NO. 2971

IMMERSION PERIOD 96 ± 2 hr
 CONDITION OF SAMPLE Soaked
 SURCHARGE MASS 4.54 kg

TARGET MAX. DRY DENSITY 1460 kg/m³
 TARGET OPTIMUM MOISTURE 26.0 %

+19 mm OVERSIZE 0 %
 SWELL OF SAMPLE 5.06 %
 POST-TEST MOISTURE 38.4 %

AS-COMPACTED DRY DENSITY 1387 kg/m³
 AS-COMPACTED MOISTURE 26.1 %
 AS-COMPACTED % COMPACTION 95 %



**CBR VALUE AT 2.54 mm
PENETRATION**
1.6

**CBR VALUE AT 5.08 mm
PENETRATION**
1.3

COMMENTS

Sample prepared to 95% of the maximum dry density at the optimum moisture content as determined from ASTM D698.

REPORT DATE 2024.Feb.12

REVIEWED BY  Jason Thompson, C.E.T.
 Principal - Manager of Materials Testing Services

ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Ali Campbell

REPORT NO. 6

DATE SAMPLED: 2024.Jan.16

DATE RECEIVED: 2024.Jan.16

DATE TESTED: 2024.Feb.06

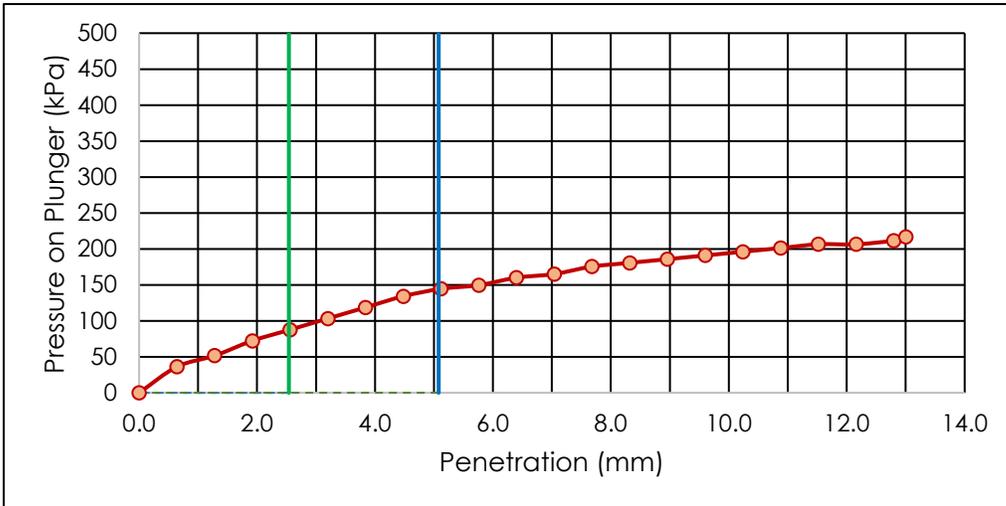
SAMPLED BY: Stantec Consulting Ltd.

SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Donald Eliazar

MATERIAL IDENTIFICATION

| | | | |
|---------------------|-------------------------|---------------------------|------------------------|
| MATERIAL USE | Subgrade | SUPPLIER | Existing Material |
| MAX. NOMINAL SIZE | 4.75 mm | SOURCE | Existing Material |
| MATERIAL TYPE | Fat CLAY with sand (CH) | SAMPLE LOCATION | BH-08, 0.755 m |
| SPECIFICATION ID | Not Applicable | STANTEC SAMPLE NO. | 2984 |
| IMMERSION PERIOD | 96 ± 2 hr | TARGET MAX. DRY DENSITY | 1420 kg/m ³ |
| CONDITION OF SAMPLE | Soaked | TARGET OPTIMUM MOISTURE | 24.5 % |
| SURCHARGE MASS | 4.54 kg | | |
| +19 mm OVERSIZE | 0 % | AS-COMPACTED DRY DENSITY | 1350 kg/m ³ |
| SWELL OF SAMPLE | 7.78 % | AS-COMPACTED MOISTURE | 24.4 % |
| POST-TEST MOISTURE | 44.3 % | AS-COMPACTED % COMPACTION | 95 % |



**CBR VALUE AT 2.54 mm
PENETRATION**
1.3

**CBR VALUE AT 5.08 mm
PENETRATION**
1.4

COMMENTS

Sample prepared to 95% of the maximum dry density at the optimum moisture content as determined from ASTM D698.

REPORT DATE 2024.Feb.12

REVIEWED BY  Jason Thompson, C.E.T.
 Principal - Manager of Materials Testing Services

ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Ali Campbell

REPORT NO. 7

DATE SAMPLED: 2024.Jan.16

DATE RECEIVED: 2024.Jan.16

DATE TESTED: 2024.Feb.15

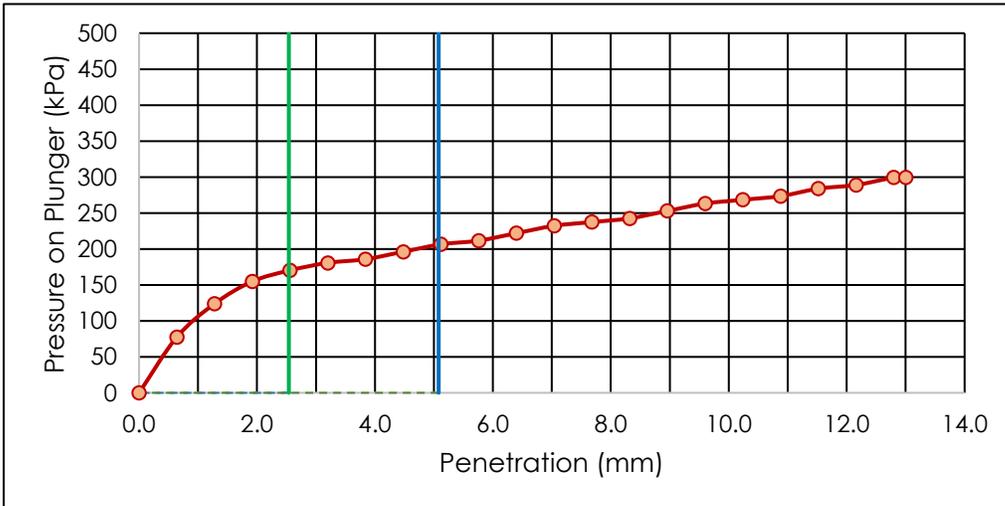
SAMPLED BY: Stantec Consulting Ltd.

SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Donald Elizazar

MATERIAL IDENTIFICATION

| | | | |
|---------------------|----------------|---------------------------|------------------------|
| MATERIAL USE | Subgrade | SUPPLIER | Existing Material |
| MAX. NOMINAL SIZE | 4.75 mm | SOURCE | Existing Material |
| MATERIAL TYPE | Fat Clay (CH) | SAMPLE LOCATION | BH-10, 0.735 m |
| SPECIFICATION ID | Not Applicable | STANTEC SAMPLE NO. | 2985 |
| IMMERSION PERIOD | 96 ± 2 hr | TARGET MAX. DRY DENSITY | 1510 kg/m ³ |
| CONDITION OF SAMPLE | Soaked | TARGET OPTIMUM MOISTURE | 24.5 % |
| SURCHARGE MASS | 4.54 kg | | |
| +19 mm OVERSIZE | 0 % | AS-COMPACTED DRY DENSITY | 1435 kg/m ³ |
| SWELL OF SAMPLE | 3.94 % | AS-COMPACTED MOISTURE | 24.5 % |
| POST-TEST MOISTURE | 40.5 % | AS-COMPACTED % COMPACTION | 95 % |



**CBR VALUE AT 2.54 mm
PENETRATION**
2.5

**CBR VALUE AT 5.08 mm
PENETRATION**
2.1

COMMENTS

Sample prepared to 95% of the maximum dry density at the optimum moisture content as determined from ASTM D698.

REPORT DATE 2024.Feb.20

REVIEWED BY  Jason Thompson, C.E.T.
 Principal - Manager of Materials Testing Services

ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Ali Campbell

REPORT NO. 8

DATE SAMPLED: 2024.Jan.17
 SAMPLED BY: Stantec Consulting Ltd.

DATE RECEIVED: 2024.Jan.17
 SUBMITTED BY: Stantec Consulting Ltd.

DATE TESTED: 2024.Feb.19
 TESTED BY: Donald Eliazar

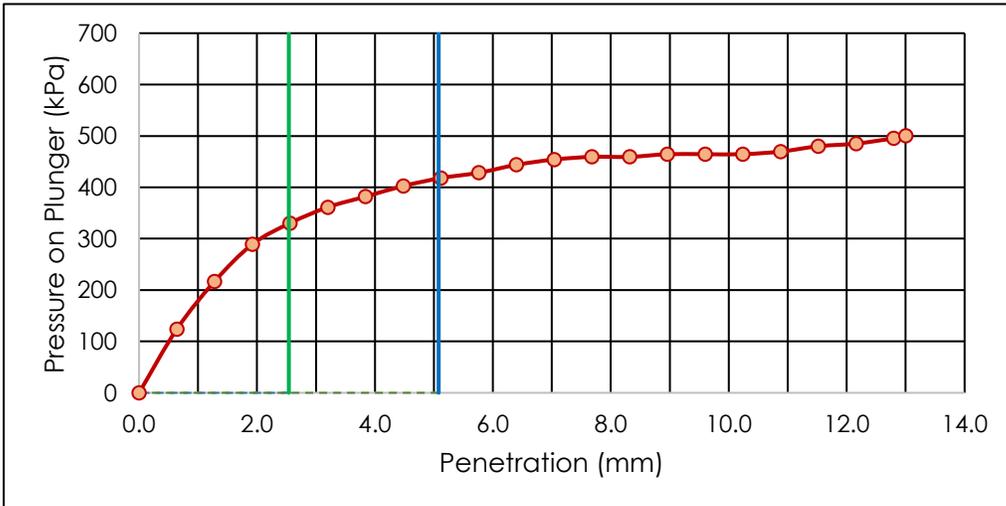
MATERIAL IDENTIFICATION

MATERIAL USE Subgrade
 MAX. NOMINAL SIZE 4.75 mm
 MATERIAL TYPE Fat Clay (CH)
 SPECIFICATION ID Not Applicable

SUPPLIER Existing Material
 SOURCE Existing Material
 SAMPLE LOCATION BH-11, 0.710 m
 STANTEC SAMPLE NO. 4000

IMMERSION PERIOD 96 ± 2 hr
 CONDITION OF SAMPLE Soaked
 SURCHARGE MASS 4.54 kg
 +19 mm OVERSIZE 0 %
 SWELL OF SAMPLE 1.51 %
 POST-TEST MOISTURE 30.4 %

TARGET MAX. DRY DENSITY 1540 kg/m³
 TARGET OPTIMUM MOISTURE 24.0 %
 AS-COMPACTED DRY DENSITY 1462 kg/m³
 AS-COMPACTED MOISTURE 24.1 %
 AS-COMPACTED % COMPACTION 95 %



**CBR VALUE AT 2.54 mm
 PENETRATION
 4.8**

**CBR VALUE AT 5.08 mm
 PENETRATION
 4.2**

COMMENTS

Sample prepared to 95% of the maximum dry density at the optimum moisture content as determined from ASTM D698.

REPORT DATE 2024.Feb.26

REVIEWED BY  Jason Thompson, C.E.T.
 Principal - Manager of Materials Testing Services

ASTM D1883 - CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOILS

TO Dillon Consulting Ltd.
 300 - 100 Innovation Drive
 Winnipeg, Manitoba
 R3T 6A8

PROJECT 24-R-06 - Local Streets Package -
 Geotechnical Investigation

PROJECT NO. 123316892

ATTN Ali Campbell

REPORT NO. 9

DATE SAMPLED: 2024.Jan.17

DATE RECEIVED: 2024.Jan.17

DATE TESTED: 2024.Feb.19

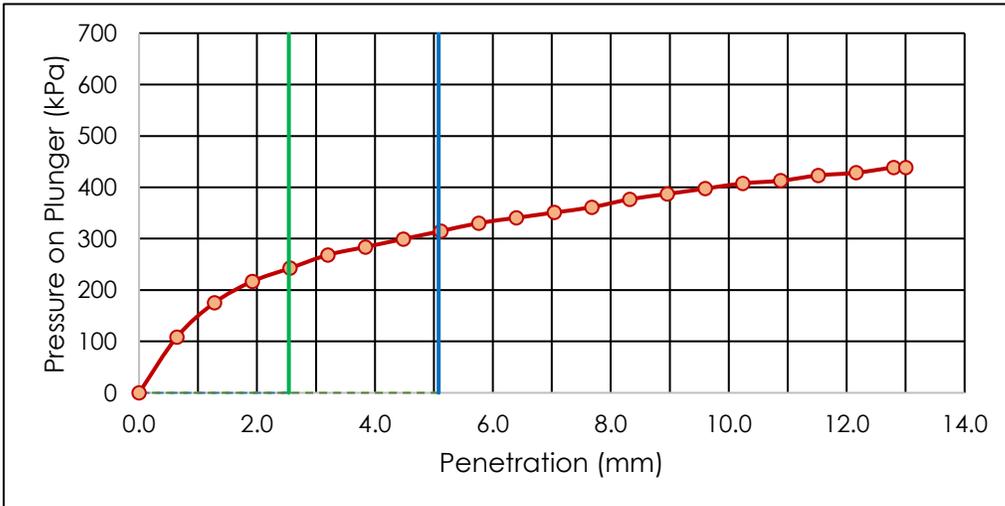
SAMPLED BY: Stantec Consulting Ltd.

SUBMITTED BY: Stantec Consulting Ltd.

TESTED BY: Donald Eliazar

MATERIAL IDENTIFICATION

| | | | |
|---------------------|-------------------------|---------------------------|------------------------|
| MATERIAL USE | Subgrade | SUPPLIER | Existing Material |
| MAX. NOMINAL SIZE | 4.75 mm | SOURCE | Existing Material |
| MATERIAL TYPE | Fat CLAY with sand (CH) | SAMPLE LOCATION | BH-12, 0.775 m |
| SPECIFICATION ID | Not Applicable | STANTEC SAMPLE NO. | 4001 |
| IMMERSION PERIOD | 96 ± 2 hr | TARGET MAX. DRY DENSITY | 1480 kg/m ³ |
| CONDITION OF SAMPLE | Soaked | TARGET OPTIMUM MOISTURE | 25.0 % |
| SURCHARGE MASS | 4.54 kg | | |
| +19 mm OVERSIZE | 0 % | AS-COMPACTED DRY DENSITY | 1407 kg/m ³ |
| SWELL OF SAMPLE | 3.02 % | AS-COMPACTED MOISTURE | 25.0 % |
| POST-TEST MOISTURE | 37.1 % | AS-COMPACTED % COMPACTION | 95 % |



CBR VALUE AT 2.54 mm PENETRATION
3.5

CBR VALUE AT 5.08 mm PENETRATION
3.1

COMMENTS

Sample prepared to 95% of the maximum dry density at the optimum moisture content as determined from ASTM D698.

REPORT DATE 2024.Feb.26

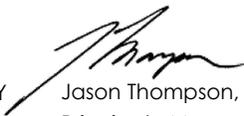
REVIEWED BY  Jason Thompson, C.E.T.
 Principal - Manager of Materials Testing Services

Table 2 - Compressive Strength Test Data

| Street | Core ID | Diameter (mm) | Length (mm) | L/D Ratio | Correction Factor | Peak Load (kN) | Compressive Strength (MPa) | | | |
|------------------|---------|---|-------------|-----------|-------------------|----------------|----------------------------|-----------|--|--|
| | | | | | | | Measured | Corrected | | |
| Champlain St | BH-14 | 75.45 | 150.50 | 1.995 | 0.9996 | 215.19 | 48.13 | 48.11 | | |
| Champlain St | BH-16 | 75.60 | 171.34 | 2.266 | 1.0000 | 210.35 | 46.86 | 46.86 | | |
| Dumoulin St | BH-19 | 76.09 | 142.27 | 1.870 | 0.9896 | 290.85 | 63.96 | 63.30 | | |
| Dumoulin St | BH-22 | 87.98 | 176.16 | 2.002 | 1.0000 | 313.85 | 51.63 | 51.63 | | |
| McMahon Pl | BH-23 | 88.24 | 182.08 | 2.063 | 1.0000 | 322.08 | 52.67 | 52.67 | | |
| McMahon Pl | BH-24 | 88.36 | 165.51 | 1.873 | 0.9898 | 390.89 | 63.75 | 63.10 | | |
| Howard Kendel Pl | BH-25 | 88.25 | 146.52 | 1.660 | 0.9728 | 383.2 | 62.65 | 60.94 | | |
| Howard Kendel Pl | BH-26 | 88.45 | 134.46 | 1.520 | 0.9616 | 367.63 | 59.83 | 57.53 | | |
| Kern Dr | BH-28 | 88.05 | 173.71 | 1.973 | 0.9978 | 302.6 | 49.70 | 49.59 | | |
| Kern Dr | BH-30 | 88.27 | 171.36 | 1.941 | 0.9953 | 343.16 | 56.08 | 55.81 | | |
| Baywater Pl | BH-32 | 75.85 | 92.35 | 1.218 | 0.9223 | 149.23 | 33.03 | 30.46 | | |
| Baywater Pl | BH-33 | 75.82 | 142.71 | 1.882 | 0.9906 | 133.84 | 29.64 | 29.36 | | |
| Courtwood Pl | BH-34 | 75.79 | 113.32 | 1.495 | 0.9594 | 146.07 | 32.38 | 31.06 | | |
| Courtwood Pl | BH-35 | <i>Concrete core sample crumbled; unsuitable for testing.</i> | | | | | | | | |
| Roanoke St | BH-36 | 88.37 | 108.55 | 1.230 | 0.9252 | 335.38 | 54.79 | 50.69 | | |
| Roanoke St | BH-37 | 75.83 | 143.27 | 1.621 | 0.9697 | 293.97 | 47.93 | 46.48 | | |
| Melrose Ave | BH-38 | 75.78 | 139.02 | 1.833 | 0.9866 | 216.57 | 47.95 | 47.31 | | |
| Melrose Ave | BH-39 | 88.37 | 172.02 | 2.270 | 1.0000 | 142.34 | 31.56 | 31.56 | | |