



THE CITY OF WINNIPEG

TENDER

TENDER NO. 4-2019

**ROBLIN BOULEVARD WESTBOUND AND ASSINIBOINE PARK DRIVE -
RECONSTRUCTION AND ASSOCIATED WORKS**

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 ROBLIN BOULEVARD WESTBOUND AND ASSINIBOINE PARK DRIVE - RECONSTRUCTION AND ASSOCIATED WORKS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, April 5, 2019.

B2.2 Bids determined by the Manager of Materials to have been received later than the Submission Deadline will not be accepted and will be returned upon request.

B2.3 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. ENQUIRIES

B3.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.

B3.2 If the Bidder finds errors, discrepancies or omissions in the Tender, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.

B3.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Tender will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B3.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Tender will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B3.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

B4. CONFIDENTIALITY

B4.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:

- (a) was known to the Bidder before receipt hereof; or
- (b) becomes publicly known other than through the Bidder; or
- (c) is disclosed pursuant to the requirements of a governmental authority or judicial order.

B4.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Tender to the media or any member of the public without the prior written authorization of the Contract Administrator.

B5. ADDENDA

B5.1 The Contract Administrator may, at any time prior to the Submission deadline, issue addenda correcting errors, discrepancies or omissions in the Tender, or clarifying the meaning or intent of any provision therein.

- B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
- B5.3 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>
- B5.4 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B5.5 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.
- B5.6 Notwithstanding B3, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D3.

B6. SUBSTITUTES

- B6.1 The Work is based on the Plant, Materials and methods specified in the Tender.
- B6.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B6.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.
- B6.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.
- B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.
- B6.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.

- B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B17.
- B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B7. BID COMPONENTS

- B7.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices, hard copy;
 - (c) Form G1: Bid Bond and Agreement to Bond.
- B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.
- B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely.
- B7.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Tender number and the Bidder's name and address.
- B7.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Tender number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.
- B7.4.2 A hard copy of Form B: Prices must be submitted with the Bid. If there is any discrepancy between the Adobe PDF version of Form B: Prices and the Microsoft Excel version of Form B: Prices, the PDF version shall take precedence.
- B7.5 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.
- B7.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Tender document, including the General Conditions, will be evaluated in accordance with B17.1(a).
- B7.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B7.8 Bids shall be submitted to:
- The City of Winnipeg
 - Corporate Finance Department
 - Materials Management Division
 - 185 King Street, Main Floor
 - Winnipeg MB R3B 1J1

B8. BID

- B8.1 The Bidder shall complete Form A: Bid, making all required entries.

- B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his/her own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.
- B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B8.4 Paragraph 13 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, shall be affixed;
 - (d) if the Bidder is carrying on business under a name other than his/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B8.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.
- B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B9. PRICES

- B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B9.1.1 Prices stated on Form B: Prices shall not include any costs which may be incurred by the Contractor with respect to any applicable funding agreement obligations as outlined in D29. Any such costs shall be determined in accordance with D29.
- B9.1.2 For the convenience of Bidders, and pursuant to B7.4.2 and B17.4.2, an electronic spreadsheet Form B: Prices in Microsoft Excel (.xls) format is available along with the Adobe PDF documents for this Tender on the Bid Opportunities page at the Materials Management Division website at <http://www.winnipeg.ca/matmgt/>
- B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.
- B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.
- B9.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B10. DISCLOSURE

B10.1 Various Persons provided information or services with respect to this Work. In the City's opinion, this relationship or association does not create a conflict of interest because of this full disclosure. Where applicable, additional material available as a result of contact with these Persons is listed below.

B10.2 The Persons are:

(a) N/A

B11. CONFLICT OF INTEREST AND GOOD FAITH

B11.1 Bidders, by responding to this Tender, declare that no Conflict of Interest currently exists, or is reasonably expected to exist in the future.

B11.2 Conflict of Interest means any situation or circumstance where a Bidder or employee of the Bidder proposed for the Work has:

- (a) other commitments;
- (b) relationships;
- (c) financial interests; or
- (d) involvement in ongoing litigation;

that could or would be seen to:

- (i) exercise an improper influence over the objective, unbiased and impartial exercise of the independent judgment of the City with respect to the evaluation of Bids or award of the Contract; or
- (ii) compromise, impair or be incompatible with the effective performance of a Bidder's obligations under the Contract;
- (e) has contractual or other obligations to the City that could or would be seen to have been compromised or impaired as a result of its participation in the Tender process or the Work; or
- (f) has knowledge of confidential information (other than confidential information disclosed by the City in the normal course of the Tender process) of strategic and/or material relevance to the Tender process or to the Work that is not available to other bidders and that could or would be seen to give that Bidder an unfair competitive advantage.

B11.3 In connection with its Bid, each entity identified in B11.2 shall:

- (a) avoid any perceived, potential or actual Conflict of Interest in relation to the procurement process and the Work;
- (b) upon discovering any perceived, potential or actual Conflict of Interest at any time during the Tender process, promptly disclose a detailed description of the Conflict of Interest to the City in a written statement to the Contract Administrator; and
- (c) provide the City with the proposed means to avoid or mitigate, to the greatest extent practicable, any perceived, potential or actual Conflict of Interest and shall submit any additional information to the City that the City considers necessary to properly assess the perceived, potential or actual Conflict of Interest.

B11.4 Without limiting B11.3, the City may, in its sole discretion, waive any and all perceived, potential or actual Conflicts of Interest. The City's waiver may be based upon such terms and conditions as the City, in its sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately avoided or mitigated, including requiring the Bidder to put into place such policies, procedures, measures and other safeguards as may be required by and be acceptable to the City, in its sole discretion, to avoid or mitigate the impact of such Conflict of Interest.

B11.5 Without limiting B11.3, and in addition to all contractual or other rights or rights at law or in equity or legislation that may be available to the City, the City may, in its sole discretion:

- (a) disqualify a Bidder that fails to disclose a perceived, potential or actual Conflict of Interest of the Bidder or any of its employees proposed for the Work;
- (b) require the removal or replacement of any employees proposed for the Work that has a perceived, actual or potential Conflict of Interest that the City, in its sole discretion, determines cannot be avoided or mitigated;
- (c) disqualify a Bidder or employees proposed for the Work that fails to comply with any requirements prescribed by the City pursuant to B11.4 to avoid or mitigate a Conflict of Interest; and
- (d) disqualify a Bidder if the Bidder, or one of its employees proposed for the Work, has a perceived, potential or actual Conflict of Interest that, in the City's sole discretion, cannot be avoided or mitigated, or otherwise resolved.

B11.6 The final determination of whether a perceived, potential or actual Conflict of Interest exists shall be made by the City, in its sole discretion.

B12. QUALIFICATION

B12.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba; and
- (b) be financially capable of carrying out the terms of the Contract; and
- (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

B12.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/debar.stm>

B12.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) have successfully carried out work similar in nature, scope and value to the Work; and
- (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and
- (c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);

B12.4 Further to B12.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

- (a) Written confirmation of a safety and health certification meeting SAFE Work Manitoba's SAFE Work Certified Standard (e.g., COR™ and SECOR™) in the form of:
 - (i) a copy of their valid Manitoba COR certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Certificate of Recognition (COR) Program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or
 - (ii) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety

Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or

- (b) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>).

B12.5 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B12.6 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B13. BID SECURITY

B13.1 The Bidder shall provide bid security in the form of a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond).

B13.1.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.

B13.1.2 All signatures on bid securities shall be original.

B13.1.3 The Bidder shall sign the Bid Bond.

B13.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.

B13.2 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly executed by the successful Bidder and the contract securities are furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B13.3 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Tender.

B14. OPENING OF BIDS AND RELEASE OF INFORMATION

B14.1 Bids will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Division, or in such other office as may be designated by the Manager of Materials.

B14.1.1 Bidders or their representatives may attend.

B14.1.2 Bids determined by the Manager of Materials, or his/her designate, to not include the bid security specified in B13 will not be read out.

B14.2 Following the submission deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>

B14.3 After award of Contract, the name(s) of the successful Bidder(s), their address(es) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>

B14.4 The Bidder is advised that any information contained in any Bid may be released if required by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law or by City policy or procedures (which may include access by members of City Council).

B14.4.1 To the extent permitted, the City shall treat as confidential information, those aspects of a Bid Submission identified by the Bidder as such in accordance with and by reference to Part 2, Section 17 or Section 18 or Section 26 of The Freedom of Information and Protection of Privacy Act (Manitoba), as amended.

B15. IRREVOCABLE BID

B15.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.

B15.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the contract securities have been furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid.

B16. WITHDRAWAL OF BIDS

B16.1 A Bidder may withdraw his/her Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B16.1.1 Notwithstanding C23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.

B16.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 13 of Form A: Bid, and only such person, has authority to give notice of withdrawal.

B16.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:

- (a) retain the Bid until after the Submission Deadline has elapsed;
- (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 13 of Form A: Bid; and
- (c) if the notice has been given by any one of the persons specified in B16.1.3(b), declare the Bid withdrawn.

B16.2 A Bidder who withdraws his/her Bid after the Submission Deadline but before his/her Bid has been released or has lapsed as provided for in B15.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B17. EVALUATION OF BIDS

B17.1 Award of the Contract shall be based on the following bid evaluation criteria:

- (a) compliance by the Bidder with the requirements of the Tender, or acceptable deviation therefrom (pass/fail);
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B12 (pass/fail);
- (c) Total Bid Price;

(d) economic analysis of any approved alternative pursuant to B6.

B17.2 Further to B17.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities, if the interests of the City so require.

B17.3 Further to B17.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his/her Bid or in other information required to be submitted, that he/she is qualified.

B17.4 Further to B17.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.

B17.4.1 Further to B17.1(a), in the event that a unit price is not provided on Form B: Prices, the City will determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B17.4.2 The electronic Form B: Prices and the formulas imbedded in that spreadsheet are only provided for the convenience of Bidders. The City makes no representations or warranties as to the correctness of the imbedded formulas. It is the Bidder's responsibility to ensure the extensions of the unit prices and the sum of Total Bid Price performed as a function of the formulas within the electronic Form B: Prices are correct.

B18. AWARD OF CONTRACT

B18.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B18.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be qualified, and the Bids are determined to be responsive.

B18.2.1 Without limiting the generality of B18.2, the City will have no obligation to award a Contract where:

- (a) the prices exceed the available City funds for the Work;
- (b) the prices are materially in excess of the prices received for similar work in the past;
- (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
- (d) only one Bid is received; or
- (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.

B18.3 If funding for the Work is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, Bidders are advised that the terms of D29 shall immediately take effect upon confirmation of such funding, regardless of when funding is confirmed.

B18.4 Where an award of Contract is made by the City, the award shall be made to the qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B17.

B18.4.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Bid upon written request to the Contract Administrator.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for Construction* (Revision 2019-01-15) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm
- C0.2 A reference in the Tender to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

D1.1 In addition to the General Conditions for Construction, these Supplemental Conditions are applicable to the Work of the Contract.

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of:

- (a) Concrete Reconstruction and Associated Works
 - (i) Roblin Boulevard Westbound from Shaftesbury Boulevard to Assiniboine Park Drive
- (b) Mill & Fill and Associated Works
 - (i) Assiniboine Park Drive from Commissary Road to Station 3+70
- (c) Asphalt Reconstruction and Associated Works
 - (i) Assiniboine Park Drive from Station 3+70 to Zoo Drive

D2.2 The major components of the Work are as follows:

- (a) Concrete Reconstruction and Associated Works – Roblin Boulevard Westbound
 - (i) Planing of existing asphalt and at intersections as required;
 - (ii) Removal of existing pavement;
 - (iii) Removal of existing temporary asphalt cross-overs in median boulevard;
 - (iv) Removal of existing curb, splash strip, bullnose and sidewalk;
 - (v) Abandon existing catch basins;
 - (vi) Abandon existing drainage inlets;
 - (vii) Abandon existing spillways;
 - (viii) Installation of catch basins and sewer service pipe;
 - (ix) Installation of subdrains;
 - (x) Relocation of electrical works for Outfront Media Bus Stop Shelter;
 - (xi) Excavation;
 - (xii) Stockpile suitable in-situ material as required;
 - (xiii) Placement of suitable in-situ material as required;
 - (xiv) Compaction of existing sub-grade;
 - (xv) Adjustment of existing pavement and boulevard structures;
 - (xvi) Placement of geotextile fabric;
 - (xvii) Placement of sub-base material;
 - (xviii) Placement of base course material;
 - (xix) Construction of 230mm concrete pavement(plain-dowelled) and integral 180mm barrier curb utilizing slip form paving equipment;
 - (xx) Construction of 230mm concrete pavement(plain-dowelled);
 - (xxi) Construction of 200mm concrete pavement(reinforced);
 - (xxii) Installation of curb inlet frames;
 - (xxiii) Construction of reinforced concrete spillways with riprap;
 - (xxiv) Construction of separate concrete splash strip with thickened edge;
 - (xxv) Construction of monolithic concrete splash strip utilizing slip form paving equipment;
 - (xxvi) Construction of barrier curb utilizing slip form paving equipment;
 - (xxvii) Construction of safety curb and safety median;

- (xxviii) Construction of monolithic concrete bullnose;
- (xxix) Construction of concrete median slab and monolithic concrete median slab;
- (xxx) Construction of concrete sidewalk;
- (xxxi) Construction of OutFront Media Bus Shelter pad;
- (xxxii) Renewal of existing curbs as required;
- (xxxiii) Renewal of existing curb and gutter as required;
- (xxxiv) Renewal of existing sidewalks as required;
- (xxxv) Installation of detectable warning surface tiles;
- (xxxvi) Renewal of existing asphalt pathway as required;
- (xxxvii) Construction of asphalt overlay(average thickness 80mm);
- (xxxviii) Construction of asphalt pavement at approach tie-ins as required;
- (xxxix) Removal of existing culverts;
 - (xl) Installation of corrugated steel pipe culvert;
 - (xli) Installation of culvert end markers;
 - (xlii) Installation of ditch inlet grate;
 - (xliii) Construction of grouted stone riprap and random stone riprap;
 - (xliv) Ditching;
 - (xlv) Placement of limestone surface material;
 - (xlvi) Boulevard restoration, salt tolerant seed and sod.
- (b) Mill & Fill and Associated Works – Assiniboine Park Drive
 - (i) Planing of 25mm of existing asphalt pavement;
 - (ii) Construction of mountable curb and gutter;
 - (iii) Renewal of existing asphalt pathway as required;
 - (iv) Placement of asphalt overlay(100mm - Type 1A asphalt);
 - (v) Ditching as required;
 - (vi) Installation of corrugated steel pipe culvert;
 - (vii) Installation of culvert end markers;
 - (viii) Relocation of TeraSpan conduit as required;
 - (ix) Placement of limestone surface material;
 - (x) Boulevard restoration and sod.
- (c) Asphalt Reconstruction and Associated Works – Assiniboine Park Drive
 - (i) Removal of existing asphalt pavement;
 - (ii) Relocation of TeraSpan conduit as required;
 - (iii) Excavation;
 - (iv) Compaction of existing sub-grade;
 - (v) Adjustment of existing pavement and boulevard structures;
 - (vi) Placement of geotextile fabric;
 - (vii) Placement of sub-base material;
 - (viii) Placement of base course material;
 - (ix) Construction of mountable curb and gutter;
 - (x) Renewal of barrier curb and curb ramp;
 - (xi) Installation of curb inlet frame;
 - (xii) Regrading of existing interlocking paving stones;
 - (xiii) Renewal of existing asphalt pathway as required;
 - (xiv) Placement of asphalt pavement(100mm - Type 1A asphalt);
 - (xv) Placement of asphalt pavement at tie-ins as required;
 - (xvi) Ditching as required;

- (xvii) Installation of corrugated steel pipe culverts;
- (xviii) Installation of culvert end markers;
- (xix) Placement of limestone surface material;
- (xx) Boulevard restoration and sod.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is:

Richard Weibel
Technologist III
Public Works

Telephone No. 204-805-0104

Email Address rweibel@winnipeg.ca

D3.2 At the pre-construction meeting, the Contract Administrator will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D3.3 Bids Submissions must be submitted to the address in B7.

D4. CONTRACTOR'S SUPERVISOR

D4.1 At the pre-construction meeting, the Contractor shall identify his/her designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D4.2 At least two (2) business days prior to the commencement of any Work on the site, the Contractor shall provide the Contract Administrator with a phone number where the supervisor identified in D4.1 or an alternate can be contacted twenty-four (24) hours a day to respond to an emergency.

D5. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

D5.1 The Contract, all deliverables produced or developed, and information provided to or acquired by the Contractor are the property of the City and shall not be appropriated for the Contractors own use, or for the use of any third party.

D5.2 The Contractor shall not make any public announcements or press releases regarding the Contract, without the prior written authorization of the Contract Administrator.

D5.3 The following shall be confidential and shall not be disclosed by the Contractor to the media or any member of the public without the prior written authorization of the Contract Administrator;

- (a) information provided to the Contractor by the City or acquired by the Contractor during the course of the Work;
- (b) the Contract, all deliverables produced or developed; and
- (c) any statement of fact or opinion regarding any aspect of the Contract.

D5.4 A Contractor who violates any provision of D5 may be determined to be in breach of Contract.

D6. NOTICES

- D6.1 Except as provided for in C23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.
- D6.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D6.3 D6.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator identified in D3.
- D6.3 Notwithstanding C21, all notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following:
- The City of Winnipeg
Attn: Chief Financial Officer
Office of the Chief Administrative Officer
Susan A. Thompson Building
2nd Floor, 510 Main Street
Winnipeg MB R3B 1B9
- D6.4 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following facsimile number:
- The City of Winnipeg
Legal Services Department
Attn: Director of Legal Services
Facsimile No.: 204-947-9155
- D6.5 Bids Submissions must not be submitted to this facsimile number. Bids must be submitted in accordance with B7.**

D7. FURNISHING OF DOCUMENTS

- D7.1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Tender. If the Contractor requires additional sets of the Tender, they will be supplied to him/her at cost.

SUBMISSIONS

D8. AUTHORITY TO CARRY ON BUSINESS

- D8.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

D9. SAFE WORK PLAN

- D9.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.
- D9.2 The Safe Work Plan shall be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate

Finance, Materials Management Division website at
<http://www.winnipeg.ca/matmgt/safety/default.stm>

D10. INSURANCE

- D10.1 The Contractor shall provide and maintain the following insurance coverage during the performance of the work and throughout the warranty period, unless otherwise specified below:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) per occurrence. The policy shall include sudden and accidental pollution liability coverage with 120 hours reporting for accidental escape of pollutants, cross liability clause, unlicensed motor vehicle liability, products and completed operations and shall cover the City and all contractors, consultants, subcontractors and subconsultants engaged to provide goods or services in connection with the Project. Manitoba and its Ministers, officers, employees and agents shall be added as additional insureds to this policy.
 - (b) Automobile liability insurance covering all motor vehicles, owned and operated and used or to be used by the Contractor directly or indirectly in the performance of the Work. The limit of liability shall not be less than \$2,000,000 inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence;
 - (c) an all risks installation floater carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.
- D10.2 Deductibles shall be borne by the Contractor.
- D10.3 The Contractor shall require each of its Subcontractors to provide comparable insurance to that set forth under D10.1 (a) and D10.1 (b) .
- D10.4 The Contractor shall provide the City Solicitor with certificate(s) of insurance for themselves and any subcontractors for the City and Manitoba, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in the C4.1 for the return of the executed Contract, and annually thereafter, as required.
- D10.5 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.
- D10.6 All policies shall be taken out with insurers duly licensed to carry on business in the Province of Manitoba.

D11. CONTRACT SECURITY

- D11.1 The Contractor shall provide and maintain the performance bond and the labour and material payment bond until the expiration of the warranty period in the form of:
- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; and
 - (b) a labour and material payment bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H2: Labour and Material Payment Bond), in an amount equal to fifty percent (50%) of the Contract Price.
- D11.2 The Contractor shall provide the City Solicitor with the required performance and labour and material payment bonds within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.
- D11.3 The Contractor shall, as soon as practicable after entering into a contract with a Subcontractor:

- (a) give the Subcontractor written notice of the existence of the labour and material payment bond in D11.1(b); and
- (b) post a notice of the bond and/or a copy of that bond in a conspicuous location at the Site of the Work.

D12. SUBCONTRACTOR LIST

D12.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at or prior to a pre-construction meeting, or at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the C4.1 for the return of the executed Contract.

D13. DETAILED WORK SCHEDULE

D13.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the General Conditions for the return of the executed Contract.

D13.2 The detailed work schedule shall consist of the following:

- (a) a Gantt chart for the Work acceptable to the Contract Administrator.

D13.3 Further to D13.2(a), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each trade, or specification division. The time shall be on the horizontal axis, and the type of trade shall be on the vertical axis.

D13.4 The Contractor shall provide an updated Gantt chart upon request by the Contract Administrator. Updated Gantt chart to be supplied prior to the following job meeting.

SCHEDULE OF WORK

D14. COMMENCEMENT

D14.1 The Contractor shall not commence any Work until he/she is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.

D14.2 The Contractor shall not commence any Work on the Site until:

- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence of authority to carry on business specified in D8;
 - (ii) evidence of the workers compensation coverage specified in C6.15;
 - (iii) the twenty-four (24) hour emergency response phone number specified in D4.2;
 - (iv) the Safe Work Plan specified in D9;
 - (v) evidence of the insurance specified in D10;
 - (vi) the contract security specified in D10.1;
 - (vii) the subcontractor list specified in D12; and
 - (viii) the detailed work schedule specified in D13.
- (b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.

D14.3 The Contractor shall not commence the Work on the Site before May 6, 2019, and shall commence the Work on Site no later than May 21, 2019, as directed by the Contract Administrator and weather permitting.

D14.4 The City intends to award this Contract by April 30, 2019

D14.4.1 If the actual date of award is later than the intended date, the dates specified for Critical Stages, Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

D15. WORKING DAYS

D15.1 Further to C1.1(ii);

D15.1.1 The definition of a Working Day shall be amended to include Saturdays.

D15.1.2 The Contract Administrator will determine daily if a Working Day has elapsed and will record his/her assessment. On a weekly basis the Contract Administrator will provide the Contractor with a record of the Working Days assessed for the preceding week. The Contractor shall sign each report signifying that he/she agrees with the Contract Administrator's determination of the Working Days assessed for the report period.

D15.1.3 Work done to restore the Site to a condition suitable for Work, shall not be considered "work" as defined in the definition of a Working Day.

D15.1.4 When the Work includes two or more major types of Work that can be performed under different atmospheric conditions, the Contract Administrator shall consider all major types of Work in determining whether the Contractor was able to work in assessing Working Days.

D16. RESTRICTED WORK HOURS

D16.1 Further to clause 3.10 of CW 1130, the Contractor shall require written permission forty-eight (48) hours in advance from the Contract Administrator for any work to be performed between 2000 hours and 0700 hours, or on Sundays, Statutory Holidays and or Civic Holidays.

D17. WORK BY OTHERS

D17.1 Work by others on or near the Site will include but not necessarily be limited to:

- (a) City of Winnipeg Traffic Services – traffic diversion signing and line painting;
- (b) City of Winnipeg Traffic Signals – signals plant at pedestrian corridor crossing (Station 3+80) and Shaftesbury Boulevard/Conservatory Drive intersection;
- (c) City of Winnipeg Geomatics – various Works on survey monuments;
- (d) Outfront Media – reinstall bus stop shelter and bench; and
- (e) TeraSpan/Assiniboine Park Conservancy/ACME – fiber optic Works on Assiniboine Park Drive.

D18. SEQUENCE OF WORK

D18.1 Further to C6.1, the sequence of work shall be as follows:

D18.1.1 The Work shall be divided into 2 Phases. Each Phase shall be subdivided into stages. Stages are further subdivided into major items of work.

D18.1.2 **Phase I** – Roblin Boulevard Westbound from Shaftesbury Boulevard to Assiniboine Park Drive, and Assiniboine Park Drive from Commissary Road to Zoo Drive

- (a) **Stage I** – Roblin Boulevard Westbound from Shaftesbury Boulevard to Assiniboine Park Drive – Ditching, Catch Basins, Manhole and Associated Works
 - (i) Ditching;
 - (ii) Removal of existing culverts;
 - (iii) Installation of corrugated steel pipe culverts;
 - (iv) Installation of culvert end markers;
 - (v) Installation of ditch inlet grate;

- (vi) Abandon existing catch basins;
 - (vii) Abandon existing drainage inlets;
 - (viii) Installation of manhole;
 - (ix) Installation of catch basins and sewer service pipe;
 - (x) Construction of grouted stone riprap and random riprap; and
 - (xi) Adjustment of boulevard structures.
- (b) Stage II – Roblin Boulevard Westbound from Station 14+50 to Assiniboine Park Drive excluding Commissary Road Intersection and most easterly Zoo Entrance/Exit Intersection – Concrete Reconstruction**
- (i) Removal of existing pavement;
 - (ii) Removal of existing temporary asphalt cross-over in median boulevard at Zoo Bus Loop(Station 7+40);
 - (iii) Removal of existing curb, splash strip, median, bullnose, sidewalk and asphalt pathway;
 - (iv) Abandon existing spillways;
 - (v) Abandon existing drainage inlets;
 - (vi) Excavation;
 - (vii) Stockpile suitable in-situ material as required;
 - (viii) Placement of suitable in-situ material as required;
 - (ix) Compaction of existing sub-grade;
 - (x) Installation of subdrains;
 - (xi) Adjustment of existing pavement and boulevard structures;
 - (xii) Placement of geotextile fabric;
 - (xiii) Placement of sub-base material;
 - (xiv) Placement of base course material;
 - (xv) Construction of 230mm concrete pavement(plain-dowelled) and integral 180mm curb(curbs lane) utilizing slip form paving equipment;
 - (xvi) Installation of curb inlet frames;
 - (xvii) Construction of 230mm concrete pavement(plain-dowelled);
 - (xviii) Construction of 200mm concrete pavement(reinforced);
 - (xix) Construction of integral modified barrier curb;
 - (xx) Construction of separate concrete splash strip with thickened edge;
 - (xxi) Construction of safety curb;
 - (xxii) Construction of reinforced concrete spillway with riprap;
 - (xxiii) Removal of existing temporary asphalt cross-over in median boulevard east of Assiniboine Park Drive(Station 3+40);
 - (xxiv) Construction of monolithic concrete splash strip utilizing slip form paving equipment;
 - (xxv) Construction of safety median;
 - (xxvi) Construction of barrier curb utilizing slip form paving equipment;
 - (xxvii) Construction of monolithic concrete bullnose;
 - (xxviii) Construction of concrete median slab and monolithic concrete median slab;
 - (xxix) Relocation of electrical works for OutFront Media Bus Stop Shelter;
 - (xxx) Construction of OutFront Media Bus Stop Shelter pad;
 - (xxxi) Construction of concrete sidewalk;
 - (xxxii) Installation of detectable warning surface tiles;
 - (xxxiii) Renewal of existing curb as required;
 - (xxxiv) Renewal of existing sidewalk as required;

- (xxxv) Planing of existing asphalt and at intersections as required;
 - (xxxvi) Construction of asphalt overlay(average thickness 80mm);
 - (xxxvii) Construction of asphalt pavement tie-ins at approaches; and
 - (xxxviii) Boulevard restoration.
- (c) **Stage III** - Assiniboine Park Drive from Station 3+70 to Zoo Drive – Asphalt Reconstruction
- (i) Ditching as required;
 - (ii) Removal of existing culverts;
 - (iii) Installation of corrugated steel pipe culverts;
 - (iv) Installation of culvert end markers;
 - (v) Removal of existing catch pit;
 - (vi) Installation of catch pit and drainage connection pipe;
 - (vii) Removal of existing curb and sidewalk;
 - (viii) Relocation of TeraSpan conduit as required;
 - (ix) Removal of existing asphalt pavement;
 - (x) Excavation;
 - (xi) Compaction of existing sub-grade;
 - (xii) Placement of geotextile fabric;
 - (xiii) Placement of sub-base material;
 - (xiv) Placement of base course material;
 - (xv) Construction of mountable curb and gutter;
 - (xvi) Renewal of barrier curb and curb ramp;
 - (xvii) Installation of curb inlet frame;
 - (xviii) Installation of interlocking paving stones;
 - (xix) Regrading of existing interlocking paving stones;
 - (xx) Renewal of existing asphalt pathway as required;
 - (xxi) Placement of scratch asphalt pavement(50mm - Type 1A asphalt);
 - (xxii) Placement of scratch asphalt pavement at tie-ins as required(50mm - Type 1A asphalt); and
 - (xxiii) Boulevard restoration.
- (d) **Stage IV** - Assiniboine Park Drive from Commissary Road to Station 3+70 – Mill & Fill
- (i) Ditching as required;
 - (ii) Removal of existing culvert;
 - (iii) Installation of corrugated steel pipe culvert;
 - (iv) Installation of culvert end markers;
 - (v) Planing of 25mm of existing asphalt pavement;
 - (vi) Construction of mountable curb and gutter;
 - (vii) Renewal of existing asphalt pathway as required;
 - (viii) Placement of scratch asphalt overlay(50mm - Type 1A asphalt);
 - (ix) Boulevard restoration;
 - (x) Placement of final lift asphalt pavement – Stage III and Stage IV(50mm – Type 1A asphalt);
 - (xi) Relocation of TeraSpan conduit as required;
 - (xii) Placement of limestone surface material; and
 - (xiii) Placement of sod.
- (e) Placing the topsoil and finished grading of all boulevard and median areas shall be completed prior to commencing construction of the asphaltic concrete overlay, including the scratch course.

- (f) Roblin Boulevard Westbound and Eastbound traffic must be maintained at all times.
- (g) Construction of Stage III and Stage IV may run concurrently with Stage I or Stage II.

D18.1.3 Immediately following the completion of the asphaltic concrete Works of Phase I, the Contractor shall clean up the Site and remove all plant, surplus material, waste and debris, other than that left by the City or other Contractors.

D18.1.4 **Phase II** –Roblin Boulevard Westbound from Shaftesbury Boulevard to Station 14+50 and Roblin Boulevard/Conservatory Drive/Shaftesbury Boulevard Intersection including Commissary Road Intersection and most easterly Zoo Entrance/Exit Intersection

(a) **Stage I** – Roblin Boulevard Westbound(gutter lane) from Shaftesbury Boulevard to Station 14+50 including Commissary Road Intersection(gutter lane) and most easterly Zoo Entrance/Exit Intersection(gutter lane) – Concrete Reconstruction

- (i) Removal of existing pavement;
- (ii) Removal of existing curb, sidewalk and asphalt pathway;
- (iii) Abandon existing spillway;
- (iv) Removal of existing culvert;
- (v) Excavation;
- (vi) Compaction of existing sub-grade;
- (vii) Installation of subdrains;
- (viii) Adjustment of existing pavement and boulevard structures;
- (ix) Placement of geotextile fabric;
- (x) Placement of sub-base material;
- (xi) Placement of base course material;
- (xii) Construction of 230mm concrete pavement(plain-dowelled) and integral 180mm curb(curb lane) utilizing slip form paving equipment;
- (xiii) Construction of 230mm concrete pavement(plain-dowelled);
- (xiv) Construction of 200mm concrete pavement(reinforced);
- (xv) Construction of integral modified barrier curb;
- (xvi) Construction of separate concrete splash strip with thickened edge;
- (xvii) Construction of monolithic concrete splash strip;
- (xviii) Construction of concrete sidewalk;
- (xix) Installation of detectable warning surface tiles;
- (xx) Renewal of existing curb as required;
- (xxi) Renewal of existing sidewalk as required;
- (xxii) Renewal of existing asphalt pathway as required;
- (xxiii) Planing of existing asphalt and at intersections as required;
- (xxiv) Construction of asphalt overlay(average thickness 80mm);
- (xxv) Construction of asphalt pavement tie-ins at approaches;
- (xxvi) Placement of limestone surface material; and
- (xxvii) Boulevard restoration.

(b) **Stage II** – Roblin Boulevard Westbound at Conservatory Drive Intersection(gutter lane) and Roblin Boulevard Eastbound at Shaftesbury Boulevard Intersection(gutter lane) including Commissary Road Intersection(median lane) and most easterly Zoo Entrance/Exit Intersection(median lane) – Concrete Reconstruction

- (i) Removal of existing pavement;
- (ii) Removal of existing curb, bullnose, sidewalk;
- (iii) Excavation;
- (iv) Compaction of existing sub-grade;
- (v) Adjustment of existing pavement and boulevard structures;

- (vi) Placement of geotextile fabric;
 - (vii) Placement of sub-base material;
 - (viii) Placement of base course material;
 - (ix) Construction of 230mm concrete pavement(plain-dowelled);
 - (x) Construction of monolithic concrete splash strip;
 - (xi) Construction of barrier curb;
 - (xii) Construction of monolithic concrete bullnose;
 - (xiii) Construction of concrete median slab;
 - (xiv) Construction of concrete sidewalk;
 - (xv) Installation of detectable warning surface tiles;
 - (xvi) Renewal of existing curb as required;
 - (xvii) Renewal of existing curb and gutter as required;
 - (xviii) Planing of existing asphalt and at intersections as required;
 - (xix) Construction of asphalt overlay(average thickness 80mm);
 - (xx) Construction of asphalt pavement tie-ins at approaches; and
 - (xxi) Boulevard restoration.
- (c) **Stage III - Roblin Boulevard Westbound(median lane) from Shaftesbury Boulevard to Station 14+50 and Roblin Boulevard Eastbound(median lane) at Shaftesbury Boulevard Intersection – Concrete Reconstruction**
- (i) Removal of existing pavement;
 - (ii) Removal of existing temporary asphalt cross-over in median boulevard west of Shaftesbury Boulevard(Station 14+80);
 - (iii) Removal of existing curb, splash strip, median, bullnose, sidewalk;
 - (iv) Excavation;
 - (v) Compaction of existing sub-grade;
 - (vi) Adjustment of existing pavement and boulevard structures;
 - (vii) Placement of geotextile fabric;
 - (viii) Placement of sub-base material;
 - (ix) Placement of base course material;
 - (x) Construction of 230mm concrete pavement(plain-dowelled);
 - (xi) Construction of 200mm concrete pavement(reinforced);
 - (xii) Construction of monolithic concrete splash strip;
 - (xiii) Construction of safety median;
 - (xiv) Construction of barrier curb utilizing slip form paving equipment;
 - (xv) Construction of monolithic concrete bullnose;
 - (xvi) Construction of concrete median slab and monolithic concrete median slab;
 - (xvii) Renewal of existing curb as required;
 - (xviii) Planing of existing asphalt and at intersections as required;
 - (xix) Construction of asphalt overlay(average thickness 80mm);
 - (xx) Construction of asphalt pavement tie-ins at approaches; and
 - (xxi) Boulevard restoration.
- (d) **Stage IV – Roblin Boulevard/Conservatory Drive/Shaftesbury Boulevard Intersection(median lanes) – Concrete Reconstruction**
- (i) Removal of existing pavement;
 - (ii) Excavation;
 - (iii) Compaction of existing sub-grade;
 - (iv) Placement of geotextile fabric;
 - (v) Placement of sub-base material;

- (vi) Placement of base course material; and
- (vii) Construction of 230mm concrete pavement(plain-dowelled).
- (e) Placing the topsoil and finished grading of all boulevard and median areas shall be completed prior to commencing construction of the asphaltic concrete overlay, including the scratch course.
- (f) No construction Works in Phase II shall commence prior to Phase I completion as per specified in D18.1.2.
- (g) Roblin Boulevard Westbound and Eastbound traffic must be maintained at all times.
- (h) Shaftesbury Boulevard/Conservatory Drive Northbound and Southbound traffic must be maintained at all times.

D18.1.5 Immediately following the completion of the asphaltic concrete works of Phase II, the Contractor shall clean up the Site and remove all plant, surplus material, waste and debris, other than that left by the City or other Contractors.

D19. CRITICAL STAGES

- D19.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:
- (a) Assiniboine Park Drive from Commissary Road to Zoo Drive as specified in D18.1.2(c) and D18.1.2(d) to be completed no later than June 26, 2019, as directed by the Contract Administrator.
- D19.2 When the Contractor considers the Work associated with D19.1 to be completed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Completion. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.
- D19.3 The date on which the D19.1 Work has been accepted by the Contract Administrator as being completed to the requirements of the Contract is the date on which completion of D19.1 has been achieved.

D20. SUBSTANTIAL PERFORMANCE

- D20.1 The Contractor shall achieve Substantial Performance within One hundred (100) consecutive Working Days of the commencement of the Work as specified in D14.
- D20.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.
- D20.3 The date on which the Work has been certified by the Contract Administrator as being substantially performed to the requirements of the Contract through the issue of a certificate of Substantial Performance is the date on which Substantial Performance has been achieved.

D21. TOTAL PERFORMANCE

- D21.1 The Contractor shall achieve Total Performance within one hundred and five (105) consecutive Working Days of the commencement of the Work as specified in D14.
- D21.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the

Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.

- D21.3 The date on which the Work has been certified by the Contract Administrator as being totally performed to the requirements of the Contract through the issue of a certificate of Total Performance is the date on which Total Performance has been achieved.

D22. LIQUIDATED DAMAGES

- D22.1 If the Contractor fails to achieve Critical Stage, Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:

- (a) Critical Stage as specified in D19 – one thousand five hundred dollars (\$1,500.00);
- (b) Substantial Performance – five thousand dollars (\$5,000.00);
- (c) Total Performance – one thousand dollars (\$1,000.00).

- D22.2 The amounts specified for liquidated damages in D22.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve critical stages, Substantial Performance or Total Performance by the days fixed herein for same.

- D22.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D23. SCHEDULED MAINTENANCE

- D23.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

- (a) Sodding maintenance as specified in CW 3510-R9;
- (b) Seeding Maintenance as specified in CW 3520-R7, E10; and
- (c) Reflective crack maintenance as specified in CW 3250-R7.

- D23.2 Determination of Substantial Performance and Total Performance shall be exclusive of scheduled maintenance identified herein. All scheduled maintenance shall be completed prior to the expiration of the warranty period. Where the scheduled maintenance cannot be completed during the warranty period, the warranty period shall be extended for such period of time as it takes the Contractor to complete the scheduled maintenance.

CONTROL OF WORK

D24. JOB MEETINGS

- D24.1 Regular weekly job meetings will be held at the site or location agreed to by the Contract Administrator and the Contractor. These meetings shall be attended by a minimum of one representative of the Contract Administrator and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator and the Contractor respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.

- D24.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

D25. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D25.1 Further to C6.24, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

D26. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D26.1 Further to B12.4, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B12.4.

MEASUREMENT AND PAYMENT

D27. PAYMENT

D27.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D28. WARRANTY

D28.1 Notwithstanding C13.2, the warranty period shall begin on the date of Total Performance and shall expire one (1) years thereafter for pavement Mill & Fill works, and two (2) years thereafter for pavement Reconstruction works, unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

THIRD PARTY AGREEMENTS

D29. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

D29.1 Funding for the Work of the Contract is being provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada and accordingly, as required by the applicable funding agreements, the following terms and conditions shall apply.

D29.2 For the purposes of D29:

- (a) **“Government of Canada”** includes the authorized officials, auditors, and representatives of the Government of Canada; and
- (b) **“Government of Manitoba”** includes the authorized officials, auditors, and representatives of the Government of Manitoba.

D29.3 Indemnification By Contractor

D29.3.1 In addition to the indemnity obligations outlined in C17 of the General Conditions for Construction, the Contractor agrees to indemnify and save harmless the Government of Canada and the Government of Manitoba and each of their respective Ministers, officers, servants, employees, and agents from and against all claims and demands, losses, costs, damages, actions, suit or other proceedings brought or pursued in any manner in respect of any matter caused by the Contractor or arising from this Contract or the Work, or from the goods or services provided or required to be provided by the Contractor, except those resulting from the negligence of any of the Government of Canada's or the Government of Manitoba's Ministers, officers, servants, employees, or agents, as the case may be.

D29.4 Records Retention and Audits

- D29.4.1 The Contractor shall maintain and preserve accurate and complete records in respect of this Contract and the Work, including all accounting records, financial documents, copies of contracts with other parties and other records relating to this Contract and the Work during the term of the Contract and for at least six (6) years after Total Performance. Those records bearing original signatures or professional seals or stamps must be preserved in paper form; other records may be retained in electronic form.
- D29.4.2 In addition to the record keeping and inspection obligations outlined in C6 of the General Conditions for Construction, the Contractor shall keep available for inspection and audit at all reasonable times while this Contract is in effect and until at least six (6) years after Total Performance, all records, documents, and contracts referred to in D29.4.1 for inspection, copying and audit by the City of Winnipeg, the Government of Manitoba and/or the Government of Canada and their respective representatives and auditors, and to produce them on demand; to provide reasonable facilities for such inspections, copying and audits, to provide copies of and extracts from such records, documents, or contracts upon request by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada and their respective representatives and auditors, and to promptly provide such other information and explanations as may be reasonably requested by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada from time-to-time.
- D29.5 Other Obligations
- D29.5.1 The Contractor consents to the City providing a copy of the Contract to the Government of Manitoba and/or the Government of Canada upon request from either entity.
- D29.5.2 If the Lobbyists Registration Act (Manitoba) applies to the Contractor, the Contractor represents and warrants that it has filed a return and is registered and in full compliance with the obligations of that Act, and covenants that it will continue to comply for the duration of this Contract.
- D29.5.3 The Contractor shall comply with all applicable legislation and standards, whether federal, provincial, or municipal, including (without limitation) labour, environmental, and human rights laws, in the course of providing the Work.
- D29.5.4 The Contractor shall properly account for the Work provided under this Contract and payment received in this respect, prepared in accordance with generally accepted accounting principles in effect in Canada, including those principles and standards approved or recommended from time-to-time by the Chartered Professional Accountants of Canada or the Public Sector Accounting Board, as applicable, applied on a consistent basis.

FORM H1: PERFORMANCE BOND
(See D10.1)

KNOW ALL MEN BY THESE PRESENTS THAT

_____ ,
(hereinafter called the "Principal"), and

_____ ,
(hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), in the sum of

_____ dollars (\$_____)

of lawful money of Canada to be paid to the Obligee, or its successors or assigns, for the payment of which sum the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS the Principal has entered into a written contract with the Obligee for

TENDER NO. 4-2019

ROBLIN BOULEVARD WESTBOUND AND ASSINIBOINE PARK DRIVE - RECONSTRUCTION AND ASSOCIATED WORKS

which is by reference made part hereof and is hereinafter referred to as the "Contract".

NOW THEREFORE the condition of the above obligation is such that if the Principal shall:

- (a) carry out and perform the Contract and every part thereof in the manner and within the times set forth in the Contract and in accordance with the terms and conditions specified in the Contract;
- (b) perform the Work in a good, proper, workmanlike manner;
- (c) make all the payments whether to the Obligee or to others as therein provided;
- (d) in every other respect comply with the conditions and perform the covenants contained in the Contract; and
- (e) indemnify and save harmless the Obligee against and from all loss, costs, damages, claims, and demands of every description as set forth in the Contract, and from all penalties, assessments, claims, actions for loss, damages or compensation whether arising under "The Workers Compensation Act", or any other Act or otherwise arising out of or in any way connected with the performance or non-performance of the Contract or any part thereof during the term of the Contract and the warranty period provided for therein;

THEN THIS OBLIGATION SHALL BE VOID, but otherwise shall remain in full force and effect. The Surety shall not, however, be liable for a greater sum than the sum specified above.

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable as Principal, and that nothing of any kind or matter whatsoever that will not discharge the Principal shall operate as a discharge or release of liability of the Surety, any law or usage relating to the liability of Sureties to the contrary notwithstanding.

IN WITNESS WHEREOF the Principal and Surety have signed and sealed this bond the

_____ day of _____, 20____ .

SIGNED AND SEALED
in the presence of:

(Witness as to Principal if no seal)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

By: _____ (Seal)
(Attorney-in-Fact)

FORM H2: LABOUR AND MATERIAL PAYMENT BOND
(See D10.1)

KNOW ALL MEN BY THESE PRESENTS THAT

his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Principal"), and

his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), for the use and benefit of claimants as herein below defined, in the amount of

_____ dollars (\$_____)

of lawful money of Canada, for the payment whereof we, the Principal and the Surety jointly and severally bind ourselves firmly by these presents.

WHEREAS the Principal has entered into a written contract with the Obligee for

TENDER NO. 4-2019

ROBLIN BOULEVARD WESTBOUND AND ASSINIBOINE PARK DRIVE - RECONSTRUCTION AND ASSOCIATED WORKS

which is by reference made part hereof and is hereinafter referred to as the "Contract".

NOW THEREFORE the condition of the above obligation is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labour, service and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void, otherwise it shall remain in full force and effect subject, however, to the following conditions:

- (a) A claimant is defined as one having a direct contract with the Principal for labour, service and material, or any of them, used or reasonably required for use in the performance of the contract, labour, service and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment (but excluding rent of equipment where the rent pursuant to an agreement is to be applied towards the purchase price thereof) directly applicable to the Contract;
- (b) The above-named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work, labour or service was done or performed, or materials were furnished by such claimant, may sue on this bond, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon;
- (c) No suit or action shall be commenced hereunder by any claimant
 - (ii) unless claimant shall have given written notice to the Principal and the Surety above-named, within one hundred and twenty (120) days after such claimant did or performed the last of the work, labour or service, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work, labour or service was done or performed. Such notice shall be served by mailing the same by registered mail to the Principal, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the Province of Manitoba;

- (iii) after the expiration of one (1) year following the date on which Principal ceased work on said Contract; including work performed under the guarantees provided in the Contract;
 - (iv) other than in a court of competent jurisdiction in the Province of Manitoba.
- (d) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.
- (e) The Surety shall not be liable for a greater sum than the specified penalty of this bond.

The Principal and Surety hereby agree that The Guarantors' Liability Act (Manitoba) shall apply to this Bond.

IN TESTIMONY WHEREOF, the Principal has hereunto set its hand affixed its seal, and the Surety has caused these presents to be sealed and with its corporate seal duly attested by the authorized signature of its signing authority this

_____ day of _____, 20_____ .

SIGNED AND SEALED
in the presence of:

(Witness as to Principal if no seal)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

By: _____ (Seal)
(Attorney-in-Fact)

FORM J: SUBCONTRACTOR LIST
(See D12)

ROBLIN BOULEVARD WESTBOUND AND ASSINIBOINE PARK DRIVE - RECONSTRUCTION AND ASSOCIATED WORKS

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
SURFACE WORKS:		
<u>Supply of Materials:</u>		
Geotextile Fabric		
Mirafi RS380i High-tenacity Polypropylene Woven Geotextile		
Sub-base Material		
Base Course Material		
Surface Material - Limestone		
Concrete		
Asphalt		
Topsoil, Salt Tolerant Seed and Sod		
<u>Installation and Placement:</u>		
Geotextile Fabric		
Mirafi RS380i High-tenacity Polypropylene Woven Geotextile		
Sub-base Material		
Base Course Material		
Surface Material - Limestone		
Concrete		
Asphalt		
Topsoil, Salt Tolerant Seed and Sod		

FORM J: SUBCONTRACTOR LIST
(See D12)

ROBLIN BOULEVARD WESTBOUND AND ASSINIBOINE PARK DRIVE - RECONSTRUCTION AND ASSOCIATED WORKS

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
UNDERGROUND WORKS:		
<u>Supply of Materials:</u>		
Pre-cast Concrete Catch Basins, Catch Pit, Manhole and Pre-cast Concrete Risers		
Sewer Service Pipe/Drainage Connection Pipe		
Subdrains		
Catch Basin/Catch Pit/Manhole Frames, Covers, Curb Inlet Frames and Lifter Rings		
Ditch Inlet Grate		
Corrugated Steel Pipe		
Culvert End Markers		
<u>Installation and Placement:</u>		
Pre-cast Concrete Catch Basins, Catch Pit, Manhole and Pre-cast Concrete Risers		
Sewer Service Pipe/Drainage Connection Pipe		
Subdrains		
Catch Basin/Catch Pit/Manhole Frames, Covers, Curb Inlet Frames and Lifter Rings		
Ditch Inlet Grate		
Corrugated Steel Pipe		
Culvert End Markers		
Electrical Works		

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

- E1.1 These Specifications shall apply to the Work.
- E1.2 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/Spec/Default.stm>
- E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.2.3 Further to C2.4(d), Specifications included in the Tender shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B6. In every instance where a brand name or design specification is used, the City will also consider approved equals and/or approved alternatives in accordance with B6.
- E1.4 The following are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
	Cover Sheet	A1
P-3504-01	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 2+10 to Sta. 3+40	A1
P-3504-02	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 3+40 to Sta. 4+60	A1
P-3504-03	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 4+60 to Sta. 5+80	A1
P-3504-04	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 5+80 to Sta. 6+90	A1
P-3504-05	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 6+90 to Sta. 8+20	A1
P-3504-06	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 8+20 to Sta. 9+30	A1
P-3504-07	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 9+30 to Sta. 10+60	A1
P-3504-08	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 10+60 to Sta. 11+80	A1
P-3504-09	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 11+80 to Sta. 13+00	A1
P-3504-10	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and	A1

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
P-3504-11	Associated Works from Sta. 13+00 to Sta. 14+10 Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 14+10 to Sta. 15+40	A1
P-3504-12	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 15+40 to Sta. 16+70	A1
P-3504-13	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works - Detail Drawing	A1
P-3504-14	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works - Detail Drawing	A1
P-3504-15	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works - Detail Drawing	A1
P-3504-16	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works – Traffic Staging: Phase I – Stage I & Stage II and Phase II – Stage I	A1
P-3504-17	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works – Traffic Staging: Phase II – Stage II, Stage III & Stage IV	A1
P-3504-18	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 2+10 to Sta. 9+30 - Horizontal Geometry	A1
P-3504-19	Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 9+30 to Sta. 16+70 - Horizontal Geometry	A1
P-3504-20	Assiniboine Park Drive from Commissary Road to Zoo Drive – Mill & Fill, Asphalt Reconstruction and Associated Works from Sta. 1+00 to Sta. 2+10	A1
P-3504-21	Assiniboine Park Drive from Commissary Road to Zoo Drive – Mill & Fill, Asphalt Reconstruction and Associated Works from Sta. 2+10 to Sta. 3+30	A1
P-3504-22	Assiniboine Park Drive from Commissary Road to Zoo Drive – Mill & Fill, Asphalt Reconstruction and Associated Works from Sta. 3+30 to Sta. 4+50	A1
P-3504-23	Assiniboine Park Drive from Commissary Road to Zoo Drive – Mill & Fill, Asphalt Reconstruction and Associated Works from Sta. 4+50 to Sta. 5+70	A1
P-3504-24	Assiniboine Park Drive from Commissary Road to Zoo Drive – Mill & Fill, Asphalt Reconstruction and Associated Works from Sta. 5+70 to Sta. 6+90	A1
P-3504-25	Assiniboine Park Drive from Commissary Road to Zoo Drive – Mill & Fill, Asphalt Reconstruction and Associated Works from Sta. 6+90 to Sta. 8+10	A1
P-3504-26	Assiniboine Park Drive from Commissary Road to Zoo Drive – Mill & Fill, Asphalt Reconstruction and Associated Works from Sta. 8+10 to Sta. 9+30	A1
P-3504-27	Assiniboine Park Drive from Commissary Road to Zoo Drive – Mill & Fill, Asphalt Reconstruction and Associated Works from Sta. 9+30 to Sta. 10+00	A1

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
P-3504-28	Assiniboine Park Drive from Commissary Road to Zoo Drive – Mill & Fill, Asphalt Reconstruction and Associated Works - Traffic Staging: Phase I – Stage III & Stage IV	A1

E2. GEOTECHNICAL REPORT

- E2.1 Further to C3.1, the geotechnical report is provided to aid the Contractor's evaluation of the pavement structure and/or existing soil conditions. The geotechnical report for Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard (TH1 to TH14) and the geotechnical report for Assiniboine Park Drive from Commissary Road to Zoo Drive are contained in Appendix 'A'.

E3. OFFICE FACILITIES

- E3.1 The Contractor shall supply office facilities meeting the following requirements:
- (a) The field office shall be for the exclusive use of the Contract Administrator.
 - (b) The building shall be conveniently located near the site of the Work.
 - (c) The building shall have a minimum floor area of 25 square metres, a height of 2.4m with two windows for cross ventilation and a door entrance with a suitable lock.
 - (d) The building shall be suitable for all weather use. It shall be equipped with an electric heater and air conditioner so that the room temperature can be maintained between either 16-18°C or 24-25°C.
 - (e) The building shall be adequately lighted with fluorescent fixtures and have a minimum of three wall outlets.
 - (f) The building shall be furnished with one desk, one drafting table, table 3m x 1.2m, one stool and a minimum of 8 chairs.
 - (g) A portable toilet shall be located near the field office building. The toilet shall have a locking door and be for the exclusive use of the Contract Administrator and other personnel from the City.
 - (h) The field office building and the portable toilet shall be cleaned on a weekly basis immediately prior to each site meeting. The Contract Administrator may request additional cleaning when he/she deems it necessary.
- E3.2 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.
- E3.3 The office facilities will be provided from the date of the commencement of the Work to the date of Substantial Performance.

E4. PROTECTION OF EXISTING TREES

- E4.1 The Contractor shall take the following precautionary steps to prevent damage from construction activities to existing boulevard trees within the limits of the construction area:
- (a) The Contractor shall not stockpile materials and soil or park vehicles and equipment on boulevards within 2 metres of trees.
 - (b) Trees identified to be at risk by the Contract Administrator are to be strapped with 25 x 100 x 2400mm wood planks, or suitably protected as approved by the Contract Administrator.
 - (c) Excavation shall be performed in a manner that minimizes damage to the existing root systems. Where possible, excavation shall be carried out such that the edge of the excavation shall be a minimum of 1.5 times the diameter (measured in inches), with the

outcome read in feet, from the closest edge of the trunk. Where roots must be cut to facilitate excavation, they shall be pruned neatly at the face of excavation.

- (d) Operation of equipment within the dripline of the trees shall be kept to the minimum required to perform the work required. Equipment shall not be parked, repaired, refuelled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposition on areas where trees are located.
- (e) Work on-site shall be carried out in such a manner so as to minimize damage to existing tree branches. Where damage to branches does occur, they shall be neatly pruned.

E4.2 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the City Forester or his/her designate.

E4.3 No separate measurement or payment will be made for the protection of trees.

E4.4 Except as required in clause E4.1(c) and E4.1(e), Elm trees shall not be pruned at any time between April 1 and July 31.

E5. TRAFFIC CONTROL

E5.1 Further to clauses 3.6, 3.7 and 3.8 of CW 1130:

- (a) Where directed by the Contract Administrator, the Contractor shall construct and maintain temporary asphalt ramps to alleviate vertical pavement obstructions such as manholes and planing drop-offs to the satisfaction of the Contract Administrator. Payment shall be in accordance with CW3410.
- (b) In accordance with the Manual of Temporary Traffic Control on City Streets (MTTC), the Contractor ("Construction Agency" in the manual) shall be responsible for placing, maintaining and removing the appropriate temporary traffic control devices as specified by the MTTC or by the Traffic Management Branch of the City of Winnipeg Public Works Department. The Contractor shall bear all costs associated with the placement of temporary traffic control devices by their own forces or subcontractor.

E5.2 Notwithstanding E5.1, in accordance with the MTTC, the Contract Administrator shall make arrangements with the **Traffic Services Branch of the City of Winnipeg** to place, maintain, and remove all **regulatory signs** and traffic control devices authorized and/or required by the Traffic Management Branch in the following situations:

- (a) Parking restrictions,
- (b) Stopping restrictions,
- (c) Turn restrictions,
- (d) Diamond lane removal,
- (e) Full or directional closures on a Regional Street,
- (f) Traffic routed across a median,
- (g) Full or directional closure of a non-regional street where there is a requirement for regulatory signs (turn restrictions, bus stop relocations, etc.) to implement the closure.
- (h) Approved Designated Construction Zones with a temporary posted speed limit reduction. Traffic Services will be responsible for placing all of the advance signs and 'Construction Ends' (TC-4) signs. The Contractor is still responsible for all other temporary traffic control including but not limited to barricades, barrels and tall cones.

E5.2.1 An exception to E5.2 is the 'KEEP RIGHT/KEEP LEFT' sign (RB-25 / RB-25L) which shall be supplied, installed, and maintained by the Contractor at their own expense.

E5.2.2 Further to E5.2, where the Contract Administrator has determined that the services of the Traffic Services Branch are required, the City shall bear the costs associated with the placement of temporary traffic control devices by the Traffic Services Branch of the City of Winnipeg in connection with the works undertaken by the Contractor.

E6. TRAFFIC MANAGEMENT

E6.1 Further to clause 3.7 of CW 1130:

E6.1.1 Contractor to refer to the applicable Contract Drawings for traffic management for Traffic Staging of Roblin Boulevard Westbound from Shaftesbury Boulevard to Assiniboine Park Drive and Assiniboine Park Drive from Commissary Road to Zoo Drive.

E6.1.2 Roblin Boulevard Westbound from Shaftesbury Boulevard to Assiniboine Park Drive – All Phases:

- (a) Maintain one lane of traffic westbound and one lane of traffic eastbound.
- (b) Contractor responsible for maintaining all construction signage, barricades and traffic control within the area under construction, including advance warning construction signage at extremities of project area.
- (c) Alterations to the Traffic Staging shown herein must be presented and approved by the Contract Administrator at least 48 hours prior to implementing change.
- (d) Northbound/Southbound traffic at Assiniboine Park Drive and Roblin Boulevard intersection must be maintained during construction to allow for one lane of traffic in the northbound direction and one lane of traffic in the southbound direction to go through and turn left. When no work is being performed in the intersection and providing it is safe for vehicles, north and south lane closures in the intersection will not be permitted.
- (e) Northbound/Southbound traffic at Shaftesbury Boulevard/Conservatory Drive and Roblin Boulevard intersection must be maintained during construction to allow for one lane of traffic in the northbound direction and one lane of traffic in the southbound direction to go through. When no work is being performed in the intersection and providing it is safe for vehicles, north and south lane closures in the intersection will not be permitted.
- (f) Intersecting street and private approach access shall be maintained at all times as indicated on Drawings.
- (g) Closures of side streets not permitted unless approved by the Contract Administrator.
- (h) Pedestrian and ambulance/emergency vehicle access must be maintained at all times.
- (i) Should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, he/she shall review the planned disruption with the residence or business and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 48 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.
- (j) Winnipeg Transit service shall be maintained at all times.

E6.1.3 Roblin Boulevard Westbound from Station 14+50 to Assiniboine Park Drive – Phase I:

- (a) Maintain one lane of traffic westbound and one lane of traffic eastbound in the eastbound lanes of Roblin Boulevard from Shaftesbury Boulevard to Assiniboine Park Drive.
- (b) Roblin Boulevard westbound traffic to be diverted to the eastbound median lane of Roblin Boulevard at the temporary asphalt traffic cross-over at Shaftesbury Boulevard(Station 14+80).

- (c) Roblin Boulevard westbound traffic to be diverted back to the westbound gutter lane of Roblin Boulevard at the temporary asphalt traffic cross-over at Assiniboine Park Drive(Station 3+40).
- (d) City of Winnipeg Traffic Services Branch to maintain traffic cross-overs at Shaftesbury Boulevard(Station 14+80) and Assiniboine Park Drive(Station 3+40), and delineation of westbound and eastbound traffic for Phase I construction of Roblin Boulevard Westbound from Shaftesbury Boulevard to Assiniboine Park Drive, including advance warning construction signage. Contractor responsible for general construction signage and barricades between traffic cross-overs within the area under construction.
- (e) Access to Commissary Road and most easterly Zoo Entrance/Exit intersections shall be maintained at all times.

E6.1.4 Roblin Boulevard Westbound from Shaftesbury Boulevard to Station 14+50 – Phase II:

- (a) Maintain one lane of traffic westbound and one lane of traffic eastbound.
- (b) Right turns are prohibited in all directions at the Roblin Boulevard/Conservatory Drive/Shaftesbury Boulevard intersection in Stage I.
- (c) Information signs shall be placed by City of Winnipeg Traffic Services Branch south of Cuthbertson Avenue directing Shaftesbury Boulevard northbound traffic wishing to travel eastbound on Corydon Avenue to take the detour via Cuthbertson Avenue and Bower Boulevard in Stage I.
- (d) Left turns are prohibited in the westbound and eastbound direction of Roblin Boulevard at the Roblin Boulevard/Conservatory Drive/Shaftesbury Boulevard intersection in Stage II, Stage III and Stage IV.
- (e) Information signs shall be placed by City of Winnipeg Traffic Services Branch east of the Roblin Boulevard/Conservatory Drive/Shaftesbury Boulevard intersection directing westbound traffic wishing to travel southbound on Shaftesbury Boulevard to take the detour via Bower Boulevard and Cuthbertson Avenue in Stage II, Stage III and Stage IV.
- (f) Left turns are prohibited in the northbound and southbound direction of Shaftesbury Boulevard and Conservatory Drive at the Roblin Boulevard/Conservatory Drive/Shaftesbury Boulevard intersection in Stage III and Stage IV.
- (g) Information signs shall be placed by City of Winnipeg Traffic Services Branch south of Cuthbertson Avenue directing Shaftesbury Boulevard northbound traffic wishing to travel westbound on Roblin Boulevard to take the detour via Cuthbertson Avenue and Bower Boulevard in Stage III and Stage IV.
- (h) Assiniboine Park Zoo Bus Loop at Station 7+40 must be maintained during Phase II of construction to allow bus traffic to enter Bus Loop from the westbound direction and allow bus traffic to exit Bus Loop in the westbound and eastbound direction.

E6.1.5 Assiniboine Park Drive from Commissary Road to Zoo Drive – Phase I:

- (a) Assiniboine Park Drive shall be closed for construction from Commissary Road to Zoo Drive and no vehicle traffic will be allowed.
- (b) Contractor responsible for maintaining all construction signage, barricades and traffic control within the area under construction, including advance warning construction signage at extremities of project area.
- (c) Access to the Commissary Road and Zoo Drive shall be maintained at all times.
- (d) Alterations to the Traffic Staging shown herein must be presented and approved by the Contract Administrator at least 48 hours prior to implementing change.

E7. WATER OBTAINED FROM THE CITY

- E7.1 Further to clause 3.7 of CW 1120, the Contractor shall pay for all costs, including sewer charges, associated with obtaining water from the City in accordance with the Waterworks and Sewer By-laws.

E8. SURFACE RESTORATIONS

- E8.1 Further to clause 3.3 of CW 1130, when Total Performance is not achieved in the year the Contract is commenced, the Contractor shall temporarily repair any Work commenced and not completed to the satisfaction of the Contract Administrator. The Contractor shall maintain the temporary repairs in a safe condition as determined by the Contract Administrator until permanent repairs are completed. The Contractor shall bear all costs associated with temporary repairs and their maintenance.

E9. INFRASTRUCTURE SIGNS

- E9.1 The Contractor shall obtain infrastructure signs from the Traffic Services Sign Shop at 421 Osborne Street. The Contractor shall mount each sign securely to a rigid backing material approved by the Contract Administrator. The Contractor shall fasten each sign to a suitable support and erect and maintain one sign at each street as directed by the Contract Administrator. When the Contract Administrator considers the Work on the street complete, the Contractor shall remove and dispose of the signs and supports. No measurement for payment will be made for performing all operations herein described and all other items incidental to the work described

E10. SALT TOLERANT GRASS SEEDING

DESCRIPTION

- E10.1 Further to CW 3520 and CW3540, this specification shall cover sub-grade preparation and the supply and placement of Salt Tolerant Grass Seed.

MATERIALS

- E10.2 Salt Tolerant Grass Seed

- E10.2.1 Salt Tolerant Grass Seed for regional and collector boulevards, medians and interchange areas shall be a mixture composed of:

- (a) Seventy percent (70%) Fults or Nuttals Alkaligrass (*Puccinellia* spp.), twenty percent (20%) Audubon or Aberdeen Creeping Red Fescue and ten percent (10%) Perennial Ryegrass.

EQUIPMENT

- E10.3 Scarification equipment shall be suitable for the area being scarified, shall be capable of scarifying the sub-grade to the specified depth and shall be accepted by the Contract Administrator. For confined areas a toothed bucket may be acceptable. For larger areas tilling equipment may be required.

CONSTRUCTION METHODS

- E10.4 Preparation of Existing Grade

- E10.4.1 Prior to placing topsoil, in areas to be seeded greater in width than 600mm, prepare the existing sub-grade by scarifying to a minimum depth of 75mm and to a maximum depth of 100mm to the satisfaction of the Contract Administrator.

- E10.4.2 Scarification shall consist of breaking up and loosening the sub-grade. No scarification shall occur within the edge of a tree canopy (or drip line).

E10.5 Salt Tolerant Grass Seeding

E10.5.1 Salt Tolerant Grass Seed shall be sown at a rate of 2.2 kilograms per 100 square meters.

MEASUREMENT AND PAYMENT

E10.6 Supply, placement and maintenance of Salt Tolerant Grass Seed will be paid for at the Contract Unit Price per square metre for "Salt Tolerant Grass Seeding", measured as specified herein, which price shall be payment in full for supplying all materials and for completing all operations herein described and all other items incidental to the work included in this Specification. Payment for Salt Tolerant Grass Seeding shall be in accordance with the following:

- (a) Sixty five (65%) percent of quantity following supply and placement.
- (b) Remaining thirty five (35%) percent of quantity following termination of the Maintenance Period.

E11. CONSTRUCTION OF REINFORCED CONCRETE SPILLWAY WITH RIPRAP

DESCRIPTION

E11.1 General

E11.1.1 This Specification shall cover the operations relating to the construction of reinforced concrete spillway with riprap on Roblin Boulevard. The Work to be done under this Specification shall include the furnishings of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all other things necessary for and incidental to the satisfactory performance and completion of all Work specified.

E11.1.2 Referenced Standard Construction Specifications and Detail Drawing:

- (a) CW 3110 – Subgrade, Sub-Base and Base Course Construction;
- (b) CW 3210 – Adjustment of Pavement and Boulevard Structures;
- (c) CW 3310 – Portland Cement Concrete Pavement Works;
- (d) CW 3615 – Riprap; and
- (e) Detail Drawing P-3504-14

CONSTRUCTION METHODS

E11.2 Construction of Reinforced Concrete Spillway with Riprap

E11.2.1 Curb inlet frames to be installed with 230mm concrete pavement and integral barrier curb.

E11.2.2 Excavate area behind curb designated for the concrete spillway to accommodate a minimum of 50 millimetre base course construction.

E11.2.3 Place base course and compact in accordance with the Detail Drawing and Specification CW 3110.

E11.2.4 Tie bars in drilled holes are to be installed into existing concrete pavement.

E11.2.5 Place reinforcing steel in accordance with the Detail Drawing and Section 9.2 of Specification CW 3310 or as specified by the Contract Administrator.

E11.2.6 Place concrete in accordance with the Detail Drawing and Specification CW 3310.

E11.2.7 Place grouted stone riprap in accordance with the Detail Drawing and Specification CW 3615.

MEASUREMENT AND PAYMENT

E11.3 Construction of Reinforced Concrete Spillway with Riprap

- E11.3.1 Construction of reinforced concrete spillway will be measured on an area basis and paid for at the Contract Unit Price per square metre for “Construction of Reinforced Concrete Spillway with Riprap”. The area to be paid for will be the total number of square metres of concrete spillway constructed in accordance with this Specification, accepted and measured by the Contract Administrator.
- E11.3.2 All costs for removal, excavation, compaction, base course material, reinforcing steel, concrete, riprap, superintendence and all other incidental items necessary to complete the Work described in this Specification will be included in payment for “Construction of Reinforced Concrete Spillway with Riprap”.
- E11.3.3 The drilled tie-bars shall be paid for under payment item “20 M Deformed Tie Bar”.
- E11.3.4 The supply and installation of curb inlet frames shall be paid under payment item “Curb Inlet Frames”.

E12. ELECTRICAL WORKS

GENERAL PROVISIONS

- E12.1 Refer also to Contract Drawings.
- E12.2 Disconnect all signs on Site to be relocated or removed. Coordinate with Transit/Outfront Media and site works contractors for timing of work and site access requirements.
- E12.3 All sites to be left in a safe manner for installation of new Work.
- E12.4 Furnish all labour, new material, equipment and services for the complete installation of the electrical Work as shown on the plans and specified. Complete system to operate to total satisfaction of the responsible professional engineer.
- E12.5 Conform with all Codes and pay all permits and Fees. Upon completion, present a “Certificate of Approval” for electrical Work from the Inspection Department.
- E12.6 Examine the Site and local conditions affecting the Work under this Contract.
- E12.7 Install all Work promptly and in advance of concrete pouring and/or construction.
- E12.8 The Contractor shall be responsible to make good all “Cutting and Patching” required by his section of the Contract. Include all trenching, backfilling and surface repair. Contractor to push wires where possible at all locations.
- E12.9 All supports, hangers, and securing devices shall be solid and substantial. All Work shall be laid out neatly in its mechanical appearance. It shall be logically arranged for simplicity of installation and accessibility.
- E12.10 Provide corrected “as-built” drawings on completion of the project. All underground services shall be indicated on as-builts and dimensioned.
- E12.11 Provide shop drawings for approval of all major electrical items. Provide three (3) copies of manufacturers maintenance instructions bound in hard covered book for each piece of major electrical equipment.
- E12.12 Identify circuits/equipment with lamacoid nameplates.
- E12.13 All electrical apparatus shall be properly grounded according to the latest edition of the “Canadian Electrical Code”.
- E12.14 All equipment, wiring, conduit, grounding, seals, etc., shall be in compliance with the latest edition of the “Canadian Electrical” and local “Codes”. Wiring in finished grade shall be in rigid PVC conduits, complete with ground conductor.

- E12.15 Wiring shall be copper, RWU-90, insulated, minimum #12 AWG.
- E12.16 Wire and connect to signs where indicated. Provide lockable, weatherproof disconnect switches for each sign as shown on the drawings. Locate as directed on Site.
- E12.17 Co-ordinate disconnection, reconnection and installation with Manitoba Hydro and City of Winnipeg. Installation to conform with all utility requirements.
- E12.18 Obtain all permits and inspections. Provide copies of all paperwork to the Contract Administrator prior to completion of the Work.
- E12.19 Provide ground rod and grounding connections to suit Manitoba Hydro and City of Winnipeg Inspection Department.
- E12.20 All distribution equipment to be weather proof.
- E12.21 The Contractor shall carefully examine all drawings relating to the Work, to be certain that the Work under this Contract can be carried out and, prior to the submission of his/her Bid in accordance with B3, report at once to the Contract Administrator any defect, discrepancy, omission or interference affecting the work of this section or the guarantee of same.
- E12.22 The Contractor shall be responsible for any damage caused the City or their Contractors by improperly carrying out this contract.
- E12.23 The Contractor shall guarantee the satisfactory operation of all work and apparatus included and installed under this section for a period of twelve (12) calendar months after the final acceptance of the Project.

MEASUREMENT AND PAYMENT

- E12.24 Electrical Work for each location will be measured and paid on a lump sum basis which price shall be payment in full for completing all operations herein described and all other items incidental to the Work included in this Specification.

E13. SUPPLY AND INSTALL DITCH INLET GRATE

DESCRIPTION

- E13.1 General
- E13.1.1 This Specification shall cover the supply and installation of ditch inlet grate on ditch catch basin on Roblin Boulevard.
- E13.1.2 Referenced Standard Construction Specifications and Detail Drawing:
- (a) CW 2160 – Concrete Underground Structures and Works;
 - (b) CW 3110 – Subgrade, Sub-Base and Base Course Construction;
 - (c) CW 3210 – Adjustment of Pavement and Boulevard Structures;
 - (d) CW 3310 – Portland Cement Concrete Pavement Works; and
 - (e) Detail Drawing P-3504-15.

MATERIALS

- E13.2 All steel shall be supplied in accordance with the Detail Drawing.
- E13.3 All steel shall be hot dip galvanized and all hardware shall be stainless steel.
- E13.4 Ditch inlet grate shall be Shopost Iron Works MK-A1 or approved equal.

CONSTRUCTION METHODS

E13.5 Installation of Ditch Inlet Grate

- E13.5.1 The Contractor shall remove and dispose of the existing catch basin frame and cover where shown on Detail Drawing and identified by the Contract Administrator.
- E13.5.2 The Contractor shall drill anchor bolts into the catch basin concrete reducer as shown on the Detail Drawing.
- E13.5.3 The Contractor shall install the ditch inlet grate.

MEASUREMENT AND PAYMENT

- E13.6 The supply and install of ditch inlet grate complete shall be measured on a unit basis and paid for at the Contract Unit Price for "Supply and Install Ditch Inlet Grate" supplied and installed in accordance with this Specification, accepted and measured by the Contract Administrator.

E14. CONSTRUCTION OF SEPARATE SPLASH STRIP WITH THICKENED EDGE

DESCRIPTION

- E14.1 This Specification covers the construction of separate concrete splash strip on Roblin Boulevard.

GENERAL

- E14.2 Referenced Standard Construction Specifications and Detail Drawing:
 - (a) CW 3310 – Portland Cement Concrete Pavement Works; and
 - (b) Detail Drawing P-3504-14.

CONSTRUCTION METHODS

- E14.3 Further to CW 3310, the contractor shall construct the separate concrete splash strip with a thickened concrete edge as per Detail Drawing.
- E14.4 Further to CW 3310, the contractor shall supply and install 10M deformed stirrups at the back of curb, at the time of integral curb installation, in accordance with Detail Drawing.

MEASUREMENT AND PAYMENT

- E14.5 Construction of separate concrete splash strip with thickened edge shall be measured on a length basis and paid for at the Contract Unit Price per metre of "Construction of Splash Strip with Thickened Edge". The length to be paid for shall be the total number of meters supplied and installed in accordance with this Specification, accepted and measured by the Contract Administrator.
- E14.6 The supply and installation of 10M deformed stirrups is incidental to "Construction of Splash Strip with Thickened Edge" and no measurement or payment will be made.

E15. REMOVAL OF EXISTING CONCRETE SPILLWAYS

DESCRIPTION

- E15.1 General
 - E15.1.1 Further to clause 4.1 of CW 3110, this specification shall cover the removal of existing concrete spillways with the removal of pavement for the westbound Roblin Boulevard roadway.

CONSTRUCTION

E15.2 Removal of Existing Concrete Spillways

E15.2.1 The existing concrete spillways will be removed with the pavement removal operations.

MEASUREMENT AND PAYMENT

E15.3 Removal of Existing Concrete Spillways

E15.3.1 Removal of existing concrete spillways will be included in the payment for the Item of Work when removed in one operation with the pavement and no separate measurement or payment will be made.

E16. SUB-GRADE, SUB-BASE AND BASE COURSE CONSTRUCTION

E16.1 This Specification shall amend Standard Construction Specification CW 3110-R19 – Sub grade, Sub-base and Base Course Construction and is contained in Appendix 'B'.

E17. SUPPLY AND INSTALLATION OF GEOTEXTILE FABRICS

E17.1 This Specification shall amend Standard Construction Specification CW 3130-R4 – Supply and Installation of Geotextile Fabrics and is contained in Appendix 'C'.

E17.2 Assiniboine Park Drive – Asphalt reconstruction: Geotextile fabric will be Mirafi RS380i High-tenacity Polypropylene Woven Geotextile or approved equal.

E17.2.1 Source

Manufacturer - TenCate Geosynthetics

Supplier - Corix Water Products Limited
1835 Hekla Avenue
Winnipeg, MB R2R 0K3

Attention: Dan Gilkes
Ph: 204-632-0331
Fax: 204-632-0391
Email: Dan.Gilkes@corix.com

E18. RELOCATION OF TERASPAN CONDUIT

DESCRIPTION

E18.1 General

E18.1.1 This Specification shall cover the relocation of existing TeraSpan conduit located within the roadway excavation area of Assiniboine Park Drive, as indicated on the drawing. The Work to be done under this Specification shall include the furnishings of all superintendence overhead, labour, materials, equipment, tools, supplies, and all other things necessary for and incidental to the satisfactory performance and completion of all Work specified.

CONSTRUCTION

E18.2 Relocation of Existing TeraSpan Conduit

E18.2.1 Locate TeraSpan conduit.

E18.2.2 Expose TeraSpan conduit by means of soft digging or hand excavation without damaging TeraSpan conduit.

- E18.2.3 Any damage caused by the Contractor or Subcontractors to the TeraSpan conduit shall be promptly repaired by the Contractor at the Contractors expense to the satisfaction of the Contract Administrator.
- E18.2.4 Temporarily place TeraSpan conduit outside of roadway excavation area without damaging TeraSpan conduit until such time to be relocated back into roadway excavation area.
- E18.2.5 Relocate TeraSpan conduit against wall of excavation area and on top of compacted roadway Base Course Material.
- E18.2.6 Cover TeraSpan conduit with 50mm layer of clean sand to protect TeraSpan conduit from any further construction Works, to the satisfaction of Contract Administrator.

MEASUREMENT AND PAYMENT

- E18.3 Relocation of Existing TeraSpan Conduit
 - E18.3.1 Relocation of existing TeraSpan conduit shall be measured on a length basis and paid for at the Contract Unit Price per metre of "Relocation of TeraSpan Conduit". The length to be paid shall be the total number of metres relocated in accordance with this Specification, accepted and measured by the Contract Administrator.
 - E18.3.2 No separate measurement or payment will be made for any soft excavation operations or any items incidental to those operations.

APPENDIX 'A' – GEOTECHNICAL REPORT

GEOTECHNICAL REPORTS FOR:

- I. Roblin Boulevard Westbound from Assiniboine Park Drive to Shaftesbury Boulevard
(see TH1 to TH14 test hole locations)
- II. Assiniboine Park Drive from Commissary Road to Zoo Drive

The geotechnical report is provided to aid in the Contractor's evaluation of the existing pavement structure and/or soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. However, variations in pavement structure and/or soil conditions may exist between test holes and fluctuations in groundwater levels can be expected seasonally and may occur as a result of construction activities. The nature and extent of variations may not become evident until construction commences.



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January 12, 2018

File No.: 17-037-03R1

City of Winnipeg
106-1155 Pacific Avenue
Winnipeg, Manitoba
R3E 3P1

ATTENTION: Richard Weibel, C.E.T

RE: Geotechnical Investigation – 2018 Street Reconstructions

Dear Mr. Weibel,

1.0 Introduction

ENG-TECH Consulting Limited (ENG-TECH) completed the requested geotechnical investigation for the following streets:

- Roblin Boulevard (Eastbound and Westbound lanes) from Assiniboine Park Drive to Shaftesbury Boulevard – twenty eight (28) locations.
- Assiniboine Park Drive from Roblin Boulevard to Commissary Road (within Assiniboine Park) – ten (10) locations.

The geotechnical investigation field work and laboratory program was conducted in accordance with the City of Winnipeg Geotechnical Investigation requirements for Public Works Projects (September 2015).

2.0 Scope of Work

The scope of work for the project was as follows:

- Clear all underground services at the test hole locations.
- Maintain at least one (1) lane of traffic, and adhering to the Manual of Temporary Traffic Control.
- Core a total of 38 holes through the existing pavement structure at the two locations previous mentioned using a 150 mm diameter core barrel, and retain the cores for measurements and photographs.
- Drill 125 mm diameter test holes to a depth near 2 m below the surface of the pavement structure, and classify the underlying soils and collect samples from the auger flights at regular intervals, and retain the samples for laboratory testing.

- A laboratory testing program consisting of moisture contents, Atterberg Limits and particle size analyses on select samples.
- A report outlining the work conducted, including a test hole summary table with the laboratory test results, a site plan showing the test holes location, UTM coordinates, photographs, and test hole summary logs.

3.0 Field Program

ENG-TECH conducted the coring and test hole drilling program on November 2nd to 8th, 2017 at Roblin Boulevard (Eastbound and Westbound) from Assiniboine Park Drive to Shaftesbury Boulevard and on November 9th, 2017 at Assiniboine Park Drive (from Roblin Boulevard to Commissary Road). The cores were obtained using a 150 mm diameter core barrel owned and operated by ENG-TECH, whereas the test holes were drilled using a 125 mm diameter solid stem continuous flight augers using a CME truck mounted drill rig owned and operated by Subterranean Manitoba Ltd. The test holes were advanced to 2 m below the pavement structure on the streets mentioned above at the locations shown in Figures 1 to 6. Soil samples were collected off the auger flights at regular depth intervals and at 0.1, 0.4, 0.7, 1.0, 1.3, 1.6, and 1.9 m stratigraphic changes, as specified in geotechnical investigation requirements for the City of Winnipeg Public Works Project (September 2015) and then the test holes were backfilled with soil auger cuttings, then a compacted cold mix asphalt was placed upon the completion of drilling. The core thicknesses and stratigraphy at the location of the test holes are outlined on Tables 1 and 2, and the attached test hole summary logs, with the test holes location and UTM coordinates shown on Figures 1 to 6.

4.0 Laboratory Program

The soil samples collected and the pavement structure cores were retained for testing in ENG-TECH'S laboratory. The moisture content of each sample was determined and select samples were tested for Particle Size and Atterberg Limits. The pavement structure core thicknesses were measured and photographed. The moisture content, particle size and Atterberg Limit test results are summarized on Tables 1 and 2, with a photograph of each core and test hole summary logs attached.

5.0 Closure

ENG-TECH trusts this is all the information required. If you have any questions, please contact the undersigned.

Sincerely,
ENG-TECH Consulting Limited



Paula Filizzola Pinheiro Chagas
B.Sc. (C.E.), B.Sc. (Enviro. E.)
Engineering Department

CDH/pfpc



Clark Hryhoruk, M.Sc., P.Eng.
Principal, Geotechnical Engineer

Attachments: Table 1 – Summary of Pavement Structure – Roblin Boulevard: From Assiniboine Park Dr to Shaftesbury Blvd.
Table 2 – Summary of Pavement Structure – Assiniboine Park Drive: From Roblin Blvd to Commissary Road
Figure 1 – Test Hole Location Plan – Roblin Blvd. (Westbound TH1 to TH4) (Eastbound TH15 to TH18)
Figure 2 – Test Hole Location Plan – Roblin Blvd. (Westbound TH5 to TH8) (Eastbound TH19 to TH22)
Figure 3 – Test Hole Location Plan – Roblin Blvd. (Westbound TH9 to TH11) (Eastbound TH23 to TH25)
Figure 4 – Test Hole Location Plan – Roblin Blvd. (Westbound TH12 to TH14) (Eastbound TH26 to TH28)
Figure 5 – Test Hole Location Plan – Assiniboine Park Dr, From Roblin Blvd to Commissary Rd (TH29 to TH33)
Figure 6 – Test Hole Location Plan – Assiniboine Park Dr, From Roblin Blvd to Commissary Rd (TH34 to TH33)
Modified Unified Classification System for Soils
Test Hole Summary Logs (38 pages)
Particle Size Analysis (9 pages)
Photograph of Cores (14 pages)



Table 1 - Summary of Pavement Structure

Roblin Boulevard: From Assiniboine Park Drive to Shaftesbury Boulevard

Test Hole Number	Test Hole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits				
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index		
5	Roblin Blvd Westbound	Asphalt	112	Granular Fill (20 to 50 mm)	701	Granular Fill	0.1	12.1									
							0.4	11.9									
							0.7	10.7									
		Concrete	188	Clay	1.0	26.9											
					1.3	38.1											
					1.6	42.0											
							1.9	42.3									
6	Roblin Blvd Westbound	Asphalt	110	Granular Fill (20 to 50 mm)	701	Granular Fill	0.1	11.3									
							0.4	11.5									
							0.7	12.1	13.7	48.2	23.7	14.4	25	14		11	
		Concrete	197	Clay	1.0	34.0											
					1.3	37.2											
					1.6	42.6											
							1.9	44.0									

Test Hole Number	Test Hole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits				
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index		
13	Roblin Blvd Westbound	Asphalt	53	Granular Fill (20 to 50 mm)	254	Granular Fill	0.1	10.9									
							0.4	34.5									
							0.7	34.3									
		Concrete	200	Clay	1.0	38.4											
					1.3	54.1											
					1.6	42.2											
						1.9	44.2										
14	Roblin Blvd Westbound	Asphalt	72	Granular Fill (20 to 50 mm)	305	Granular Fill	0.1	5.9									
							0.4	15.7									
							0.7	36.6									
		Concrete	200	Clay	1.0	35.0	0.0	2.9	9.6	87.5	84	25	59				
					1.3	38.2											
					1.6	41.2											
						1.9	45.6										

Table 1 - Summary of Pavement Structure
 Roblin Boulevard: From Assiniboine Park Drive to Shaftesbury Boulevard

Test Hole Number	Test Hole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits						
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index				
17	Roblin Blvd Eastbound	Asphalt	40	Granular Fill (20 to 50 mm)	102	Clay Fill	0.1	25.5											
							0.4	27.3											
		Concrete	204			Clay	0.7	31.3											
							1.0	34.0											
							1.3	46.7											
							1.6	44.4											
18	Roblin Blvd Eastbound	Asphalt	53	Granular Fill (20 to 50 mm)	203	Granular Fill	0.1	12.9											
							0.4	13.6											
		Concrete	197			Clay	0.7	33.9											
							1.0	37.2											
							1.3	39.4											
						1.6	43.7												
						1.9	49.8												

Test Hole Number	Test Hole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits			
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
27	Roblin Blvd Eastbound	Asphalt	0	Granular Fill (20 to 50 mm)	965	Granular Fill	0.1	10.2								
							0.4	7.8								
							0.7	8.1								
		Concrete	243			Clay	1.0	19.2	14.7	19.0	48.9	17.4	32	17	15	
							1.3	28.6								
							1.6	39.1								
28	Roblin Blvd Eastbound	Asphalt	0	Granular Fill (20 to 50 mm)	711	Granular Fill	0.1	13.8								
							0.4	8.2								
							0.7	29.6								
		Concrete	204			Clay	1.0	35.8								
							1.3	37.1								
							1.6	42.0								

Notes:

No water seepage was encountered in the test holes.
 Test Holes (TH15 to TH28) on Eastbound at Roblin Boulevard were drilled along the curb lane due the existing lane closure for Aquarehab on the east side of Roblin Boulevard.
 Most of the test holes located at Roblin Boulevard (Eastbound) did not contain significant amount of granular material.

Table 2 - Summary of Pavement Structure
Assiniboine Park Drive: From Roblin Boulevard to Commissary Road

Test Hole Number	Test Hole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis			Atterberg Limits				
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
37	Assiniboine Park Drive	Asphalt	72	Granular Fill (20 mm)	229	Clay	0.1	9.4								
							0.4	32.1								
		Concrete	0			Clayey Silt	0.7	32.5	0.0	1.8	53.1	45.1	72	25	47	
							1.0	33.3								
							1.3	33.3								
							1.6	31.6								
38	Assiniboine Park Drive	Asphalt	72	Granular Fill (20 mm)	229	Clay	0.1	10.8								
							0.4	25.9								
		Concrete	0			Clay	0.7	33.4								
							1.0	35.3								
							1.3	35.5								
							1.6	37.0								
1.9	39.0															

Notes:

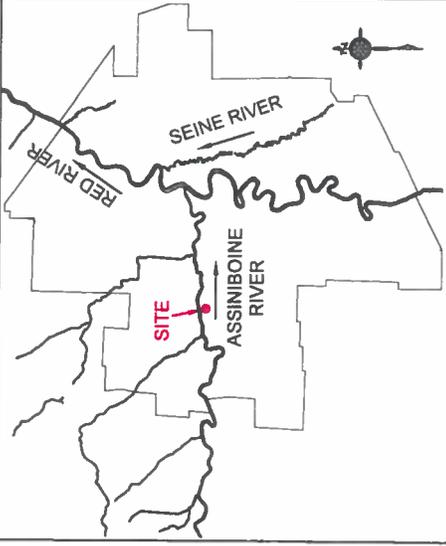
No water seepage was encountered in the test holes.

TEST HOLE No.	OFFSET OF TEST HOLES ROBLIN BLVD - WESTBOUND
TH1	1.65 m FROM CURB LANE
TH2	1.5 m FROM MEDIAN LANE
TH3	1.3 m FROM CURB LANE
TH4	1.5 m FROM MEDIAN LANE

TEST HOLE No.	OFFSET OF TEST HOLES ROBLIN BLVD - EASTBOUND
TH15	2.4 m FROM CURB LANE
TH16	1.6 m FROM CURB LANE
TH17	1.9 m FROM CURB LANE
TH18	1.74 m FROM CURB LANE

CORING AND TEST HOLE LOCATION TABLE ROBLIN BLVD - WESTBOUND	
TH #	GPS COORDINATES NOVEMBER, 2017
	UTM
1	5525426 0625929
2	5525416 0626037
3	5525416 0626115
4	5525405 0626214

CORING AND TEST HOLE LOCATION TABLE ROBLIN BLVD - EASTBOUND	
TH #	GPS COORDINATES NOVEMBER, 2017
	UTM
15	5525414 0625927
16	5525404 0626036
17	5525403 0626114
18	5525393 0626213

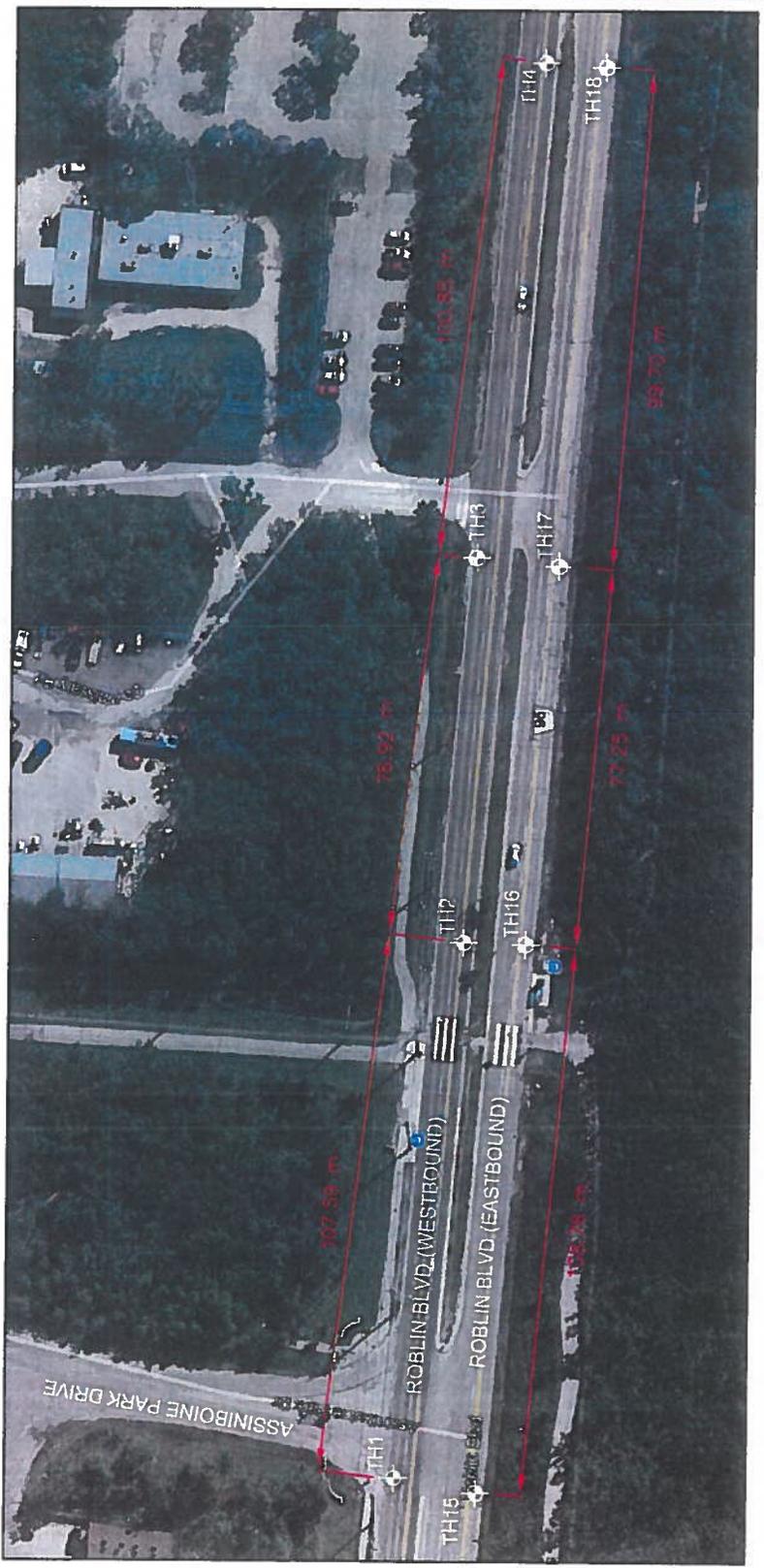


KEYMAP

LEGEND

TH1

TEST HOLE



NO.	DATE	ISSUE / REVISION
1	Jan. 2018	revision
0	Nov. 2017	report



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CLIENT:	CITY OF WINNIPEG
PROJECT:	GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTIONS
DWG DESCRIPTION:	TEST HOLE LOCATION PLAN - ROBLIN BOULEVARD (WESTBOUND TH1 TO TH4) (EASTBOUND TH15 TO TH18)
SCALE:	NTS
DRAWN BY:	DATE: NOVEMBER 2017
FILE No.:	CLIENT DWG/FIG. No.:
17-037-03	
ENG-TECH DWG/FIG. No.:	
1 OF 6	

TEST HOLE No.	OFFSET OF TEST HOLES ROBLIN BLVD - WESTBOUND
TH5	1.55 m FROM CURB LANE
TH6	1.3 m FROM MEDIAN LANE
TH7	1.4 m FROM CURB LANE
TH8	1.6 m FROM MEDIAN LANE

CORING AND TEST HOLE LOCATION TABLE ROBLIN BLVD - WESTBOUND	
TH #	GPS COORDINATES NOVEMBER, 2017
	UTM 14U
5	5525403 0626314
6	5525392 0626422
7	5525392 0626514
8	5525384 0626600

TEST HOLE No.	OFFSET OF TEST HOLES ROBLIN BLVD - EASTBOUND
TH19	1.4 m FROM CURB LANE
TH20	1.6 m FROM CURB LANE
TH21	1.35 m FROM CURB LANE
TH22	1.75 m FROM CURB LANE

CORING AND TEST HOLE LOCATION TABLE ROBLIN BLVD - EASTBOUND	
TH #	GPS COORDINATES NOVEMBER, 2017
	UTM 14U
19	5525391 0626312
20	5525381 0626421
21	5525381 0626510
22	5525374 0626609

LEGEND
TH8 TEST HOLE



NO.	DATE	ISSUE / REVISION
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0	Nov. 2017	



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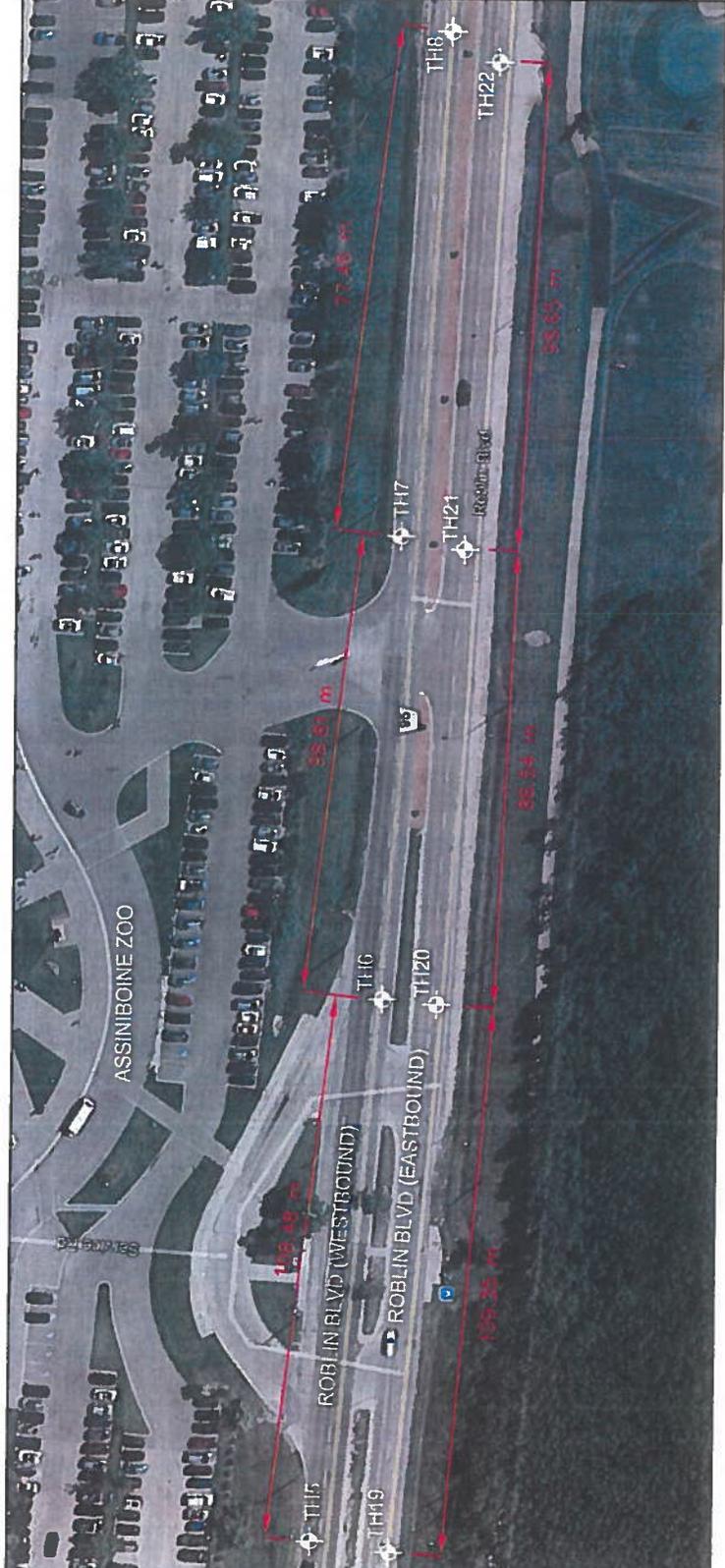
CLIENT:
CITY OF WINNIPEG

PROJECT:
GEOTECHNICAL INVESTIGATION -
2018 STREET RECONSTRUCTIONS

DWG DESCRIPTION:
TEST HOLE LOCATION PLAN -
ROBLIN BOULEVARD
(WESTBOUND TH5 TO TH8)
(EASTBOUND TH19 TO TH22)

SCALE:
NTS
DRAWN BY:
PFPC
DATE:
NOVEMBER 2017
FILE No.:
17-037-03
CLIENT DWG/FIG. No.:

ENG-TECH DWG/FIG. No.
2 OF 4
NO. 1

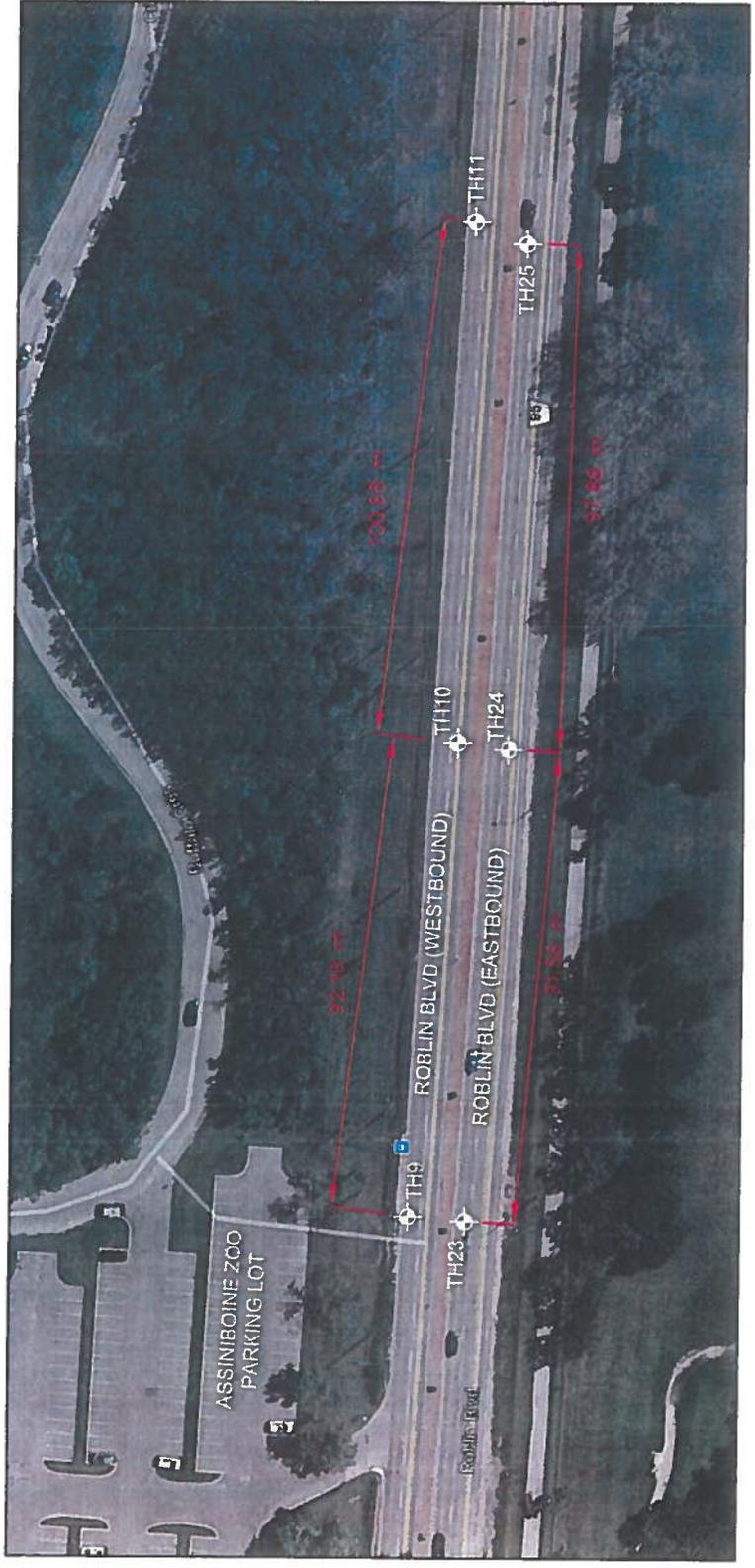


TEST HOLE No.	OFFSET OF TEST HOLES ROBLIN BLVD - WESTBOUND
TH9	1.5 m FROM CURB LANE
TH10	1.4 m FROM MEDIAN LANE
TH11	1.8 m FROM CURB LANE

CORING AND TEST HOLE LOCATION TABLE ROBLIN BLVD - WESTBOUND	
TH #	GPS COORDINATES NOVEMBER, 2017
9	UTM 14U 5525385 0626717
10	5525377 0626809
11	5525378 0626910

TEST HOLE No.	OFFSET OF TEST HOLES ROBLIN BLVD - EASTBOUND
TH23	1.6 m FROM CURB LANE
TH24	1.6 m FROM CURB LANE
TH25	1.8 m FROM CURB LANE

CORING AND TEST HOLE LOCATION TABLE ROBLIN BLVD - EASTBOUND	
TH #	GPS COORDINATES NOVEMBER, 2017
23	UTM 14U 5525374 0626716
24	5525368 0626808
25	5525368 0626906



LEGEND
 TH11 TEST HOLE



NO.	DATE	ISSUE / REVISION
1	Jan. 2018	revision report
0	Nov. 2017	



CLIENT: CITY OF WINNIPEG
 PROJECT: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTIONS
 DWG DESCRIPTION: TEST HOLE LOCATION PLAN - ROBLIN BOULEVARD (WESTBOUND TH9 TO TH11) (EASTBOUND TH23 TO TH25)
 SCALE: NTS
 DRAWN BY: PFPC
 DATE: NOVEMBER 2017
 FILE No.: 17-037-03
 CLIENT DWG/FIG. No.:
 ENG-TECH DWG/FIG. No.:
 NO.:

LEGEND



CORING AND TEST HOLE LOCATION TABLE ASSINIBOINE PARK DRIVE		
TH #	GPS COORDINATES NOVEMBER, 2017	
	UTM	14U
29	5525498	0625948
30	5525554	0625961
31	5525614	0625948
32	5525667	0625914
33	5525722	0625879

TEST HOLE No.	OFFSET OF TEST HOLES ASSINIBOINE PARK DRIVE
TH29	4.3 m FROM NORTHBOUND CURB
TH30	4.6 m FROM SOUTHBOUND CURB
TH31	4.3 m FROM SOUTHBOUND CURB
TH32	4.0 m FROM SOUTHBOUND CURB
TH33	3.9 m FROM SOUTHBOUND CURB



NO.	DATE	ISSUE / REVISION
1	JAN. 2018	report
0	Nov. 2017	report



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CLIENT: CITY OF WINNIPEG
PROJECT: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTIONS

DWG DESCRIPTION: TEST HOLE LOCATION PLAN - ASSINIBOINE PARK DRIVE, FROM ROBLIN BLVD TO COMMISSARY RD (TH29 TO TH33)

SCALE: NTS
DRAWN BY: PFPC
DATE: NOVEMBER 2017
FILE No.: 17-037-03
CLIENT DWG/FIG. No.:
ENG-TECH DWG/FIG. No.: 5 OF 6
NO.: 1

TEST HOLE No.	OFFSET OF TEST HOLES ASSINIBOINE PARK DRIVE
TH34	3.9 m FROM SOUTHBOUND CURB
TH35	1.8 m FROM NORTHBOUND CURB
TH36	4.7 m FROM SOUTHBOUND CURB
TH37	1.7 m FROM SOUTHBOUND CURB LANE
TH38	1.6 m FROM SOUTHBOUND MEDIAN LANE

CORING AND TEST HOLE LOCATION TABLE ASSINIBOINE PARK DRIVE		GPS COORDINATES NOVEMBER, 2017	
TH #	UTM	14U	
34	5525780	0625853	
35	5525838	0625867	
36	5525881	0625908	
37	5525907	0625964	
38	5525913	0626024	



LEGEND
 TH34 TEST HOLE



NO.	DATE	ISSUE / REVISION
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0	NOV. 2017	report

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ENG STAMP:

CLIENT: CITY OF WINNIPEG

PROJECT: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTIONS

DWG DESCRIPTION: TEST HOLE LOCATION PLAN - ASSINIBOINE PARK DRIVE, FROM ROBLIN BLVD TO COMMISSARY RD (TH34 TO TH38)

SCALE: NTS	DATE: NOVEMBER 2017
DRAWN BY: PFPC	CLIENT DWG/FIG. No.:
FILE No.: 17-037-03	
ENG-TECH DWG/FIG. No.:	No.:

MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS

MAJOR DIVISION		GROUP SYMBOL	GRAPH SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA			
COARSE GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 75 µm)	GRAVELS MORE THAN HALF THE COARSE FRACTION LARGER THAN 4.75 mm	CLEAN GRAVELS (TRACE OR NO FINES)	GW	[Symbol]	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	$C_u = \frac{D_{60}}{D_{10}} > 4$; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ TO } 3$		
			GP	[Symbol]	POORLY GRADED GRAVELS, GRAVEL- SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS		
		DIRTY GRAVELS (WITH SOME OR MORE FINES)	GM	[Symbol]	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I. LESS THAN 4		
			GC	[Symbol]	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	ATTERBERG LIMITS ABOVE "A" LINE AND P.I. MORE THAN 7		
	SANDS MORE THAN HALF THE COARSE FRACTION SMALLER THAN 4.75 mm	CLEAN SANDS (TRACE OR NO FINES)	SW	[Symbol]	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_u = \frac{D_{60}}{D_{10}} > 6$; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ TO } 3$		
			SP	[Symbol]	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS		
		DIRTY SANDS (WITH SOME OR MORE FINES)	SM	[Symbol]	SILTY SANDS, SAND-SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I. LESS THAN 4		
			SC	[Symbol]	CLAYEY SANDS, SAND-CLAY MIXTURES	ATTERBERG LIMITS ABOVE "A" LINE AND P.I. MORE THAN 7		
		FINE GRAINED SOILS (MORE THAN HALF BY WEIGHT SMALLER THAN 75 µm)	SILTS BELOW "A" LINE NEGLECTIBLE ORGANIC CONTENT	LL ≤ 50%	ML	[Symbol]	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHTY PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (SEE BELOW)
				LL > 50%	MH	[Symbol]	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS	
CLAYS ABOVE "A" LINE NEGLECTIBLE ORGANIC CONTENT	LL ≤ 30%		CL	[Symbol]	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY OR SILTY CLAYS, LEAN CLAYS			
	30% < LL ≤ 50%		CI	[Symbol]	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS			
	LL > 50%		CH	[Symbol]	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS			
ORGANIC SILTS & CLAYS BELOW "A" LINE	LL < 50%		OL	[Symbol]	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY			
	LL > 50%	OH	[Symbol]	ORGANIC CLAYS OF HIGH PLASTICITY				
HIGHLY ORGANIC SOILS		PI	[Symbol]	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOUR OR ODOUR, AND OFTEN FIBROUS TEXTURE			

ADDITIONAL SYMBOLS

TILL	[Symbol]	SANDSTONE	[Symbol]
FILL	[Symbol]	GRANITE	[Symbol]
TOPSOIL	[Symbol]		
CONCRETE	[Symbol]		
SHALE	[Symbol]		
LIMESTONE	[Symbol]		

PLASTIC SOILS

MOISTURE	PLASTICITY	INTRUSIONS	CONSISTENCY	POCKET PEN (TSF)	(N)
DRY	LOW	ROOTLETS	VERY SOFT		< 2
DAMP	MEDIUM	OXIDES	SOFT	0 - 0.5	2 - 4
MOIST	HIGH	MICA	FIRM	0.5 - 1.0	4 - 8
WET		GYPHUM	STIFF	1.0 - 2.0	8 - 15
		ETC.	VERY STIFF	2.0 - 4.0	15 - 30
			HARD	> 4.0	> 30

$TSF \times 95.8 = kPa (q_u)$ $S_u = \frac{1}{2} \times q_u$

SOIL DESCRIPTIONS

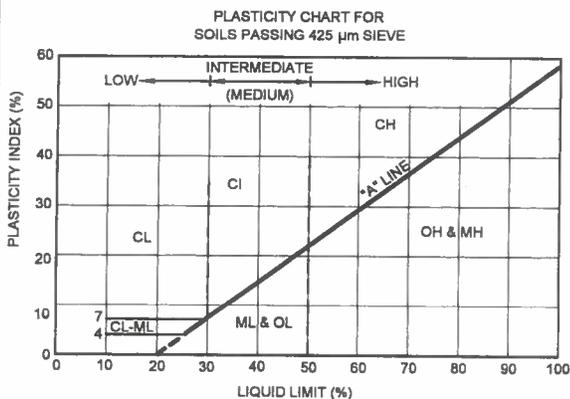
TRACE: 0 - 10%	BOULDERS: > 200 mm	COARSE SAND: 2 - 4.75 mm
SOME: 10 - 20%	COBBLES: 75 - 200 mm	MEDIUM SAND: 0.425 - 2 mm
WITH: 20 - 35%	COURSE GRAVEL: 19 - 75 mm	FINE SAND: 0.075 - 0.425 mm
AND: 35 - 50%	FINE GRAVEL: 4.75 - 19 mm	FINES: < 0.075 mm

GRANULAR SOILS

MOISTURE	DENSITY	GRADATION	INTRUSIONS	SPT (N)
DRY	VERY LOOSE	POORLY	ROOTLETS	0 - 4
DAMP	LOOSE	WELL	OXIDES	4 - 10
MOIST	MED. DENSE		MICA	10 - 30
WET	DENSE		FINES	30 - 50
	VERY DENSE		ETC.	> 50

DEFINITIONS

LL = LIQUID LIMIT C_c = COMPRESSION INDEX
 P.I. = PLASTICITY INDEX PL = PLASTIC LIMIT
 C_u = COEFFICIENT OF UNIFORMITY
 q_u = UNCONFINED COMPRESSIVE STRENGTH
 S_u = UNDRAINED SHEAR STRENGTH



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Test Hole #: TH1
 Client: City of Winnipeg
 Site: See Figure 1

File No.: 17-037-03
 Date Drilled: November 6, 2017
 Grade Elevation: 100.0 m
 Water Elevation: -

Engineering And Testing
 Solutions That Work For You

Location: Roblin Boulevard (Westbound)
 Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (86 mm)									
		Concrete (214 mm)									
		Granular Fill (305 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained, some clay.		S1	Shelby Tube	22.6					
				S2	Shelby Tube	33.8					
		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S3	Shelby Tube	39.9					
1.0		Silty Clay (CH) - medium brown, moist, soft, highly plastic, trace gravel & sand, and silt.	99.0	S4	Shelby Tube	39.4					
		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.		S5	Shelby Tube	47.3					
				S6	Shelby Tube	57.5					
2.0			98.0	S7	Shelby Tube	57.7					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CS*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH2
Client: City of Winnipeg

File No.: 17-037-03
Date Drilled: November 6, 2017

Engineering And Testing
Solutions That Work For You

Site: See Figure 1
Location: Roblin Boulevard (Westbound)

Grade Elevation: 100.0 m
Water Elevation: -

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (78 mm)									
		Concrete (192 mm)									
		Granular Fill (343 mm) - medium brown, moist, medium dense, poorly graded, fined grained.		S1	S	12.2					
		Clay Fill (Cl) - dark brown, moist, firm, medium plastic, some to with gravel.		S2	S	15.7					
1.0		Clay (Cl) - dark brown, moist, firm, medium plastic, trace silt.	99.0	S3	S	30.0					
				S4	S	33.4					
				S5	S	43.6					
2.0			98.0	S6	S	46.2					
				S7	S	55.9					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH3
Client: City of Winnipeg

File No.: 17-037-03
Date Drilled: November 2, 2017

Engineering And Testing
Solutions That Work For You

Site: See Figure 1
Location: Roblin Boulevard (Westbound)

Grade Elevation: 100.0 m
Water Elevation: --

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

SUBSURFACE PROFILE				SAMPLE DATA				SHEAR STRENGTH (kPa)			
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (115 mm)									
		Concrete (185 mm)									
		Granular Fill (305 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	Split Barrel	9.1					
		Clay Fill (CI) - dark brown, moist, firm, medium plastic, some to with gravel.		S2	Split Barrel	17.7					
1.0		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.	99.0	S3	Split Barrel	26.7					
		Clay (CH) - below 1.5 m, medium brown, medium plastic.		S4	Split Barrel	30.3					
				S5	Split Barrel	41.3					
2.0			98.0	S6	Split Barrel	42.2					
				S7	Split Barrel	54.4					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by:

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH4
 Client: City of Winnipeg
 Site: See Figure 1

File No.: 17-037-03
 Date Drilled: November 6, 2017
 Grade Elevation: 100.0 m
 Water Elevation: -

Engineering And Testing
 Solutions That Work For You

Location: Roblin Boulevard (Westbound)
 Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (90 mm)									
		Concrete (195 mm)									
		Granular Fill (318 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	Split Barrel	10.6					
		Clay Fill (CI) - black, moist, firm, medium plastic, trace silt and gravel.		S2	Split Barrel	19.1					
1.0		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.	99.0	S3	Split Barrel	32.3					
		- below 1.2 m, medium brown, medium plastic, trace silt.		S4	Split Barrel	36.6					
				S5	Split Barrel	40.6					
2.0			98.0	S6	Split Barrel	42.9					
				S7	Split Barrel	46.5					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CH*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH5
Client: City of Winnipeg
Site: See Figure 2

Location: Roblin Boulevard (Westbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 2, 2017

Grade Elevation: 100.0 m

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA				SHEAR STRENGTH (kPa)			
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (112 mm)									
		Concrete (188 mm)									
		Granular Fill (701 mm) - medium brown, moist, medium dense, poorly graded, medium to fined grained.		S1	█	12.1					
				S2	█	11.9					
1.0		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.	99.0	S3	█	10.7					
				S4	█	26.9					
				S5	█	38.1					
2.0			98.0	S6	█	42.0					
				S7	█	42.3					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by:

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH6
Client: City of Winnipeg
Site: See Figure 2

File No.: 17-037-03
Date Drilled: November 6, 2017
Grade Elevation: 100.0 m
Water Elevation: --

Engineering And Testing
Solutions That Work For You

Location: Roblin Boulevard (Westbound)
Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (110 mm)									
		Concrete (197 mm)									
		Granular Fill (701 mm)		S1	Split Barrel	11.3					
		- medium brown, moist, frozen, poorly graded, medium to fine grained, some clay & gravel, with silt, and sand.		S2	Split Barrel	11.5					
1.0		Clay (CH)	99.0	S3	Split Barrel	12.1					
		- dark brown, moist, firm, highly plastic, trace silt.		S4	Split Barrel	34.0					
				S5	Split Barrel	37.2					
2.0			98.0	S6	Split Barrel	42.6					
				S7	Split Barrel	44.0					
3.0		End of Test Hole	97.0								
		- end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.									
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CLT*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH7
Client: City of Winnipeg

File No.: 17-037-03
Date Drilled: November 2, 2017

Site: See Figure 2
Location: Roblin Boulevard (Westbound)

Grade Elevation: 100.0 m
Water Elevation: --

Engineering And Testing
Solutions That Work For You

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (46 mm)									
		Concrete (194 mm)									
		Granular Fill (978 mm)									
		- medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	Split Barrel	7.2					
				S2	Split Barrel	9.3					
1.0			99.0	S3	Split Barrel	9.4					
		Clay (CH)		S4	Split Barrel	34.4					
		- dark brown, moist, firm, highly plastic, trace silt.		S5	Split Barrel	38.0					
2.0			98.0	S6	Split Barrel	39.1					
				S7	Split Barrel	42.3					
3.0		End of Test Hole	97.0								
		- end of test hole at 3.0 m below grade.									
		- no sloughing or seepage encountered upon completion of drilling.									
		- test hole backfilled with bentonite and soil cuttings upon completion of drilling.									
		- pavement was patched with concrete grout upon completion of drilling.									
4.0			96.0								
5.0			95.0								

ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by:

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON

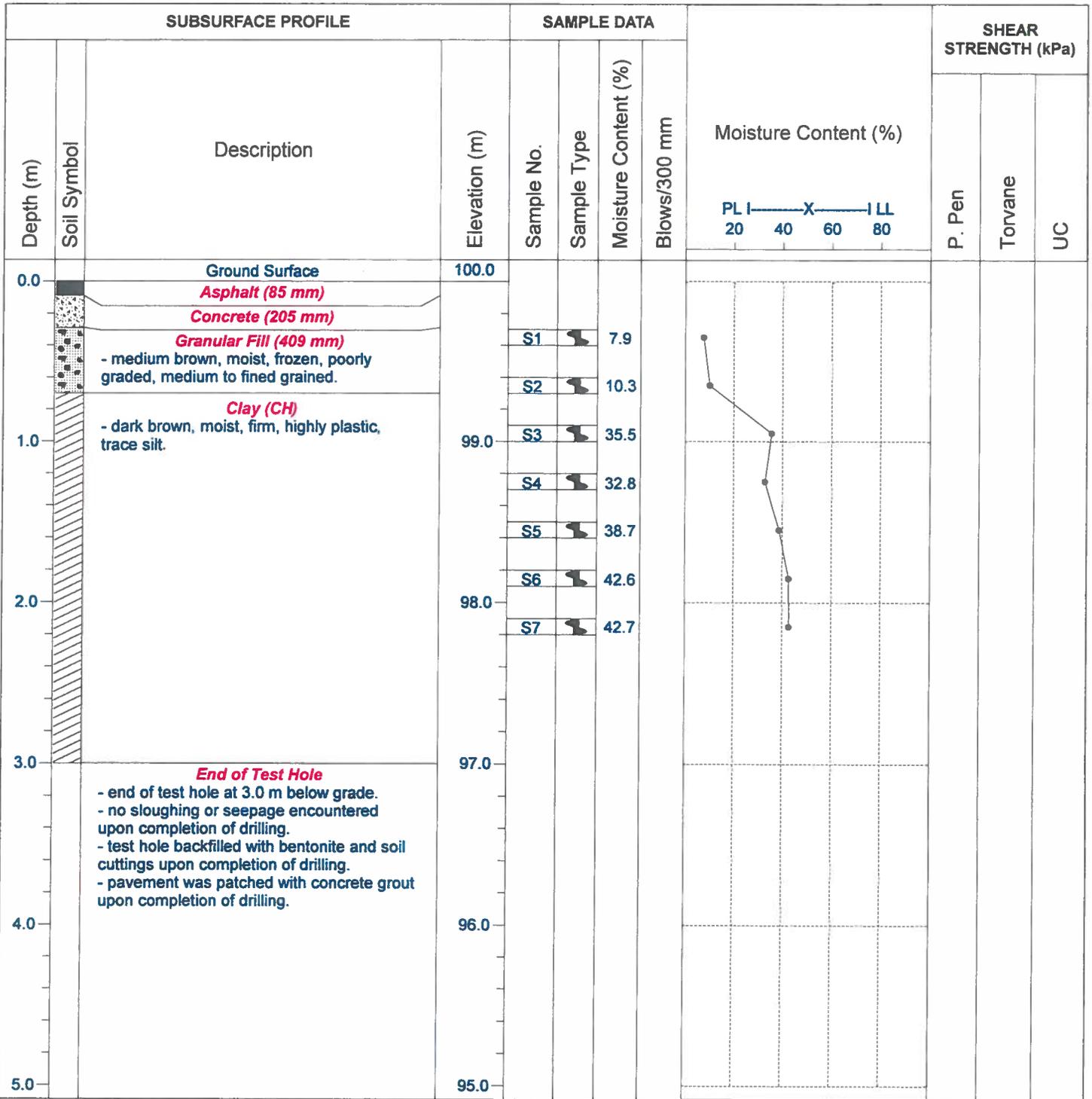


Test Hole #: TH8
 Client: City of Winnipeg
 Site: See Figure 2

File No.: 17-037-03
 Date Drilled: November 3, 2017
 Grade Elevation: 100.0 m
 Water Elevation: --

Engineering And Testing
 Solutions That Work For You

Location: Roblin Boulevard (Westbound)
 Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB



ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CHA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH9

Client: City of Winnipeg

Site: See Figure 3

Location: Roblin Boulevard (Westbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 2, 2017

Grade Elevation: 100.0 m

Water Elevation: --

Engineering And Testing Solutions That Work For You

SUBSURFACE PROFILE				SAMPLE DATA				SHEAR STRENGTH (kPa)			
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (86 mm)									
		Concrete (201 mm)									
		Granular Fill (940 mm)		S1	Split Barrel	7.3					
		- medium brown, moist, frozen, poorly graded, medium to fine grained.		S2	Split Barrel	7.3					
1.0			99.0	S3	Split Barrel	8.1					
		Clay (CH)		S4	Split Barrel	31.9					
		- dark brown, moist, firm, highly plastic, trace silt.		S5	Split Barrel	38.3					
2.0			98.0	S6	Split Barrel	39.2					
				S7	Split Barrel	41.5					
3.0		End of Test Hole	97.0								
		- end of test hole at 3.0 m below grade.									
		- no sloughing or seepage encountered upon completion of drilling.									
		- test hole backfilled with bentonite and soil cuttings upon completion of drilling.									
		- pavement was patched with concrete grout upon completion of drilling.									
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH10
Client: City of Winnipeg
Site: See Figure 3

File No.: 17-037-03
Date Drilled: November 3, 2017
Grade Elevation: 100.0 m
Water Elevation: --

Engineering And Testing
Solutions That Work For You

Location: Roblin Boulevard (Westbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (83 mm)									
		Concrete (196 mm)									
		Granular Fill (726 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	S	6.4					
				S2	S	6.5					
1.0		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.	99.0	S3	S	7.8					
				S4	S	34.4					
				S5	S	35.1					
				S6	S	36.3					
2.0			98.0	S7	S	43.2					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH11
 Client: City of Winnipeg
 Site: See Figure 3

File No.: 17-037-03
 Date Drilled: November 2, 2017
 Grade Elevation: 100.0 m
 Water Elevation: -

Engineering And Testing
 Solutions That Work For You

Location: Roblin Boulevard (Westbound)
 Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (62 mm)									
		Concrete (204 mm)									
		Granular Fill (739 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	S	17.5					
				S2	S	8.9					
1.0		Clay (CI) - dark brown, moist, firm, medium plastic, trace to some silt.	99.0	S3	S	8.0					
		Silty Clay (CI) - medium brown, moist, firm, medium plastic, with to and silt. - below 1.3 m, medium to light brown.		S4	S	27.4					
				S5	S	20.1					
				S6	S	24.0					
2.0		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.	98.0	S7	S	30.5					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH12

Client: City of Winnipeg

Site: See Figure 4

Location: Roblin Boulevard (Westbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 3, 2017

Grade Elevation: 100.0 m

Water Elevation: --

Engineering And Testing
Solutions That Work For You

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (77 mm)									
		Concrete (186 mm)									
		Granular Fill (343 mm) - medium brown, moist, frozen, poorly graded, medium to fine grained.		S1	▲	9.1					
		Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace silt and gravel.		S2	▲	8.1					
1.0		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.	99.0	S3	▲	16.5					
				S4	▲	32.1					
				S5	▲	34.1					
2.0			98.0	S6	▲	41.3					
				S7	▲	41.4					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME 75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE





Engineering And Testing
Solutions That Work For You

Test Hole #: TH13

Client: City of Winnipeg

Site: See Figure 4

Location: Roblin Boulevard (Westbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 3, 2017

Grade Elevation: 100.0 m

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA				SHEAR STRENGTH (kPa)			
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (53 mm)									
		Concrete (200 mm)									
		Granular Fill (254 mm)		S1	Split Barrel	10.9					
		- medium brown, moist, frozen, poorly graded, medium to fine grained.		S2	Split Barrel	34.5					
1.0		Clay (CH)	99.0	S3	Split Barrel	34.3					
		- dark brown, moist, firm, highly plastic, trace silt.		S4	Split Barrel	38.4					
				S5	Split Barrel	54.1					
2.0			98.0	S6	Split Barrel	42.2					
				S7	Split Barrel	44.2					
3.0		End of Test Hole	97.0								
		- end of test hole at 2.4 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.									
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: CA

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 2.4 m

Completion Elevation: 97.6 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH14

Client: City of Winnipeg

Site: See Figure 4

Location: Roblin Boulevard (Westbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 3, 2017

Grade Elevation: 100.0 m

Water Elevation: --

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (72 mm)									
		Concrete (200 mm)									
		Granular Fill (305 mm) - medium brown, moist, medium dense, poorly graded, medium to fined grained.		S1	▲	5.9					
		Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace silt and gravel.		S2	▲	15.7					
1.0		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt & sand.	99.0	S3	▲	36.6					
				S4	▲	35.0					
				S5	▲	38.2					
2.0			98.0	S6	▲	41.2					
				S7	▲	45.6					
3.0		End of Test Hole - end of test hole at 2.4 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 2.4 m

Completion Elevation: 97.6 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH15
Client: City of Winnipeg
Site: See Figure 1

Location: Roblin Boulevard (Eastbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 3, 2017

Grade Elevation: 100.0 m

Water Elevation: --

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)			
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)		
								PL	LL	UC
0.0		Ground Surface	100.0							
		Asphalt (80 mm)								
		Concrete (188 mm)								
		Granular Fill (267 mm)								
		- medium brown, moist, frozen, poorly graded, medium to fine grained.		S1	Split Barrel	13.9				
		Clay (CI)								
		- black, moist, firm, medium plastic, trace silt and gravel.		S2	Split Barrel	22.9				
1.0		Clayey Silt (CH)	99.0							
		- dark brown, moist, soft to firm, highly plastic, trace gravel & sand, and clay.		S3	Split Barrel	38.1				
		Clay (CH)								
		- dark brown, moist, firm, highly plastic, trace silt.		S4	Split Barrel	40.2				
				S5	Split Barrel	49.6				
				S6	Split Barrel	57.7				
				S7	Split Barrel	59.6				
2.0			98.0							
3.0		End of Test Hole	97.0							
		- end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.								
4.0			96.0							
5.0			95.0							

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by:

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SHELBY TUBE



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH16

Client: City of Winnipeg

Site: See Figure 1

Location: Roblin Boulevard (Eastbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 3, 2017

Grade Elevation: 100.0 m

Water Elevation: --

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (52 mm)									
		Concrete (194 mm)									
		Granular Fill (127 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	▲	19.8					
		Clay Fill (CI) - black, moist, firm, medium plastic, trace silt and gravel.		S2	▲	26.6					
1.0		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.	99.0	S3	▲	31.6					
		- below 1.5 m, medium brown, medium plastic, trace to some silt.		S4	▲	33.7					
		- below 1.8 m, dark brown, highly plastic.		S5	▲	40.1					
2.0			98.0	S6	▲	42.0					
				S7	▲	52.5					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH17
 Client: City of Winnipeg

File No.: 17-037-03
 Date Drilled: November 3, 2017

Site: See Figure 1

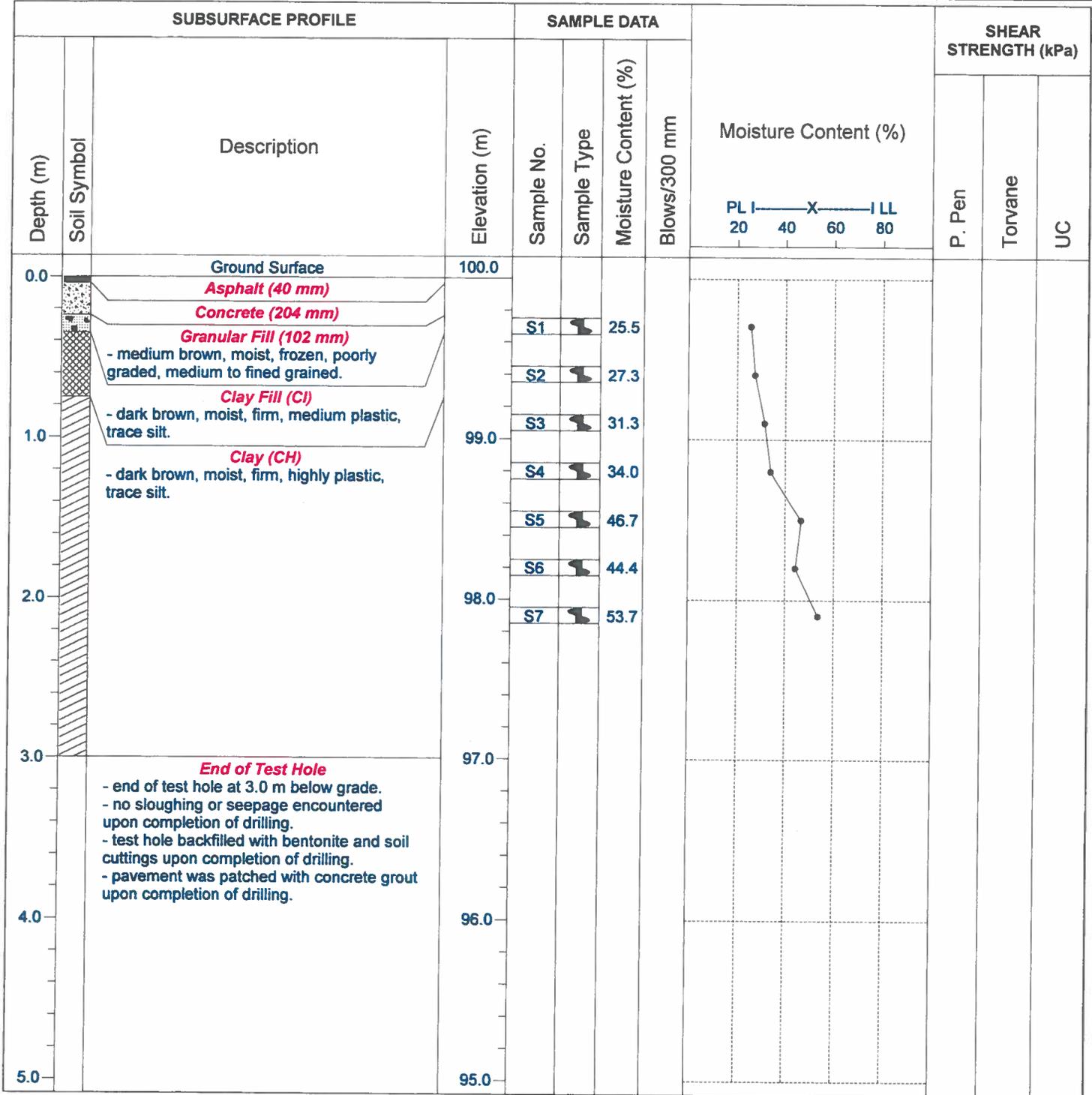
Grade Elevation: 100.0 m

Engineering And Testing
 Solutions That Work For You

Location: Roblin Boulevard (Eastbound)

Water Elevation: -

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB



ENG-TECH Consulting Limited
 Logged by: PFPC
 Reviewed by: *CA*

Drilled By: Subterranean Manitoba Ltd.
 Drill Rig: CME75
 Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m
 Completion Elevation: 97.0 m
 Sheet: 1 of 1

SAMPLE TYPE SPLIT BARREL SHELBY TUBE AUGER CUTTINGS SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH18
Client: City of Winnipeg
Site: See Figure 1

Location: Roblin Boulevard (Eastbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 7, 2017

Grade Elevation: 100.0 m

Water Elevation: --

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (53 mm)									
		Concrete (197 mm)									
		Granular Fill (203 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	S	12.9					
		Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace silt and gravel.		S2	S	13.6					
1.0		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.	99.0	S3	S	33.9					
				S4	S	37.2					
				S5	S	39.4					
				S6	S	43.7					
2.0			98.0	S7	S	49.8					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by:

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH19

Client: City of Winnipeg

Site: See Figure 2

Location: Roblin Boulevard (Eastbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 7, 2017

Grade Elevation: 100.0 m

Water Elevation: -

Engineering And Testing
Solutions That Work For You

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	LL	X	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (59 mm)									
		Concrete (198 mm)									
		Granular Fill (102 mm) - medium brown, moist, frozen, poorly graded, medium to fine grained.		S1		12.9					
		Clay Fill (CI) - black, moist, firm, medium plastic, trace gravel, some silt.		S2		12.8					
1.0		Silty Clay (CI) - black, moist, firm, medium plastic, trace gravel, with sand, and silt.	99.0	S3		18.0					
		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S4		25.5					
				S5		35.5					
				S6		36.6					
2.0			98.0	S7		44.3					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by:

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH20

Client: City of Winnipeg

Site: See Figure 2

Location: Roblin Boulevard (Eastbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 7, 2017

Grade Elevation: 100.0 m

Water Elevation: --

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (126 mm)									
		Concrete (103 mm)									
		Granular Fill (102 mm) - medium brown, moist, medium dense, poorly graded, medium to fined grained.		S1	▲	21.2					
		Clay Fill (CI) - black, moist, firm, medium plastic, trace silt and gravel.		S2	▲	27.6					
1.0		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.	99.0	S3	▲	38.1					
				S4	▲	38.9					
				S5	▲	37.5					
				S6	▲	40.2					
2.0			98.0	S7	▲	43.4					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by:

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH21

Client: City of Winnipeg

Site: See Figure 2

Location: Roblin Boulevard (Eastbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 7, 2017

Grade Elevation: 100.0 m

Water Elevation: -

SUBSURFACE PROFILE				SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)				
								PL	X	LL	P. Pen	Torvane
0.0		Ground Surface	100.0									
		Asphalt (82 mm)										
		Concrete (185 mm)										
		Clay Fill (CI) - black, moist, firm, medium plastic, trace silt and gravel.		S1	Split Barrel	35.6						
				S2	Split Barrel	35.8						
1.0		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.	99.0	S3	Split Barrel	34.3						
				S4	Split Barrel	34.6						
				S5	Split Barrel	37.4						
2.0			98.0	S6	Split Barrel	39.3						
				S7	Split Barrel	41.4						
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0									
4.0			96.0									
5.0			95.0									

ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CHS*

Drilled By: **Subterranean Manitoba Ltd.**

Drill Rig: **CME75**

Auger Size: **125 mm Solid Stem**

Completion Depth: **3.0 m**

Completion Elevation: **97.0 m**

Sheet: **1 of 1**

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH22

Client: City of Winnipeg

Site: See Figure 2

Location: Roblin Boulevard (Eastbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 7, 2017

Grade Elevation: 100.0 m

Water Elevation: --

**Engineering And Testing
Solutions That Work For You**

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (73 mm)									
		Concrete (206 mm)									
		Granular Fill (102 mm)									
		- medium brown, moist, medium dense, poorly graded, medium to fined grained.		S1	Split Barrel	25.0					
		Clay Fill (CI)		S2	Split Barrel	42.7					
		- black, moist, medium plastic, trace gravel.		S3	Split Barrel	39.4					
1.0		Clay (CH)	99.0	S4	Split Barrel	32.1					
		- black, moist, firm, highly plastic, trace silt.		S5	Split Barrel	38.2					
		- below 1.0 m, medium brown.		S6	Split Barrel	39.6					
2.0			98.0	S7	Split Barrel	43.0					
3.0		End of Test Hole	97.0								
		- end of test hole at 3.0 m below grade.									
		- no sloughing or seepage encountered upon completion of drilling.									
		- test hole backfilled with bentonite and soil cuttings upon completion of drilling.									
		- pavement was patched with concrete grout upon completion of drilling.									
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by:

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH23

Client: City of Winnipeg

Site: See Figure 3

Location: Roblin Boulevard (Eastbound)

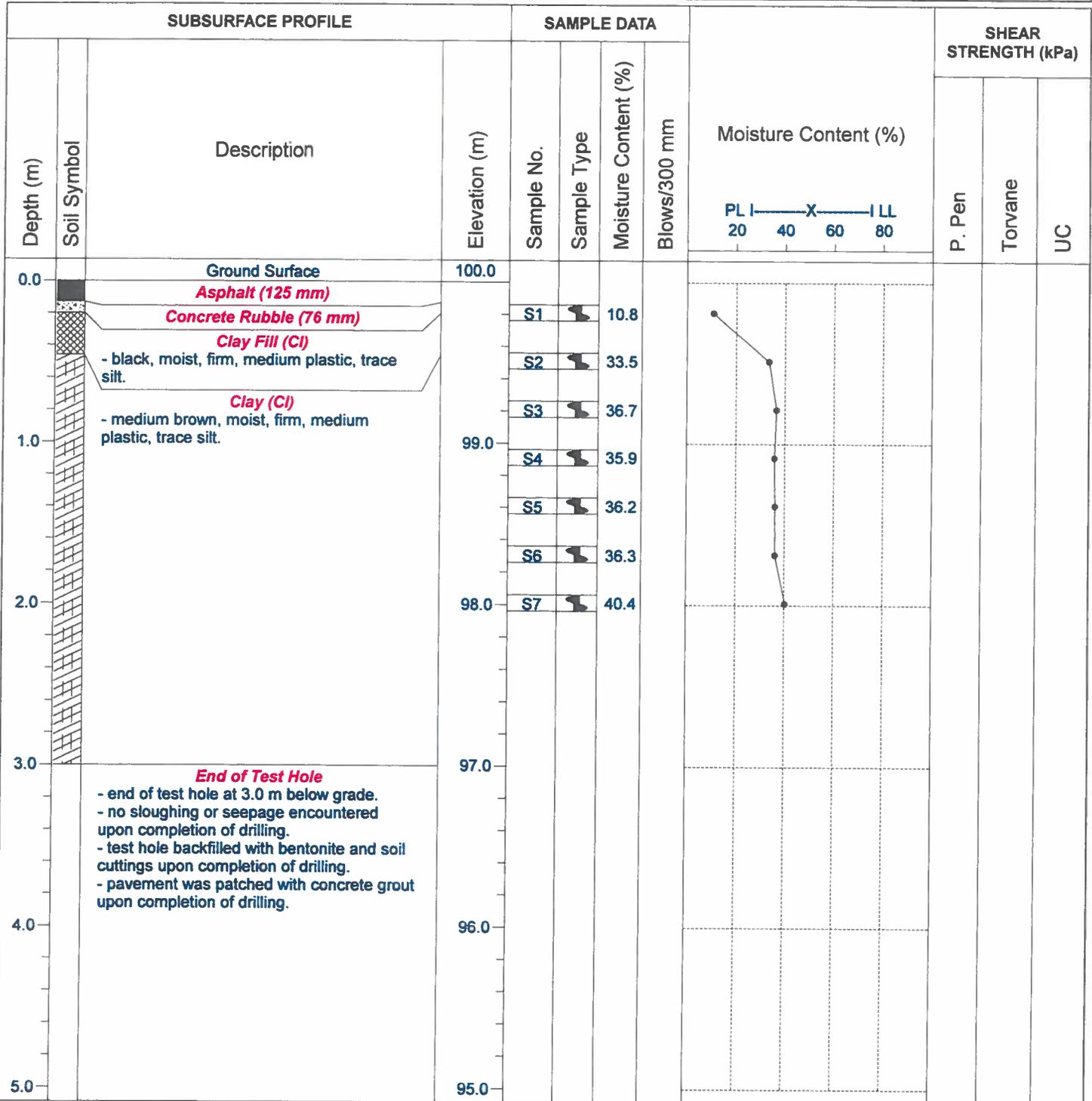
Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 7, 2017

Grade Elevation: 100.0 m

Water Elevation: --



ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH24

Client: City of Winnipeg

Site: See Figure 3

Location: Roblin Boulevard (Eastbound)

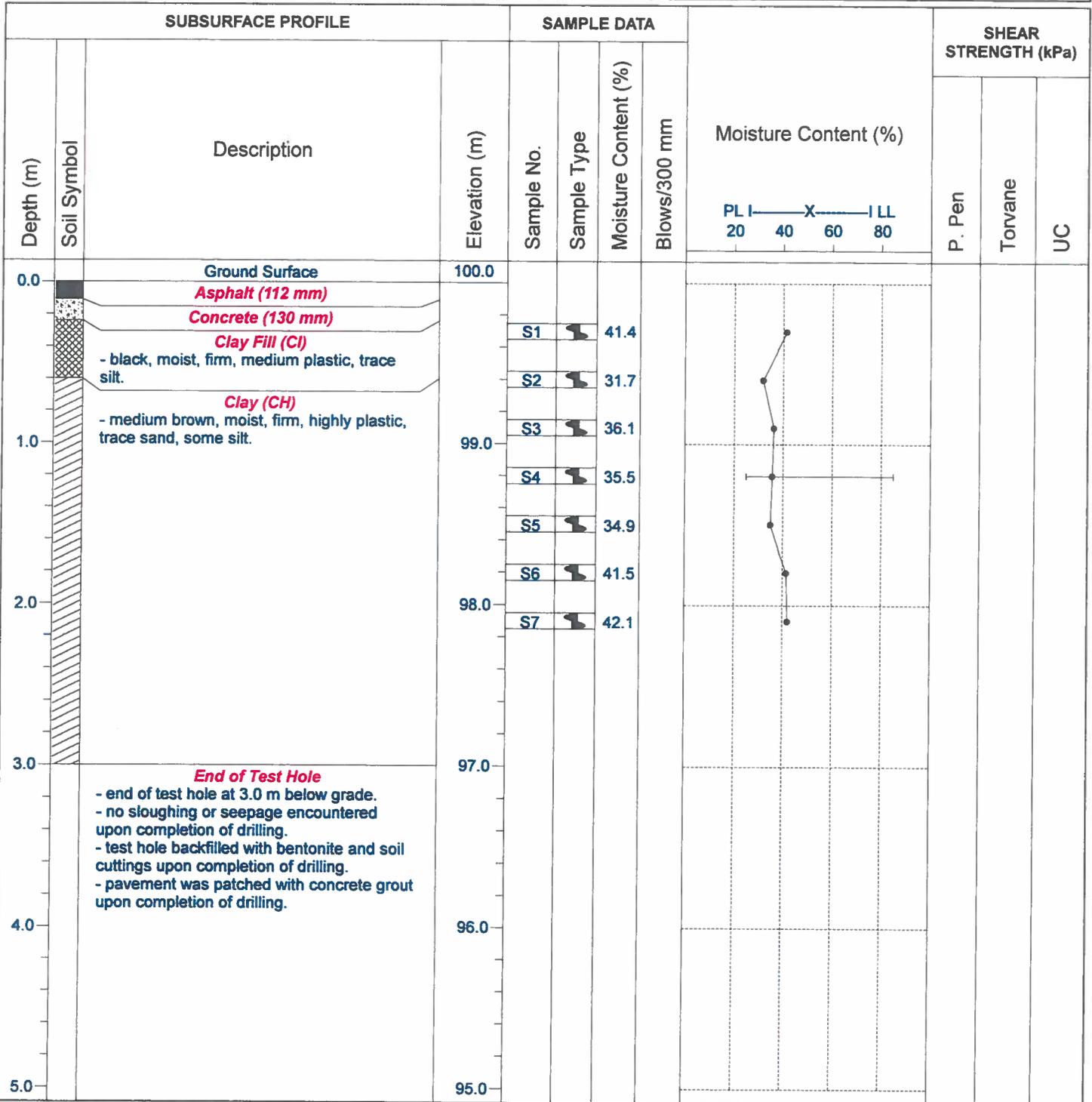
Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 7, 2017

Grade Elevation: 100.0 m

Water Elevation: --



ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CAA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE





Test Hole #: TH25

Client: City of Winnipeg

Site: See Figure 3

Location: Roblin Boulevard (Eastbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 8, 2017

Grade Elevation: 100.0 m

Water Elevation: -

**Engineering And Testing
Solutions That Work For You**

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (73 mm)									
		Concrete (143 mm)									
		Clay Fill (CI) - black, moist, firm, medium plastic, trace silt.		S1	S	33.2					
		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.		S2	S	34.7					
1.0			99.0	S3	S	35.8					
				S4	S	33.5					
				S5	S	37.1					
2.0			98.0	S6	S	42.7					
				S7	S	44.1					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by:

Drilled By: **Subterranean Manitoba Ltd.**

Drill Rig: **CME75**

Auger Size: **125 mm Solid Stem**

Completion Depth: **3.0 m**

Completion Elevation: **97.0 m**

Sheet: **1 of 1**

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH26

Client: City of Winnipeg

Site: See Figure 4

Location: Roblin Boulevard (Eastbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 8, 2017

Grade Elevation: 100.0 m

Water Elevation: --

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (68 mm)									
		Concrete (173 mm)									
		Clay Fill (CI)		S1	Split Barrel	37.1					
		- dark brown, moist, firm, medium plastic, trace silt.		S2	Split Barrel	35.6					
		Clay (CH)		S3	Split Barrel	39.2					
		- dark brown, moist, firm, highly plastic, trace silt.	99.0	S4	Split Barrel	37.0					
				S5	Split Barrel	40.7					
				S6	Split Barrel	39.4					
			98.0	S7	Split Barrel	45.7					
3.0		End of Test Hole	97.0								
		- end of test hole at 3.0 m below grade.									
		- no sloughing or seepage encountered upon completion of drilling.									
		- test hole backfilled with bentonite and soil cuttings upon completion of drilling.									
		- pavement was patched with concrete grout upon completion of drilling.									
4.0			96.0								
5.0			95.0								

ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CH*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH27
Client: City of Winnipeg
Site: See Figure 4

File No.: 17-037-03
Date Drilled: November 8, 2017
Grade Elevation: 100.0 m
Water Elevation: --

Engineering And Testing
Solutions That Work For You

Location: Roblin Boulevard (Eastbound)
Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface Concrete (243 mm)	100.0								
0.0 - 0.965		Granular Fill (965 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1		10.2					
0.965 - 1.8		Silty Clay (CI) - light brown, moist, soft, medium plastic, some gravel & sand, and silt.	99.0	S2		7.8					
1.8 - 2.0		Silty Clay (CI) - light brown, moist, soft, medium plastic, some gravel & sand, and silt.		S3		8.1					
2.0 - 2.18		Clay (CH) - light brown, moist, soft, medium plastic, some gravel & sand, and silt.		S4		19.2					
2.18 - 2.86		Clay (CH) - light brown, moist, soft, medium plastic, some gravel & sand, and silt.		S5		28.6					
2.86 - 3.0		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt. - below 1.8 m, dark brown.	98.0	S6		39.1					
3.0 - 3.18		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt. - below 1.8 m, dark brown.		S7		43.5					
3.0 - 3.18		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
3.18 - 4.0											
4.0 - 5.0											

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by:

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH28
Client: City of Winnipeg
Site: See Figure 4

Location: Roblin Boulevard (Eastbound)

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 8, 2017

Grade Elevation: 100.0 m

Water Elevation: --

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)					
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)				
								PL	X	LL	P. Pen	Torvane
0.0		Ground Surface	100.0									
		Concrete (204 mm)										
		Granular Fill (711 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	SHELBY TUBE	13.8						
				S2	SHELBY TUBE	8.2						
1.0		Clay (CH) -dark brown, moist, firm, highly plastic, trace silt.	99.0	S3	SHELBY TUBE	29.6						
				S4	SHELBY TUBE	35.8						
				S5	SHELBY TUBE	37.1						
2.0		-below 1.6 m, medium brown, some to with silt.	98.0	S6	SHELBY TUBE	42.0						
				S7	SHELBY TUBE	44.3						
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0									
4.0			96.0									
5.0			95.0									

ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by:

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH29

Client: City of Winnipeg

Site: See Figure 5

Location: Assinboine Park Drive

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 9, 2017

Grade Elevation: 100.0 m

Water Elevation: --

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (125 mm)									
		Granular Fill (305 mm) - medium brown, moist, poorly graded, medium to fined grained.		S1	█	10.5					
		Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace silt.		S2	█	30.9					
1.0		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.	99.0	S3	█	28.7					
				S4	█	30.9					
				S5	█	40.0					
				S6	█	41.1					
2.0			98.0	S7	█	48.8					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CAF*

Drilled By: **Subterranean Manitoba Ltd.**

Drill Rig: **CME75**

Auger Size: **125 mm Solid Stem**

Completion Depth: **3.0 m**

Completion Elevation: **97.0 m**

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH30
 Client: City of Winnipeg
 Site: See Figure 5

File No.: 17-037-03
 Date Drilled: November 9, 2017
 Grade Elevation: 100.0 m
 Water Elevation: -

Engineering And Testing
 Solutions That Work For You

Location: Assinboine Park Drive
 Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (157 mm)									
		Granular Fill (406 mm) - medium brown, moist, medium dense, poorly graded, medium to fine grained, and sand.		S1	Split Barrel	3.3					
				S2	Split Barrel	5.3					
		Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace to some silt.		S3	Split Barrel	22.4					
1.0		Clayey Silt (CI) - light brown, moist, soft to firm, medium plastic, trace sand, with clay.	99.0	S4	Split Barrel	22.9					
				S5	Split Barrel	21.8					
		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.		S6	Split Barrel	38.7					
2.0			98.0	S7	Split Barrel	42.7					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited
 Logged by: PFPC
 Reviewed by: *JA*

Drilled By: Subterranean Manitoba Ltd.
 Drill Rig: CME75
 Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m
 Completion Elevation: 97.0 m
 Sheet: 1 of 1

SAMPLE TYPE SPLIT BARREL SHELBY TUBE AUGER CUTTINGS SPLIT SPOON



Test Hole #: TH31

Client: City of Winnipeg

Site: See Figure 5

Location: Assinboine Park Drive

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 9, 2017

Grade Elevation: 100.0 m

Water Elevation: -

**Engineering And Testing
Solutions That Work For You**

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (77 mm)									
		Granular Fill (229 mm) - medium brown, moist, poorly graded, medium to fined grained.		S1	█	8.3					
		Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace to some silt.		S2	█	21.9					
				S3	█	27.3					
1.0		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.	99.0	S4	█	31.5					
				S5	█	40.0					
				S6	█	49.6					
2.0			98.0	S7	█	51.7					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CH*

Drilled By: **Subterranean Manitoba Ltd.**

Drill Rig: **CME75**

Auger Size: **125 mm Solid Stem**

Completion Depth: **3.0 m**

Completion Elevation: **97.0 m**

Sheet: **1 of 1**

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH32
Client: City of Winnipeg
Site: See Figure 5

File No.: 17-037-03
Date Drilled: November 9, 2017
Grade Elevation: 100.0 m
Water Elevation: -

**Engineering And Testing
 Solutions That Work For You**

Location: Assinboine Park Drive

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

SUBSURFACE PROFILE				SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)				
								PL	X	LL	P. Pen	Torvane
0.0		Ground Surface	100.0									
		Asphalt (76 mm)		S1	█	7.6						
		Granular Fill (229 mm) - medium brown, moist, poorly graded, medium to fined grained.		S2	█	25.5						
		Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace to some silt.		S3	█	29.6						
1.0			99.0	S4	█	33.6						
		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.		S5	█	40.5						
				S6	█	45.2						
2.0			98.0	S7	█	47.4						
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0									
4.0			96.0									
5.0			95.0									

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH33
 Client: City of Winnipeg
 Site: See Figure 5

File No.: 17-037-03
 Date Drilled: November 9, 2017
 Grade Elevation: 100.0 m
 Water Elevation: -

Engineering And Testing
 Solutions That Work For You

Location: Assinboine Park Drive
 Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (72 mm)		S1		5.1					
		Granular Fill (229 mm) - medium brown, moist, medium dense, poorly graded, medium to fine grained.		S2		27.0					
		Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace silt & gravel.		S3		29.2					
1.0			99.0	S4		24.0					
		Clay (CH) - medium brown, moist, firm, highly plastic, trace to some silt.		S5		36.8					
				S6		40.4					
2.0			98.0	S7		50.0					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CHA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH34
 Client: City of Winnipeg
 Site: See Figure 6
 Location: Assinboine Park Drive
 Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03
 Date Drilled: November 9, 2017
 Grade Elevation: 100.0 m
 Water Elevation: -

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (97 mm)		S1	Split Barrel	7.3					
		Granular Fill (203 mm) - medium brown, moist, medium dense, poorly graded, fined grained, trace clay, and sand.		S2	Split Barrel	21.0					
		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S3	Split Barrel	32.3					
1.0			99.0	S4	Split Barrel	36.0					
				S5	Split Barrel	41.6					
				S6	Split Barrel	42.8					
2.0			98.0	S7	Split Barrel	49.9					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

ENG-TECH Consulting Limited

Logged by: PFPC

Reviewed by: *CAA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH35

Client: City of Winnipeg

Site: See Figure 6

Location: Assinboine Park Drive

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 9, 2017

Grade Elevation: 100.0 m

Water Elevation: -

Engineering And Testing
Solutions That Work For You

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (96 mm)									
		Granular Fill (203 mm) - medium brown, moist, loose, poorly graded, fined grained, trace clay and sand.		S1	▲	8.5					
		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.		S2	▲	41.0					
				S3	▲	39.2					
1.0			99.0	S4	▲	42.5					
				S5	▲	50.7					
				S6	▲	50.1					
2.0			98.0	S7	▲	50.8					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

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Logged by: PFPC

Reviewed by:

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Test Hole #: TH36

Client: City of Winnipeg

Site: See Figure 6

Location: Assinboine Park Drive

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 9, 2017

Grade Elevation: 100.0 m

Water Elevation: --

Engineering And Testing Solutions That Work For You

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (76 mm)		S1	▲	10.9					
		Granular Fill (229 mm) - medium brown, moist, medium dense, poorly graded, fined grained, trace clay.		S2	▲	25.7					
		Clay (CI) - dark brown, moist, firm, medium plastic, trace silt.		S3	▲	33.0					
1.0		Clayey Silt (CI) - medium brown, moist, soft to firm, medium plastic, trace sand, with clay.	99.0	S4	▲	28.5					
				S5	▲	28.6					
				S6	▲	30.8					
2.0			98.0	S7	▲	30.5					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

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Logged by: PFPC

Reviewed by: *CA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH37

Client: City of Winnipeg

Site: See Figure 6

Location: Assinboine Park Drive

Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03

Date Drilled: November 9, 2017

Grade Elevation: 100.0 m

Water Elevation: -

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (72 mm)		S1	Split Barrel	9.4					
		Granular Fill (229 mm) - medium brown, moist, medium dense, poorly graded, fined grained, trace clay, and sand.		S2	Split Barrel	32.1					
		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S3	Split Barrel	32.5					
1.0		Clayey Silt (CH) - medium brown, moist, firm, highly plastic, trace sand, and clay.	99.0	S4	Split Barrel	33.3					
				S5	Split Barrel	33.3					
				S6	Split Barrel	31.6					
2.0			98.0	S7	Split Barrel	34.8					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

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Logged by: PFPC

Reviewed by: *CA*

Drilled By: **Subterranean Manitoba Ltd.**

Drill Rig: **CME75**

Auger Size: **125 mm Solid Stem**

Completion Depth: **3.0 m**

Completion Elevation: **97.0 m**

Sheet: **1 of 1**

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



Engineering And Testing
Solutions That Work For You

Test Hole #: TH38
Client: City of Winnipeg
Site: See Figure 6
Location: Assinboine Park Drive
Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

File No.: 17-037-03
Date Drilled: November 9, 2017
Grade Elevation: 100.0 m
Water Elevation: --

SUBSURFACE PROFILE			SAMPLE DATA				SHEAR STRENGTH (kPa)				
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)			
								PL	X	LL	P. Pen
0.0		Ground Surface	100.0								
		Asphalt (72 mm)		S1	█	10.8					
		Granular Fill (229 mm) - medium brown, moist, medium dense, poorly graded, fined grained, trace clay.		S2	█	25.9					
		Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S3	█	33.4					
1.0			99.0	S4	█	35.3					
		- below 1.3, medium brown.		S5	█	35.5					
				S6	█	37.0					
2.0			98.0	S7	█	39.0					
3.0		End of Test Hole - end of test hole at 3.0 m below grade. - no sloughing or seepage encountered upon completion of drilling. - test hole backfilled with bentonite and soil cuttings upon completion of drilling. - pavement was patched with concrete grout upon completion of drilling.	97.0								
4.0			96.0								
5.0			95.0								

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Logged by: PFPC

Reviewed by: *CA*

Drilled By: Subterranean Manitoba Ltd.

Drill Rig: CME75

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE



SPLIT BARREL



SHELBY TUBE



AUGER CUTTINGS



SPLIT SPOON



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PARTICLE SIZE ANALYSIS

City of Winnipeg - Public Works Department
 106 - 1155 Pacific Avenue
 Winnipeg, Manitoba
 R3E 3P1

File No.: 17-037-03

Ref. No.: 17-37-3-3

Attention: Richard Weibel, C.E.T.

Project: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTION PROGRAM

Test Hole No. 6

Sample No. 3

Depth: 0.7 m

Sample By: ENG-TECH (Paula Chagas)

Type of Sample: Grab

Source: Project site

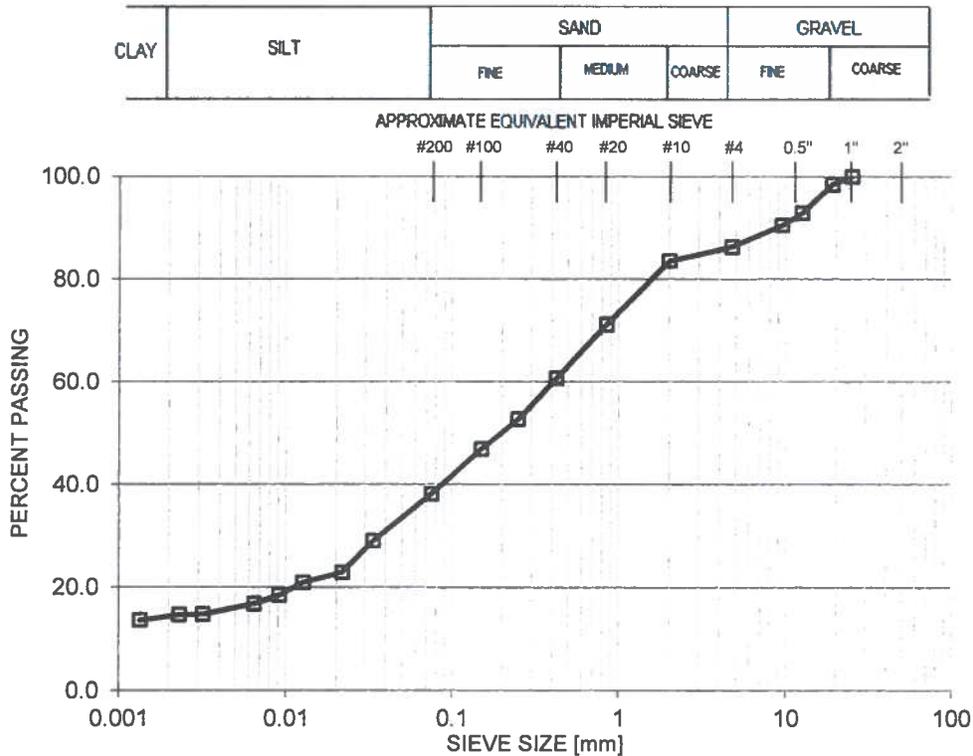
Date Sampled: Nov 6/17

Date Received: Nov 14/17

Date Tested: Nov 29/17

Dispersion Device: Apparatus A: Humboldt Mechanical Analysis Stirrer

Dispersion Time (min.): 1



Percent of: GRAVEL (13.7 %), SAND (48.2 %), SILT (23.7 %), CLAY (14.4 %)

Sample Description:

Comments: Insitu Moisture content is 12.1%.

ENG-TECH Consulting Limited

Per

Clark Hryhoruk
 Clark Hryhoruk, M.Sc., P. Eng., President
 Ph: (204) 233-1694 Fx: (204) 235-1579



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PARTICLE SIZE ANALYSIS

City of Winnipeg - Public Works Department
 106 - 1155 Pacific Avenue
 Winnipeg, Manitoba
 R3E 3P1

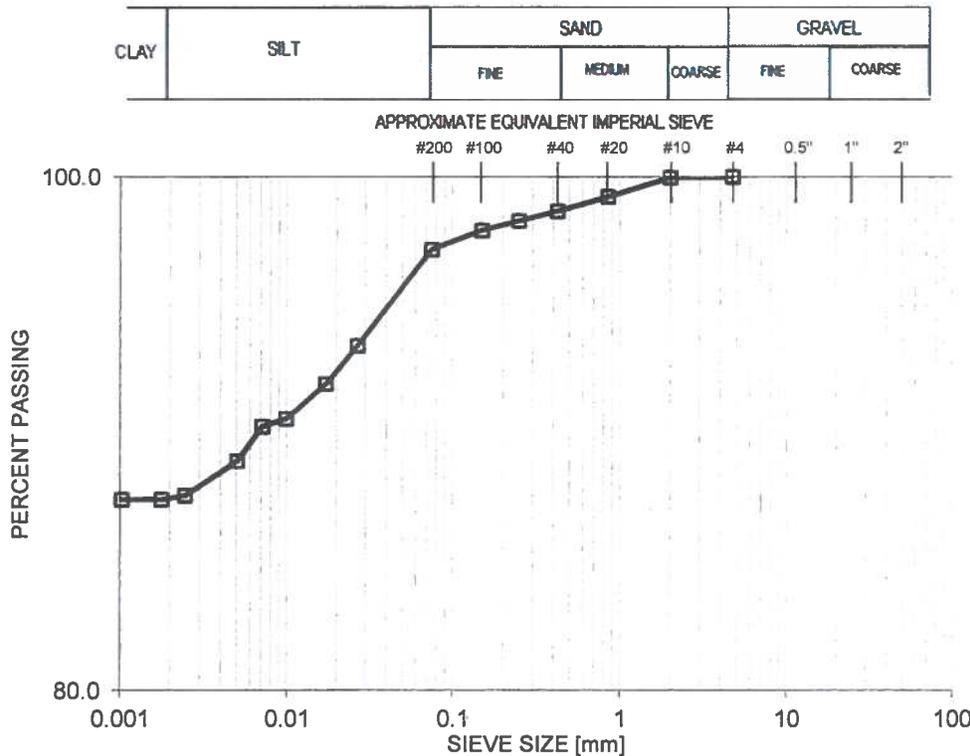
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Ref. No.: 17-37-3-4

Attention: Richard Weibel, C.E.T.

Project: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTION PROGRAM

Test Hole No. 14 Sample No. 4 Depth: 1.0 m
 Sample By: ENG-TECH (Paula Chagas) Type of Sample: Grab Source: Project site
 Date Sampled: Nov 6/17 Date Received: Nov 14/17 Date Tested: Nov 29/17
 Dispersion Device: Apparatus A: Humboldt Mechanical Analysis Stirrer Dispersion Time (min.): 1

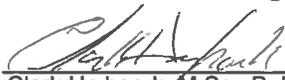


Percent of: GRAVEL (0.0 %), SAND (2.9 %), SILT (9.6 %), CLAY (87.5 %)

Sample Description:

Comments: Insitu Moisture content is 35.0%.

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PARTICLE SIZE ANALYSIS

City of Winnipeg - Public Works Department
 106 - 1155 Pacific Avenue
 Winnipeg, Manitoba
 R3E 3P1

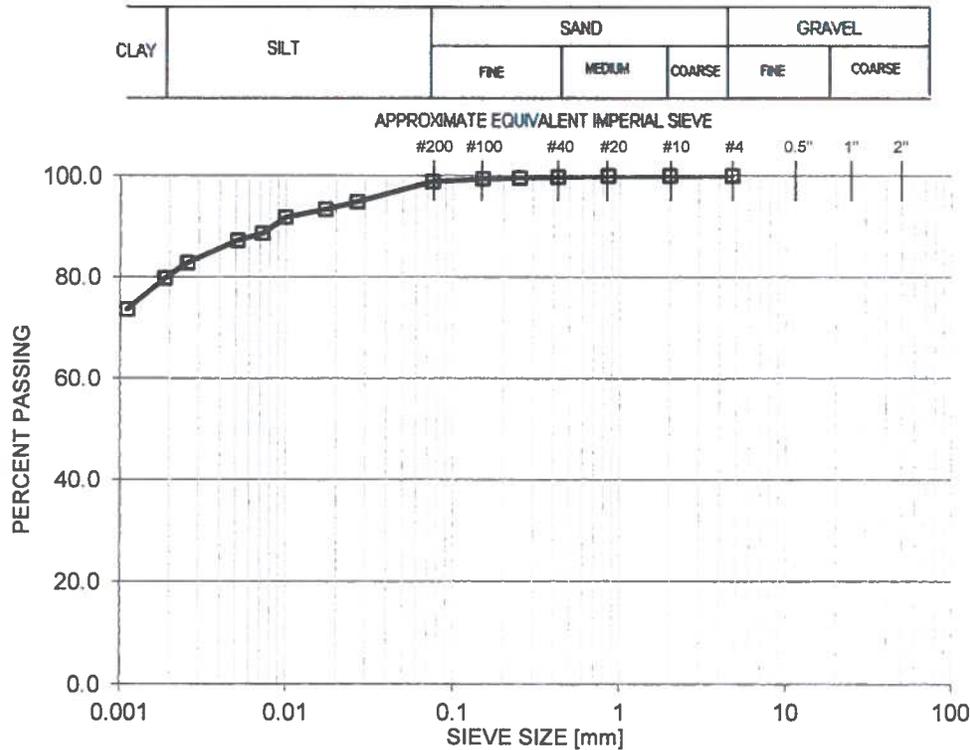
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Ref. No.: 17-37-3-7

Attention: Richard Weibel, C.E.T.

Project: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTION PROGRAM

Test Hole No. 24	Sample No. 4	Depth: 1.0 m
Sample By: ENG-TECH (Paula Chagas)	Type of Sample: Grab	Source: Project site
Date Sampled: Nov 6/17	Date Received: Nov 14/17	Date Tested: Nov 29/17
Dispersion Device: Apparatus A: Humboldt Mechanical Analysis Stirrer	Dispersion Time (min.):	1



Percent of: GRAVEL (0.0 %), SAND (1.2 %), SILT (18.3 %), CLAY (80.5 %)

Sample Description:

Comments: Insitu Moisture content is 35.5%.

ENG-TECH Consulting Limited

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PARTICLE SIZE ANALYSIS

City of Winnipeg
 104 - 1155 Pacific Avenue
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 R3B 3P1

File No.: 17-037-08

Ref. No.: 17-37-3-8

Attention: Richard Weibel, C.E.T.

Project: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTION PROGRAM

Test Hole No. 27

Sample No. 4

Depth: 1.0 m

Sample By: ENG-TECH (Paula Chagas)

Type of Sample: Grab

Source: Project site

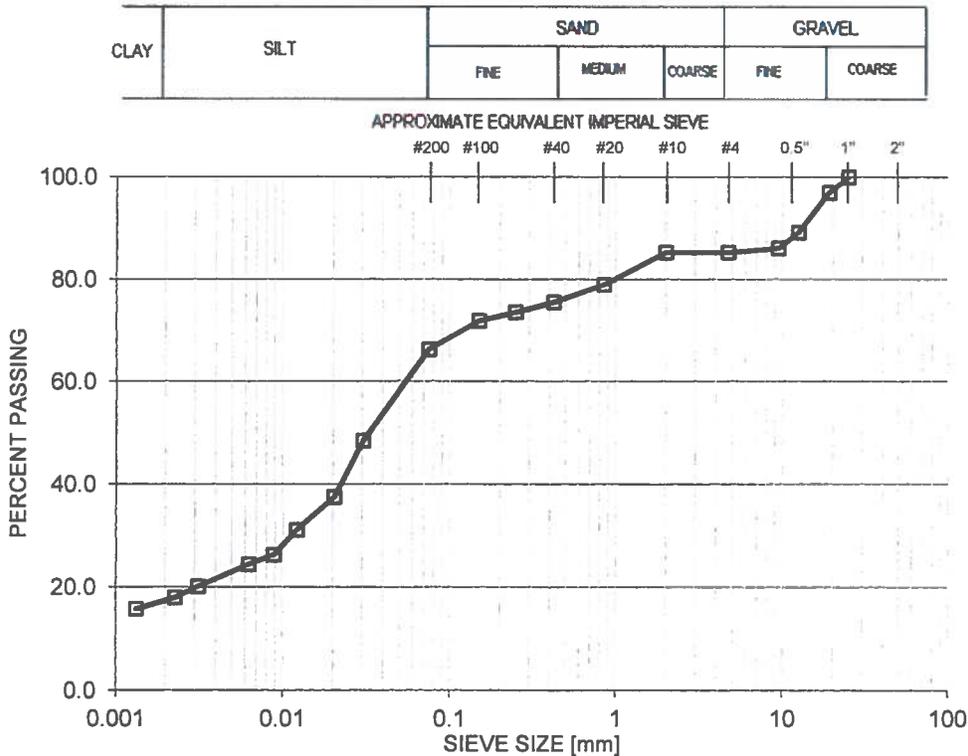
Date Sampled: Nov 6/17

Date Received: Nov 14/17

Date Tested: Nov 29/17

Dispersion Device: Apparatus A: Humboldt Mechanical Analysis Stirrer

Dispersion Time (min.): 1



Percent of: GRAVEL (14.7 %), SAND (19.0 %), SILT (48.9 %), CLAY (17.4 %)

Sample Description:

Comments: Insitu Moisture content is 19.2%.

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PARTICLE SIZE ANALYSIS

City of Winnipeg - Public Works Department
 106 - 1155 Pacific Avenue
 Winnipeg, Manitoba
 R3E 3P1

File No.: 17-037-03

Ref. No.: 17-37-3-9

Attention: Richard Weibel, C.E.T.

Project: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTION PROGRAM

Test Hole No. 30

Sample No. 4

Depth: 1.0 m

Sample By: ENG-TECH (Paula Chagas)

Type of Sample: Grab

Source: Project site

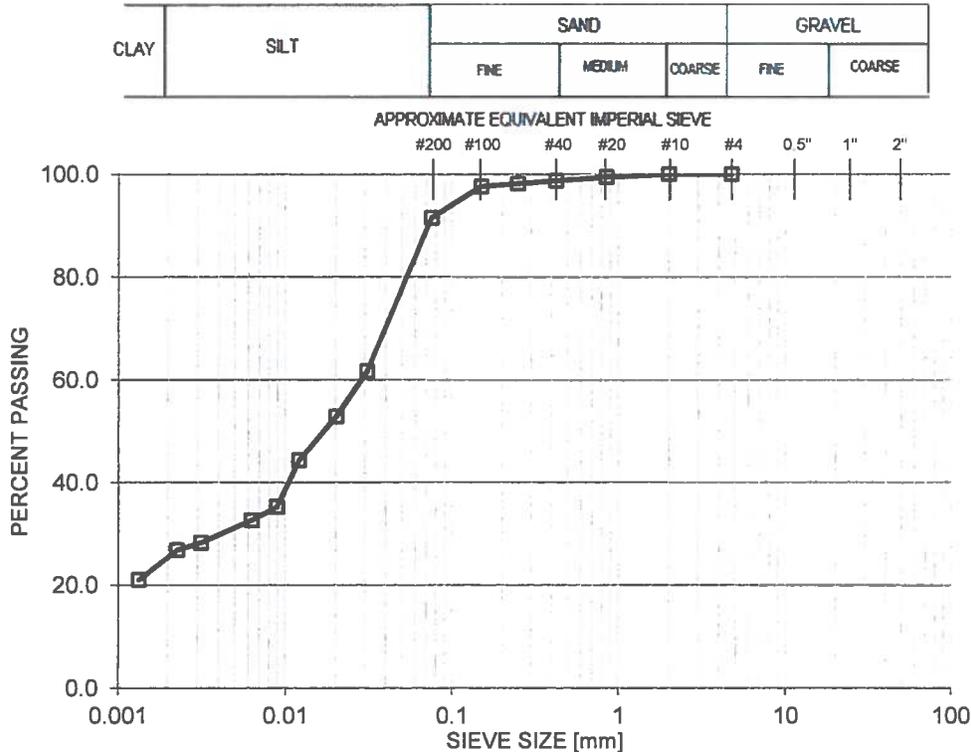
Date Sampled: Nov 6/17

Date Received: Nov 14/17

Date Tested: Nov 29/17

Dispersion Device: Apparatus A: Humboldt Mechanical Analysis Stirrer

Dispersion Time (min.): 1



SIEVE SIZE (mm)	PERCENT PASSING
4.75	100.0
2.0	100.0
0.850	99.4
0.425	98.7
0.250	98.2
0.150	97.6
0.075	91.6
0.031	61.7
0.020	52.9
0.012	44.3
0.009	35.3
0.006	32.7
0.003	28.3
0.002	26.8
0.001	21.0

Percent of: GRAVEL (0.0 %), SAND (8.4 %), SILT (66.1 %), CLAY (25.5 %)

Sample Description:

Comments: Insitu Moisture content is 22.9%.

ENG-TECH Consulting Limited

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PARTICLE SIZE ANALYSIS

City of Wininpeg - Public Works Department
 106 - 1155 Pacific Avenue
 Winnipeg, Manitoba
 R3E 3P1

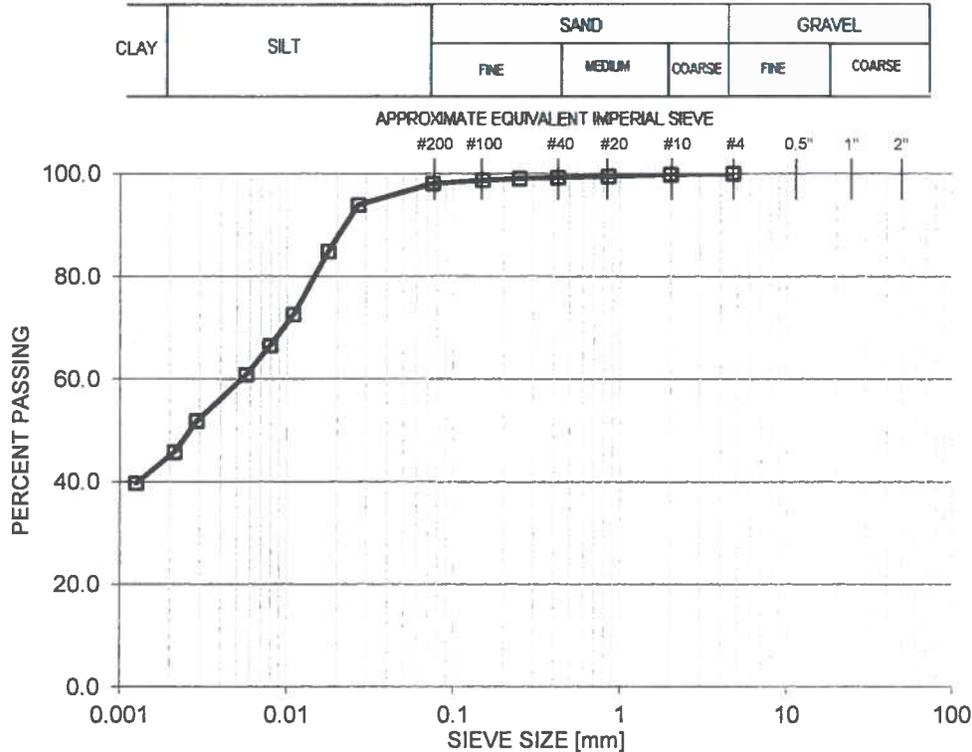
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 Ref. No.: 17-37-3-10

Attention: Richard Weibel, C.E.T.

Project: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTION PROGRAM

Test Hole No. 37 Sample No. 3 Depth: 0.7 m
 Sample By: ENG-TECH (Paula Chagas) Type of Sample: Grab Source: Project site
 Date Sampled: Nov 6/17 Date Received: Nov 14/17 Date Tested: Nov 29/17

Dispersion Device: Apparatus A: Humboldt Mechanical Analysis Stirrer Dispersion Time (min.): 1



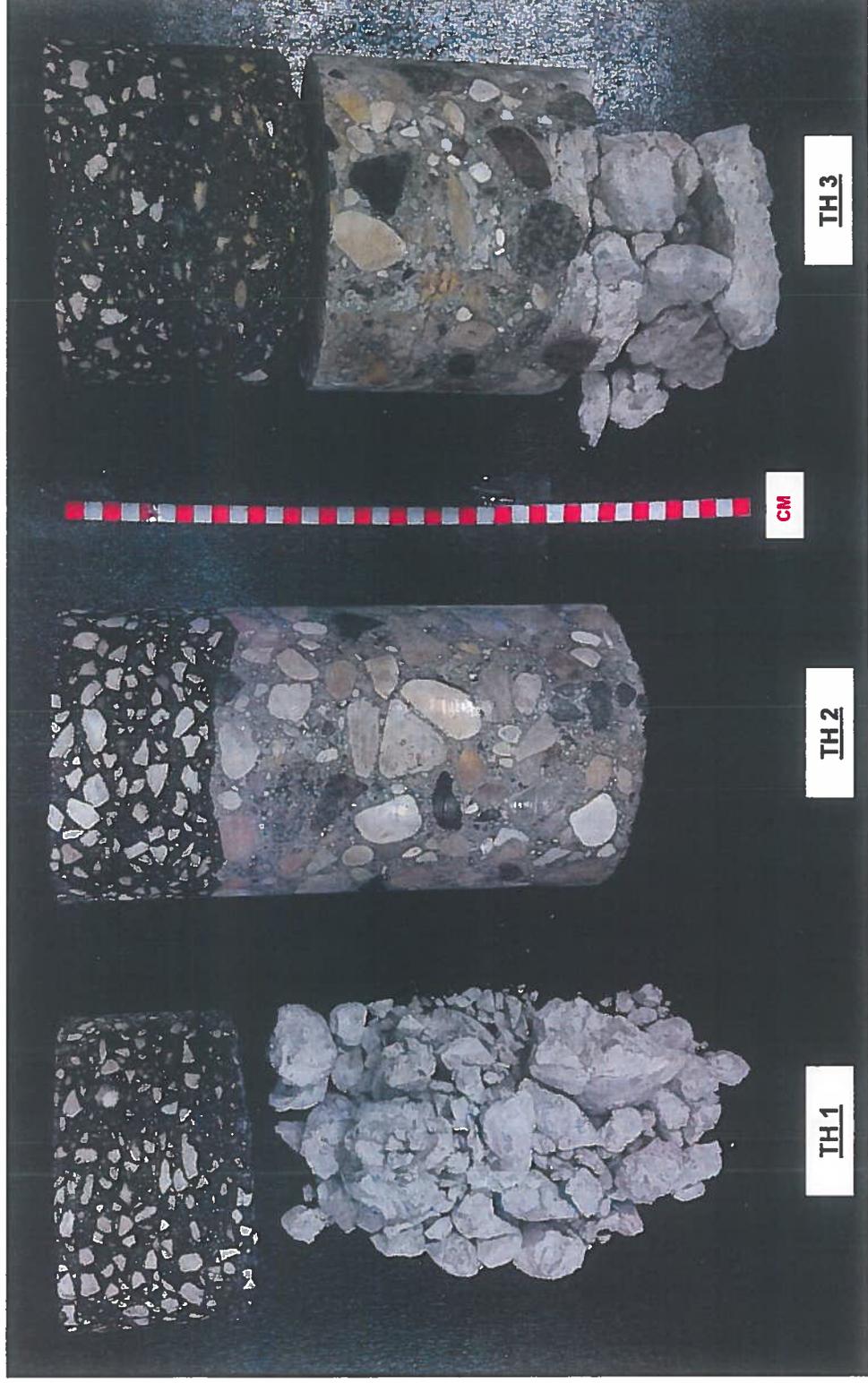
Percent of: GRAVEL (0.0 %), SAND (1.8 %), SILT (53.1 %), CLAY (45.1 %)

Sample Description:

Comments: Insitu Moisture content is 32.5%.

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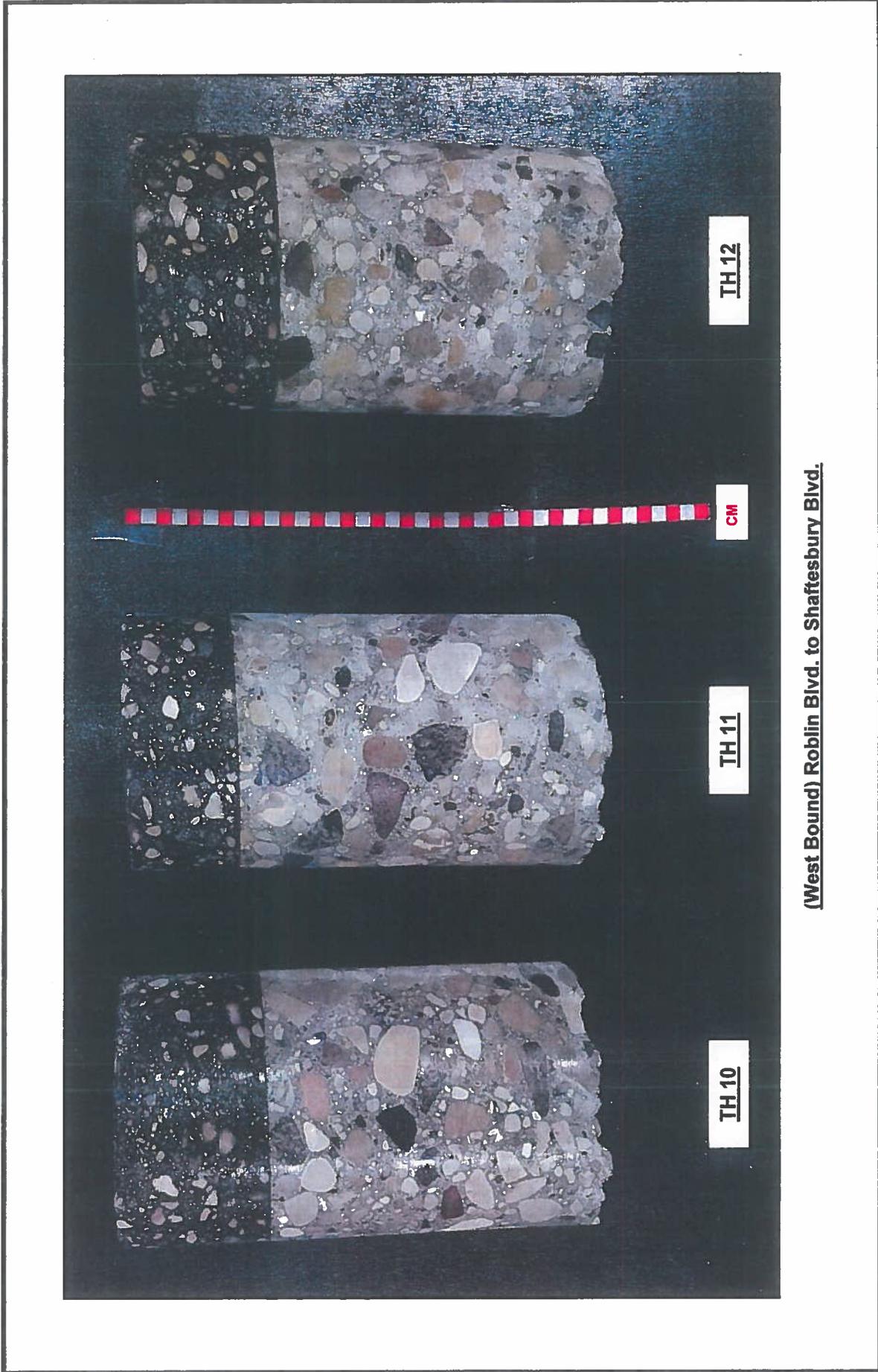
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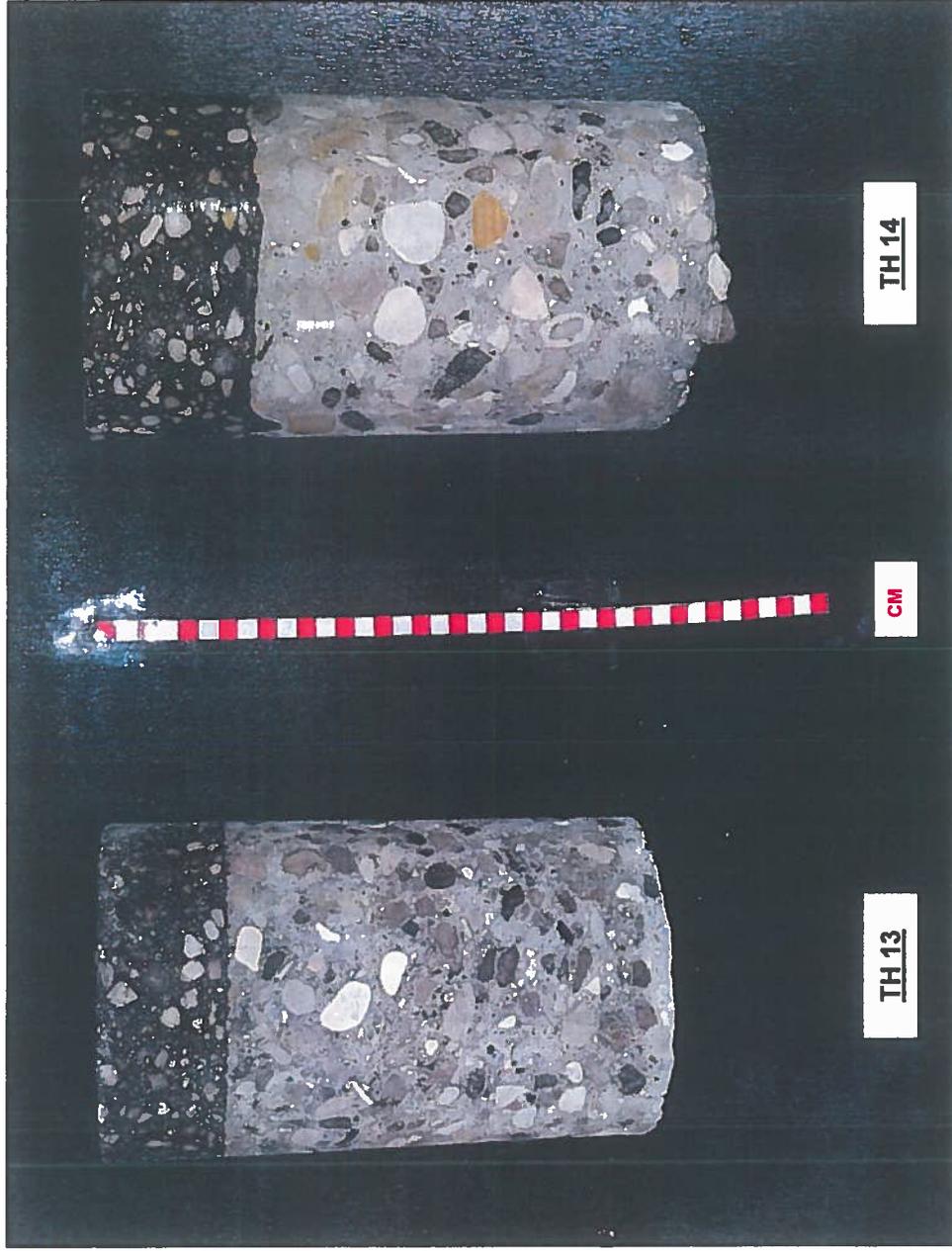
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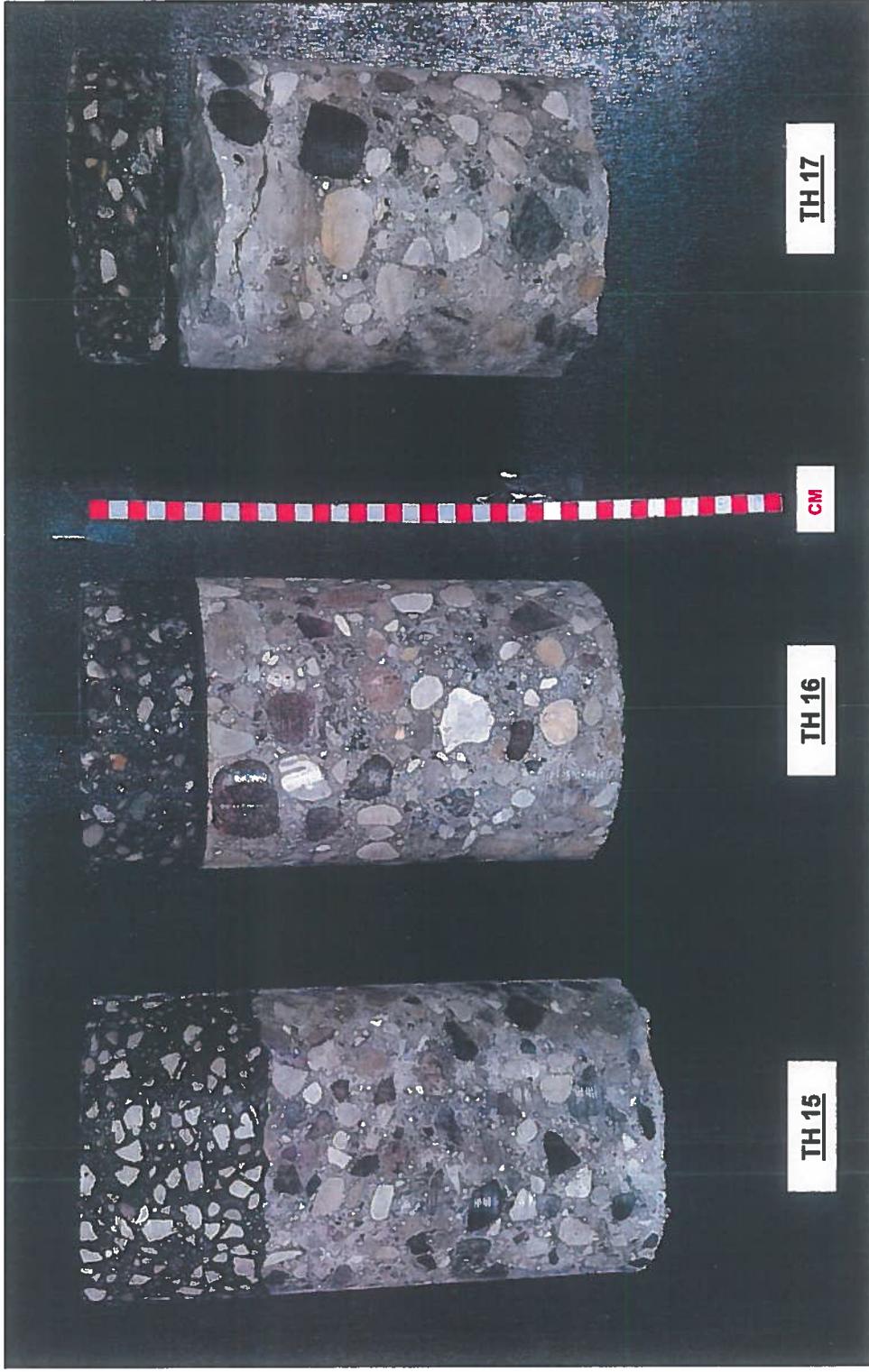
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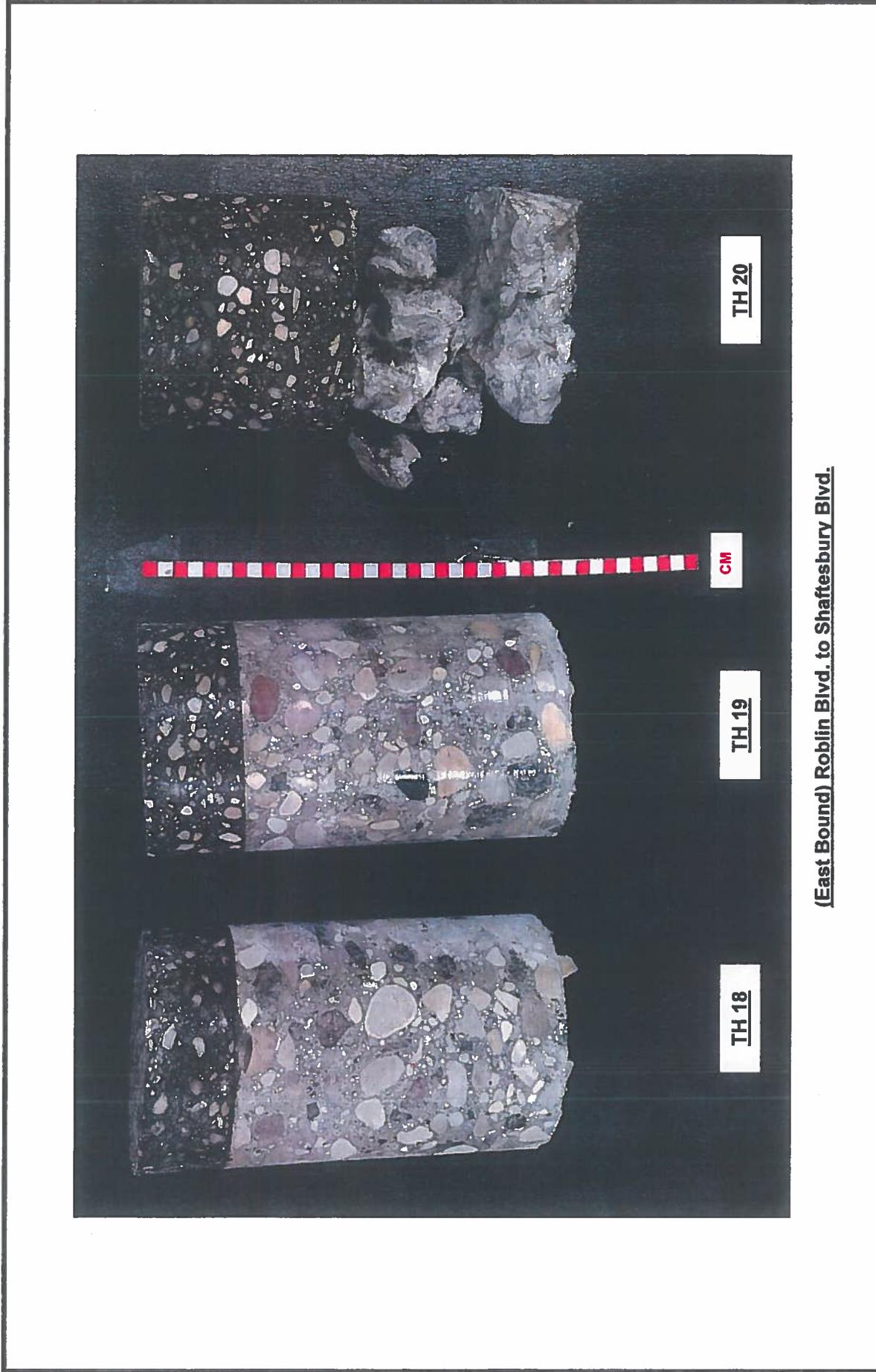
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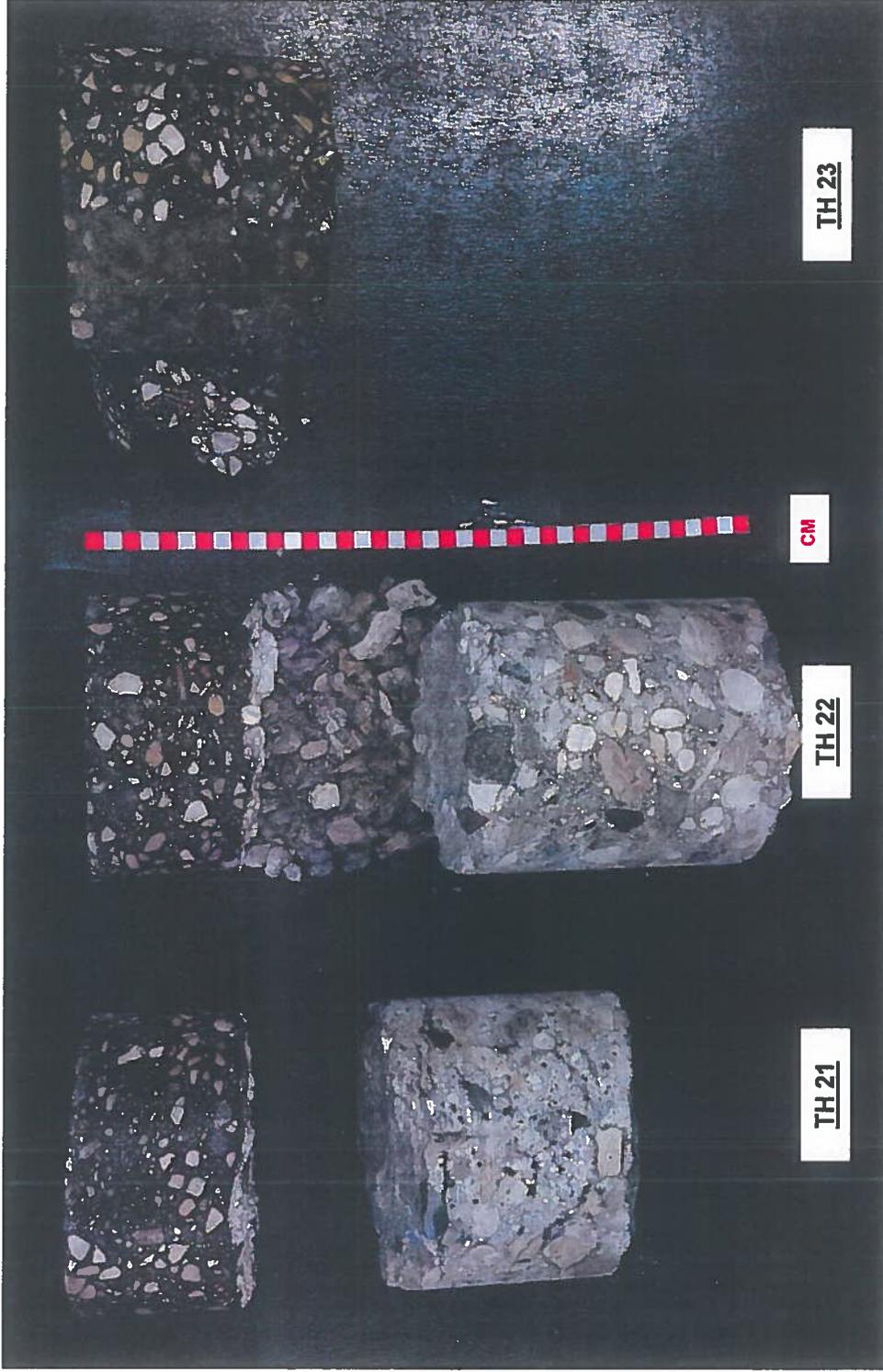
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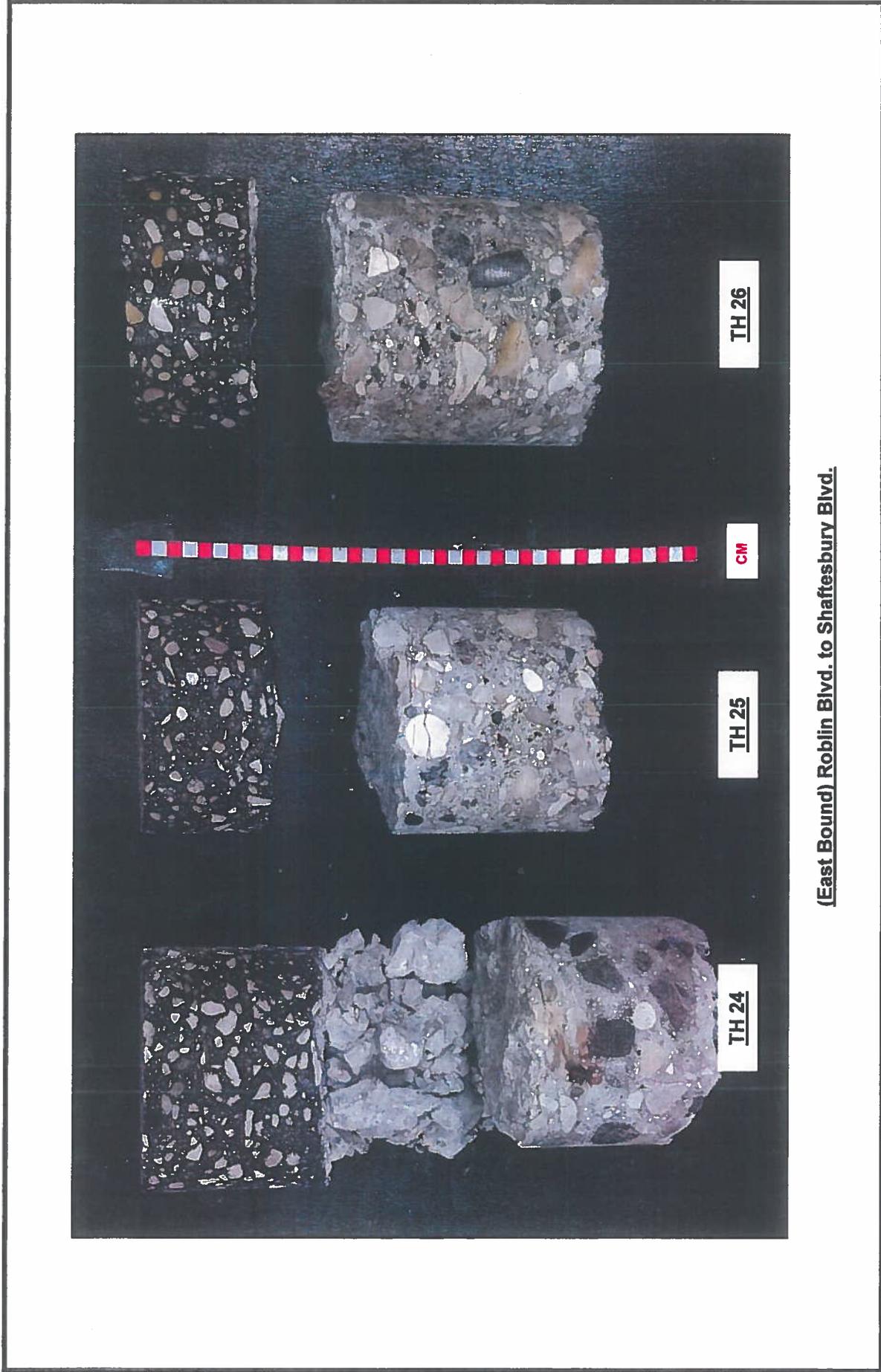
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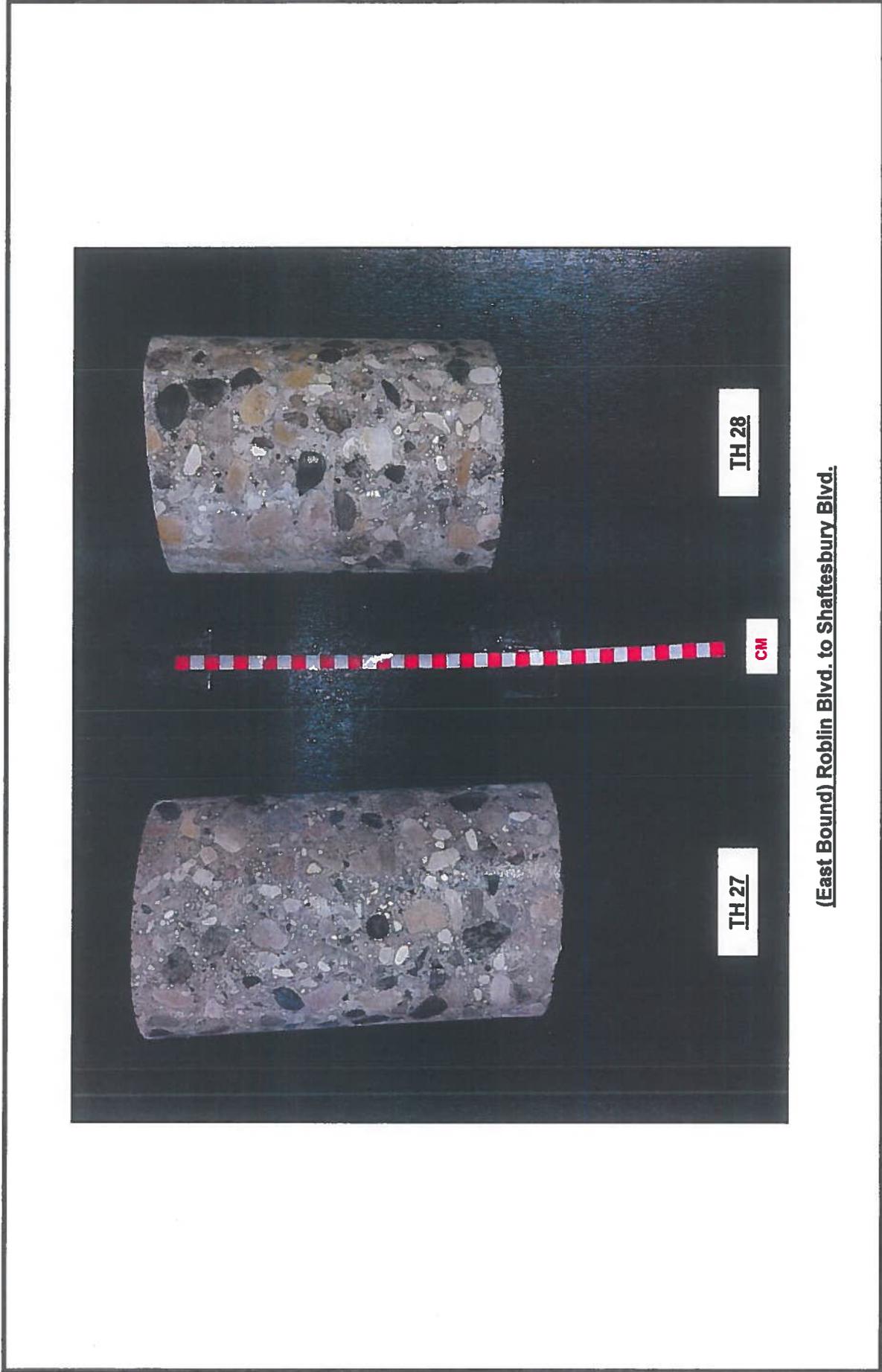
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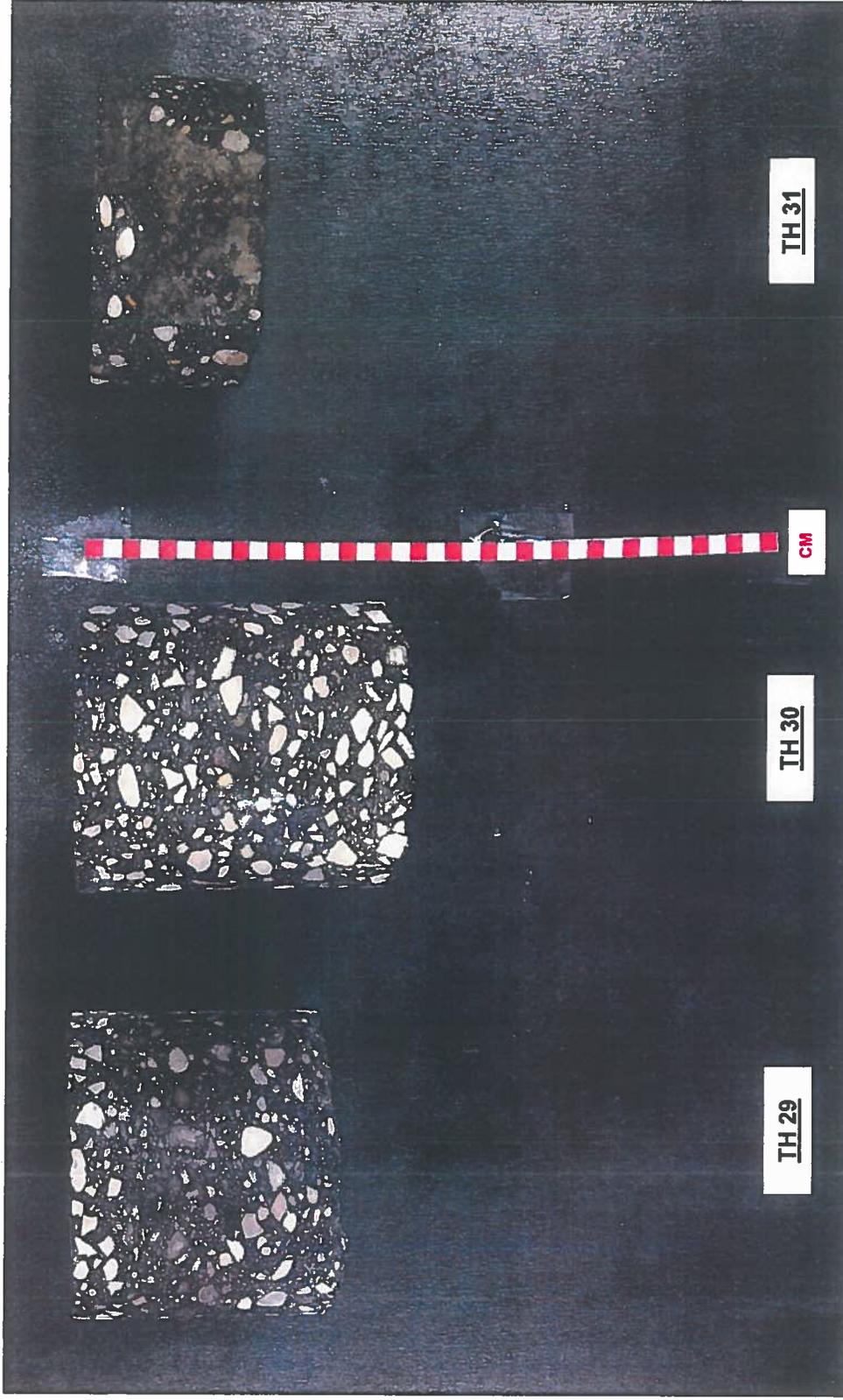
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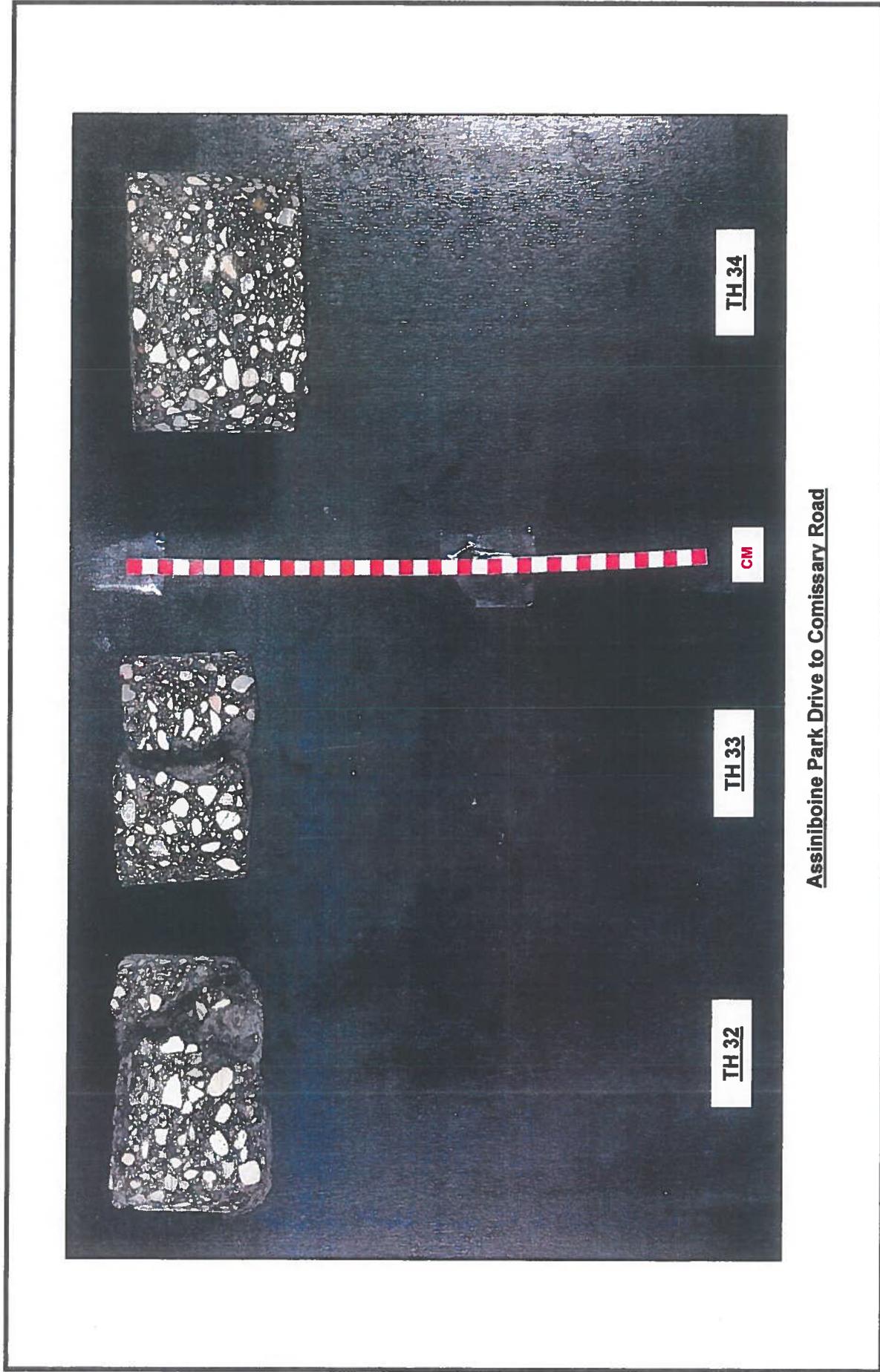
(East Bound) Roblin Blvd. to Shaftesbury Blvd.



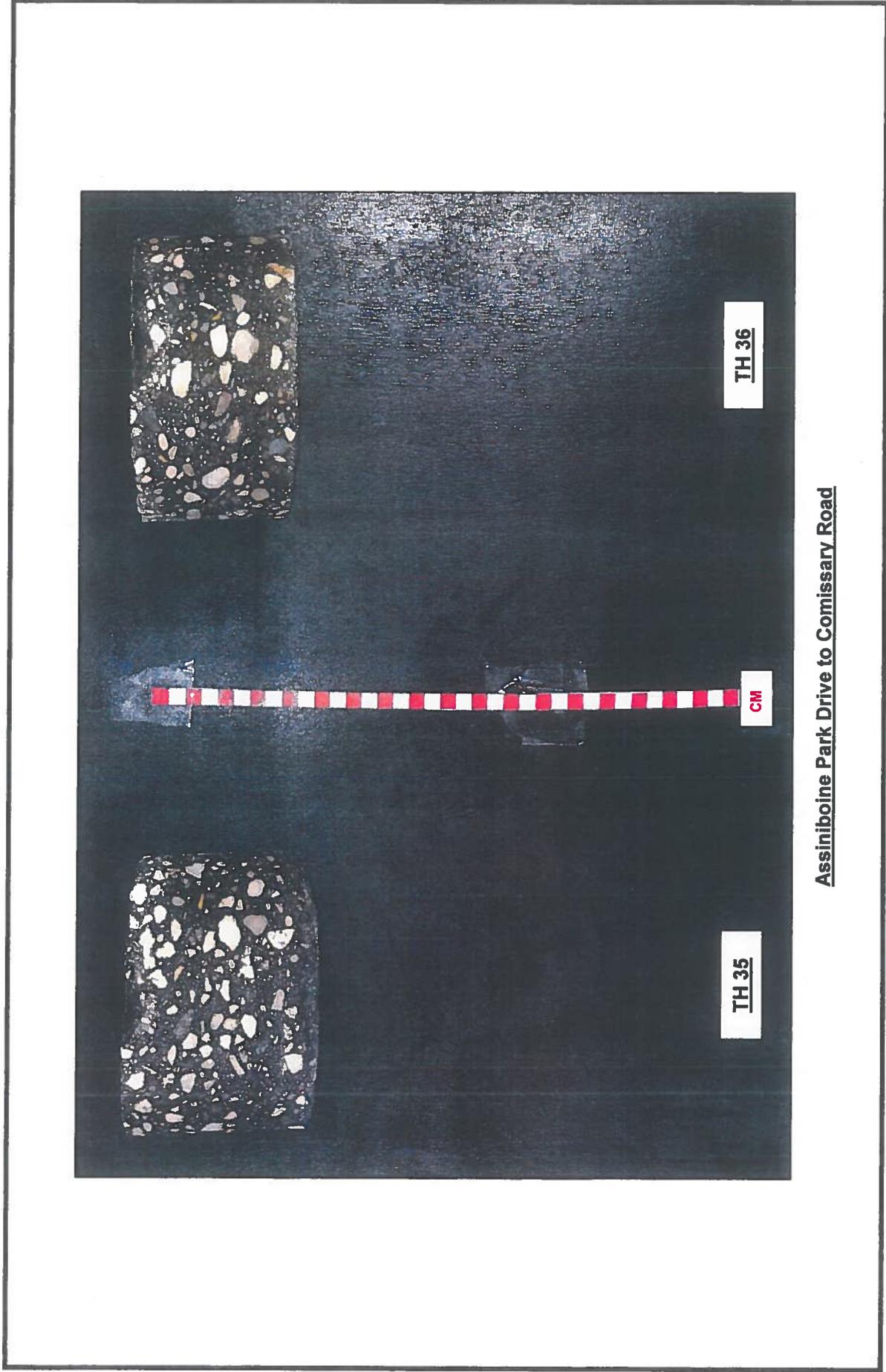
(East Bound) Roblin Blvd. to Shaftesbury Blvd.

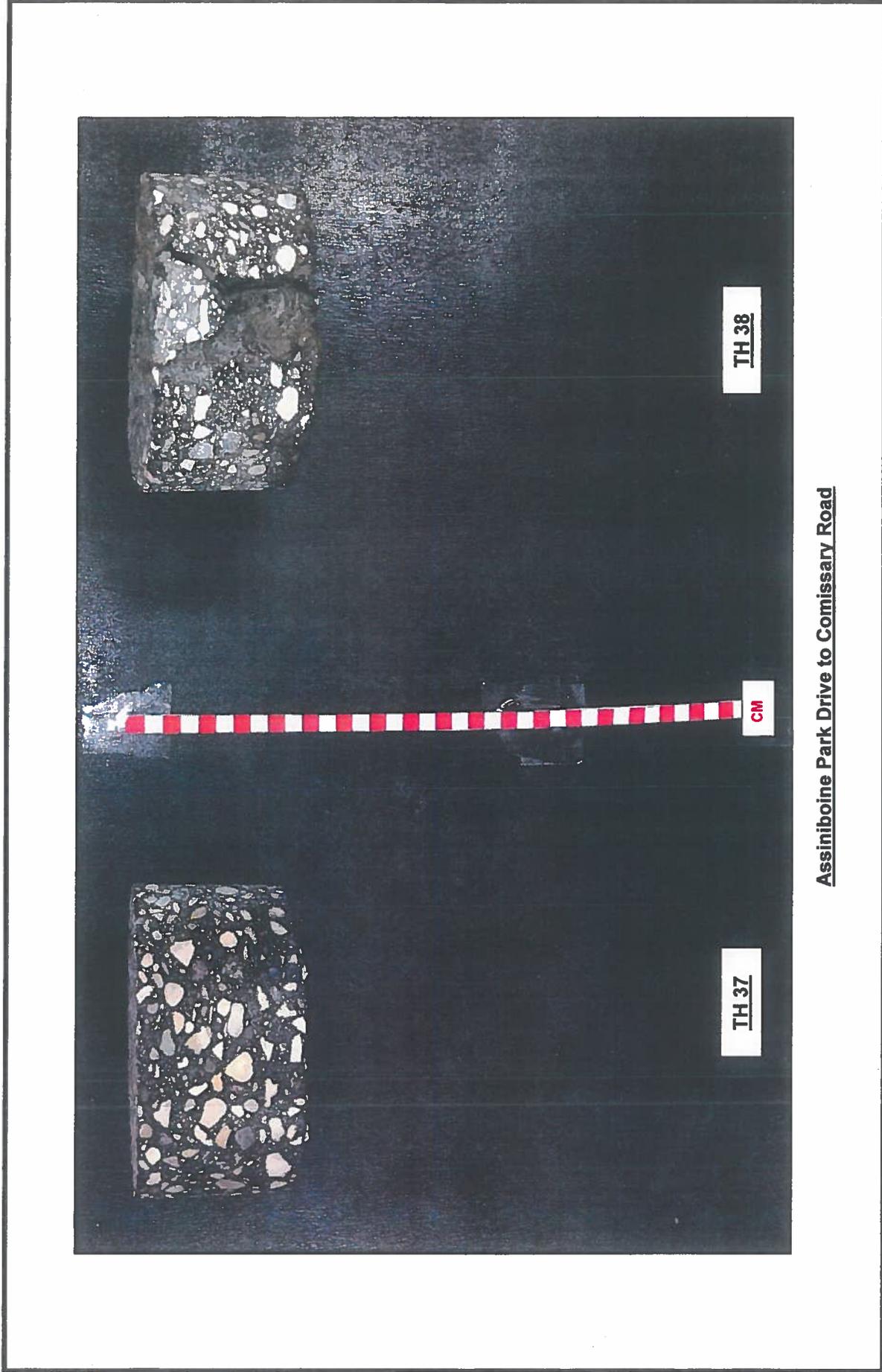


Assiniboine Park Drive to Commissary Road



Assiniboine Park Drive to Commissary Road





Assiniboine Park Drive to Commissary Road

January 14, 2019
 File: 123314117

Attention: Richard Weibel
 City of Winnipeg
 Public Works Department
 106-1155 Pacific Avenue
 Winnipeg, Manitoba
 R3E 3P1

Good day Richard,

Reference: Geotechnical Investigation for 2019 Regional Street Renewal Program – Assiniboine Park Drive

Stantec Consulting Ltd. was retained by the City of Winnipeg to conduct a geotechnical investigation for the 2019 Regional Street Renewal Program. During the period of December 5 through December 10, 2018, a total of 14 core samples were recovered and 14 testholes were drilled on Assiniboine Park Drive. The purpose of the pavement investigation was to determine the thickness of the pavement structure and observe the underlying soil conditions. Upon completion of drilling, the testholes were backfilled with crushed limestone and the top 100 mm was patched with cold mix asphalt. The findings are outlined below.

1. LABORATORY TEST RESULTS

The laboratory test results are summarized on **Table 1** and **Table 2** and are included in the testhole records.

Table 1 – Atterberg Limits Test Data

Testhole No.	Sample Depth	Soil Type	Liquid Limit	Plastic Limit	Plasticity Index
TH04	0.7 m	Clay (Fill)	77	21	56
TH10	1.0 m	Lean Clay	44	18	26
TH11	1.0 m	Fat Clay	56	18	38

Table 2 – Particle Size Analysis Test Data

Testhole No.	Sample Depth	Soil Type	Gravel	Sand	Silt	Clay
TH04	0.7 m	Clay (Fill)	0.5%	7.0%	20.3%	72.2%
TH10	1.0 m	Lean Clay	0.0%	2.4%	62.1%	35.5%
TH11	1.0 m	Fat Clay	0.0%	15.3%	33.1%	51.6%

January 14, 2019
Richard Weibel
Page 2 of 2

Reference: Geotechnical Investigation for 2019 Regional Street Renewal Program – Assiniboine Park Drive

The core findings, core photographs, testhole location plan, testhole records and laboratory test results for Assiniboine Park Drive are provided.

This report is subject to the Statement of General Conditions provided.

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

Regards

Stantec Consulting Ltd.

Guillaume Beauce P.Eng.
Geotechnical Engineer
Phone: (204) 928-7618
guillaume.beauce@stantec.com

Jason Thompson C.E.T.
Principal – Manager, Materials Testing Services
Phone: (204) 928-4004
jason.thompson@stantec.com

Attachments: Assiniboine Park Drive
- Table 3 – Core Findings
- Core Photographs
- Testhole Location Plan
- Testhole Records
- Laboratory Test Results
Statement of General Conditions

Table 3 - 2019 Regional Street Renewal Program – Assiniboine Park Drive from Commissary Road to Zoo Drive

Testhole ID	Testhole Location	Pavement Surface		Comments
		Type	Thickness (mm)	
TH01	Assiniboine Park Drive Westbound outside lane, 50 m east of Commissary Road centerline of lane	Asphalt	90	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 90 mm crushed limestone base below concrete pavement
TH02	Assiniboine Park Drive Westbound median lane, 88 m east of Commissary Road centerline of lane	Asphalt	100	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 100 mm crushed limestone base below concrete pavement
TH03	Assiniboine Park Drive Eastbound lane, 151 m east of Commissary Road centerline of lane	Asphalt	100	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 100 mm crushed limestone base below concrete pavement
TH04	Assiniboine Park Drive Westbound outside lane, 211 m east of Commissary Road centerline of lane	Asphalt	100	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 100 mm crushed limestone base below concrete pavement
TH05	Assiniboine Park Drive Westbound median lane, 271 m east of Commissary Road centerline of lane	Asphalt	100	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 100 mm crushed limestone base below concrete pavement
TH06	Assiniboine Park Drive Eastbound lane, 341 m east of Commissary Road centerline of lane	Asphalt	180	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 180 mm crushed limestone base below concrete pavement
TH07	Assiniboine Park Drive centerline of road, 390 m east of Commissary Road centerline of road	Asphalt	110	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 110 mm crushed limestone base below concrete pavement
TH08	Assiniboine Park Drive centerline of road, 462 m east of Commissary Road centerline of road	Asphalt	90	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 90 mm crushed limestone base below concrete pavement
TH09	Assiniboine Park Drive Eastbound lane, 540 m east of Commissary Road centerline of lane	Asphalt	115	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 115 mm crushed limestone base below concrete pavement
TH10	Assiniboine Park Drive Westbound lane, 602 m east of Commissary Road centerline of lane	Asphalt	165	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 165 mm crushed limestone base below concrete pavement
TH11	Assiniboine Park Drive Eastbound lane, 650 m east of Commissary Road centerline of lane	Asphalt	145	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 145 mm crushed limestone base below concrete pavement
TH12	Assiniboine Park Drive Eastbound lane, 736 m east of Commissary Road centerline of lane	Asphalt	160	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 160 mm crushed limestone base below concrete pavement
TH13	Assiniboine Park Drive Westbound lane, 781 m east of Commissary Road centerline of lane	Asphalt	200	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 200 mm crushed limestone base below concrete pavement
TH14	Assiniboine Park Drive centerline of road, 846 m east of Commissary Road centerline of road	Asphalt	105	<ul style="list-style-type: none"> intact asphalt pavement from 0 to 105 mm crushed limestone base below concrete pavement

Reference: 2019 Regional Street Renewal Program – Assiniboine Park Drive from Commissary Road to Zoo Drive



Figure 1 - TH01 Core



Figure 2 - TH02 Core

Reference: 2019 Regional Street Renewal Program – Assiniboine Park Drive from Commissary Road to Zoo Drive



Figure 3 - TH03 Core



Figure 4 - TH04 Core

Reference: 2019 Regional Street Renewal Program – Assiniboine Park Drive from Commissary Road to Zoo Drive



Figure 5 - TH05 Core



Figure 6 - TH06 Core

Reference: 2019 Regional Street Renewal Program – Assiniboine Park Drive from Commissary Road to Zoo Drive



Figure 7 - TH07 Core



Figure 8 - TH08 Core

Reference: 2019 Regional Street Renewal Program – Assiniboine Park Drive from Commissary Road to Zoo Drive



Figure 9 - TH09 Core



Figure 10 – TH10 Core

Reference: 2019 Regional Street Renewal Program – Assiniboine Park Drive from Commissary Road to Zoo Drive



Figure 11 – TH11 Core



Figure 12 – TH12 Core

Reference: 2019 Regional Street Renewal Program – Assiniboine Park Drive from Commissary Road to Zoo Drive



Figure 13 – TH13 Core



Figure 14 – TH14 Core



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2019/01/09 10:17 AM By: Baughton, Lee

ORIGINAL SHEET - ISO 11x17 - v17.05

Stantec
 Stantec Consulting Ltd.
 Suite 500, 311 Portage Avenue
 Winnipeg MB Canada R3B 2B9
 Tel. 204.489.5900 Fax. 204.453.9012
 www.stantec.com

Legend

APPROXIMATE TESTHOLE LOCATION

Notes

Client/Project
 CITY OF WINNIPEG
 2019 REGIONAL STREET RENEWAL PROGRAM
 WINNIPEG, MB
 Figure No. 15
 ASSINIBOINE PARK DRIVE 1 OF 2
 Title
 TESTHOLE LOCATION PLAN



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2019/01/09 10:26 AM By: Baughton, Lee

ORIGINAL SHEET - ISO 11x17 - v17.05

2019-01-08
12331417



Stantec Consulting Ltd.
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Winnipeg MB Canada R3B 2B9
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www.stantec.com

Legend

 APPROXIMATE TESTHOLE LOCATION

Notes

Client/Project
CITY OF WINNIPEG
2019 REGIONAL STREET RENEWAL PROGRAM
WINNIPEG, MB
Figure No.16
ASSINIBOINE PARK DRIVE 2 OF 2
Title
TESTHOLE LOCATION PLAN

TH01 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5525987
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626093
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa	
0	AS		Asphalt								0
	GW		Crushed Limestone	X GS	6						
	FL		FILL: very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel	X GS	27						
	CH		very stiff brown fat CLAY (CH) - silty, some fine sand	X GS	33						2
1				X GS	31						4
				X GS	32						6
				X GS	38						8
2				X GS	34						10
			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Frost observed to a depth of 0.9 m. • Testhole terminated at depth of 2.0 m.								

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Nestor Abarca
 Reviewed by: German Leal



TH02 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5526024
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626103
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m				DEPTH (ft)		
				TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa			
0	AS		Asphalt								0		
	GW		Crushed Limestone	X GS	6								
	FL		FILL: very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel	X GS	36							2	
				X GS	35								4
1				X GS	36								6
				X GS	34								8
	CH		very stiff brown fat CLAY (CH) - silty, some fine sand	X GS	34						6		
2			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Frost observed to a depth of 0.9 m. • Testhole terminated at depth of 2.0 m.	X GS	35						10		
3													

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Nestor Abarca
 Reviewed by: German Leal



TH03 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5526073
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626146
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m 50kPa 100kPa 150kPa 200kPa				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	W _p	W	W _L	Moisture Content & Atterberg Limits		
0	AS		Asphalt								0	
	GW		Crushed Limestone	X GS	6		○					
	FL		FILL: very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel	X GS	35				○			
	CH		stiff to very stiff brown fat CLAY (CH) - silty, some fine sand	X GS	34				○	□		
1				X GS	31				○		□	
				X GS	25				○		□	
	CL		stiff tan lean CLAY (CL) - with silt, trace fine sand	X GS	32				○	□		
2			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Frost observed to a depth of 0.9 m. • Testhole terminated at depth of 2.0 m.	X GS	14		○			□		
3											10	

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Nestor Abarca
 Reviewed by: German Leal



TH04 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5526111
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626192
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa	
0	AS		Asphalt								0
	GW		Crushed Limestone	GS	10						
	FL		FILL: stiff to very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel Particle Size Analysis Results @ 0.7 m: - 0.5% Gravel, 7.0% Sand, 20.3% Silt, 72.2% Clay	GS	36						2
	FL		Particle Size Analysis Results @ 0.7 m: - 0.5% Gravel, 7.0% Sand, 20.3% Silt, 72.2% Clay	GS	31						
1	CH		stiff to very stiff brown fat CLAY (CH) - silty, some fine sand	GS	32						
	CH		stiff to very stiff brown fat CLAY (CH) - silty, some fine sand	GS	31						4
	CH			GS	29						6
2			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Frost observed to a depth of 0.9 m. • Testhole terminated at depth of 2.0 m.	GS	26						8
3											10

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Nestor Abarca
 Reviewed by: German Leal



TH05 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5526117
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626259
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa	
0	AS		Asphalt								0
	GW		Crushed Limestone	X GS	10						
	FL		FILL: stiff to very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel	X GS	30						
	CH		very stiff brown fat CLAY (CH) - silty, some fine sand	X GS	24						2
1				X GS	20						4
				X GS	20						6
				X GS	21						8
2				X GS	17						10
			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Frost observed to a depth of 0.9 m. • Testhole terminated at depth of 2.0 m.								

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Nestor Abarca
 Reviewed by: German Leal



TH06 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5526132
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626329
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m 50kPa 100kPa 150kPa 200kPa W _p W W _L Moisture Content & Atterberg Limits ● Standard Penetration Test, blows/0.3m				DEPTH (ft)				
				TYPE	NUMBER	MOISTURE CONTENT (%)	10	20	30	40		50	60	70	80
0	AS		Asphalt												0
	GW		Crushed Limestone	X GS	7	○									
				X GS	5	○									
	FL		FILL: stiff to very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel	X GS	37				■						2
1				X GS	32			○		■					
	CL		stiff to very stiff tan lean CLAY (CL) - with silt, trace fine sand	X GS	30			○		■					4
				X GS	30			○		■					6
2			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Frost observed to a depth of 0.9 m. • Testhole terminated at depth of 2.0 m.	X GS	30			○		■					8
3															10

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Nestor Abarca
 Reviewed by: German Leal



TH07 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5526150
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626375
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa	
0	AS		Asphalt								0
	GW		Crushed Limestone								
	FL		FILL: firm to very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel	GS	33						
	FL			GS	30						
	CH		very stiff brown fat CLAY (CH) - silty, some fine sand	GS	29						
1	CH			GS	26						2
	CH			GS	24						4
	ML		soft tan SILT (ML) - clayey, trace fine sand	GS	10						
2	ML			GS	8						6
			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Frost observed to a depth of 0.9 m. • Testhole terminated at depth of 2.0 m.								
3											8
											10

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Nestor Abarca
 Reviewed by: German Leal



TH09 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5526175
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626526
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa	
0	AS		Asphalt								0
	GW		Crushed Limestone	X GS	28						
	FL		FILL: very stiff dark black/grey clay - silty, trace organics, trace fine to coarse sand, trace gravel	X GS	34						
				X GS	25						2
1				X GS	27						
	CH		very stiff brown fat CLAY (CH) - silty, some fine sand	X GS	22						4
				X GS	26						6
2				X GS	26						8
			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Frost observed to a depth of 0.9 m. • Testhole terminated at depth of 2.0 m.								10

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Nestor Abarca
 Reviewed by: German Leal



TH10 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5526184
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626588
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa	
0	AS		Asphalt								0
	GW		Crushed Limestone								
	FL		FILL: very stiff dark black/grey clay - silty, trace organics, trace fine to coarse sand, trace gravel	GS	21						
	FL			GS	18						
	CL		stiff to very stiff lean CLAY (CL) - with silt, trace fine sand	GS	15						2
1	CL		Particle Size Analysis Results @ 1.0 m: - 0% Gravel, 2.4% Sand, 62.1% Silt, 35.5% Clay	GS	12						4
	CL			GS	18						6
	CL			GS	12						8
2	CL			GS	18						10
			End of Testhole <ul style="list-style-type: none"> No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Frost observed to a depth of 0.9 m. Testhole terminated at depth of 2.0 m. 								

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Nestor Abarca
 Reviewed by: German Leal



TH11 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5526168
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626634
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa	
0	AS		Asphalt								0
	GW		Crushed Limestone								
	FL		FILL: very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel	X GS	32						
	FL			X GS	23						
	CH		stiff to very stiff brown fat CLAY (CH) - silty, some fine sand	X GS	22						2
1	CH		Particle Size Analysis Results @ 1.0 m: - 0% Gravel, 15.3% Sand, 33.1% Silt, 51.6% Clay	X GS	25						4
	CH			X GS	23						
	CH			X GS	22						
	SW		soft tan SAND (SW)								6
2	SW			X GS	6						
2			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Frost observed to a depth of 0.9 m. • Testhole terminated at depth of 2.0 m.								8
3											10

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Nestor Abarca
 Reviewed by: German Leal



TH12 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5526122
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626707
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m				DEPTH (ft)			
				TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa				
0	AS		Asphalt								0			
	GW		Crushed Limestone	X GS	8									
	FL		FILL: very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel	X GS	20									
	CH		firm to stiff brown fat CLAY (CH) - silty, some fine sand	X GS	33							2		
1				X GS	37								4	
				X GS	42									6
				X GS	45									8
2			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Frost observed to a depth of 0.9 m. • Testhole terminated at depth of 2.0 m.	X GS	47							10		
3														

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

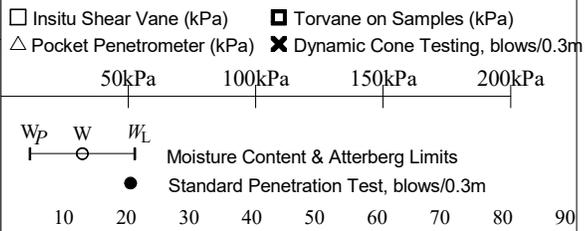
Logged by: Nestor Abarca
 Reviewed by: German Leal



TH13 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5526106
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626750
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	200kPa		
0	AS		Asphalt								0	
	GW		Crushed Limestone	X GS	13							
	FL		FILL: very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel	X GS	31							
	CH		very stiff to stiff brown fat CLAY (CH) - silty, some fine sand	X GS	35							
1				X GS	34							
				X GS	35							
				X GS	29							
2			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Frost observed to a depth of 0.9 m. • Testhole terminated at depth of 2.0 m.	X GS	36							
3												



Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Nestor Abarca
 Reviewed by: German Leal



TH14 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 123314117
 PROJECT 2019 Regional Street Renewal Program DATUM Geodetic NORTHING 5526089
 LOCATION Assiniboine Park Dr from Commissary Rd to Zoo Dr ELEVATION _____ EASTING 626814
 DRILLING DATE December 10, 2018 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/> Dynamic Cone Testing, blows/0.3m 50kPa 100kPa 150kPa 200kPa W _p W W _L Moisture Content & Atterberg Limits ● Standard Penetration Test, blows/0.3m				DEPTH (ft)				
				TYPE	NUMBER	MOISTURE CONTENT (%)	10	20	30	40		50	60	70	80
0	AS	■	Asphalt												0
	GW	○	Crushed Limestone	X	GS	12		○							
			stiff to very stiff brown fat CLAY (CH) - silty, some fine sand												
				X	GS	29			○						
				X	GS	36			○	■	○				
1	CH	▨		X	GS	30			○				■		
				X	GS	29			○				■		
				X	GS	33			○				■		
2			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Frost observed to a depth of 0.9 m. • Testhole terminated at depth of 2.0 m.	X	GS	41			○	■					
3															

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Backfill Type: ■ Bentonite ▨ Drill Cuttings ◻ Sand ▩ Slough

Logged by: Nestor Abarca
 Reviewed by: German Leal





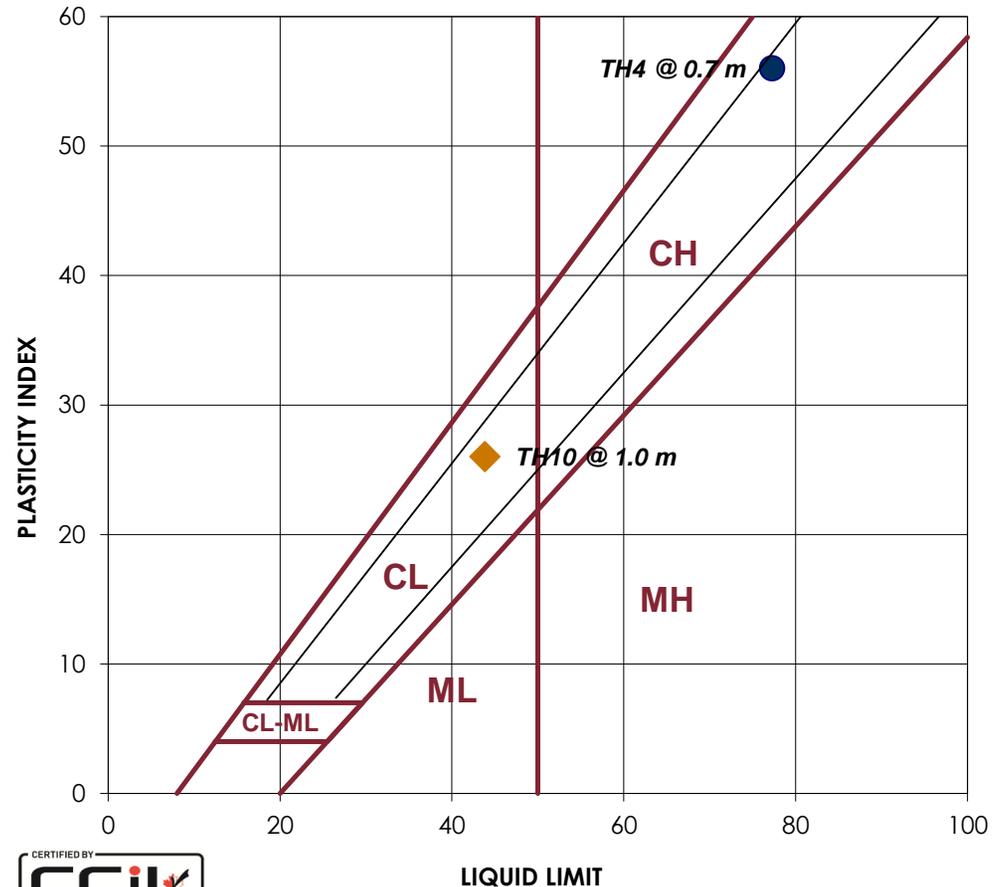
Atterberg Limits
 ASTM D4318
 Method B- One Point

Client: Stantec Consulting Ltd.
 Project Name: 2019 Street Renewal
(Assiniboine Park Drive)
 Project No: 123314117
 Date Received: December 12, 2018
 Date Tested: January 2, 2019
 Tested By: Nestor Abarca, C.Tech.

LABORATORY

199 Henlow Bay
 Winnipeg, Manitoba
 Canada R3Y 1G4
 Tel: (204) 488-6999

Sample: TH4 @ 0.7 m		Sample: TH10 @ 1.0 m	
LIQUID		LIQUID	
1	2	Trial No.	
22	22	Number of Blows	20
238	272	Container Number	154
32.01	35.15	Wt. Sample (wet+tare)(g)	35.84
26.86	28.47	Wt. Sample (dry+tare)(g)	30.55
20.30	19.96	Wt. Tare (g)	18.80
6.6	8.5	Wt. Dry Soil (g)	11.8
5.2	6.7	Wt. Water (g)	5.3
78.5%	78.5%	Water Content (%)	45.0%
77.3%	77.3%	Corrected Water Content (%)	43.9%
PLASTIC		PLASTIC	
1	2	Trial No.	
277	314	Container Number	261
32.36	31.3	Wt. Sample (wet+tare)(g)	32.9
30.28	29.37	Wt. Sample (dry+tare)(g)	30.91
20.59	20.37	Wt. Tare (g)	19.92
9.7	9.0	Wt. Dry Soil (g)	11.0
2.1	1.9	Wt. Water (g)	2.0
21.5%	21.4%	Water Content (%)	18.1%
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	77	LL	44
PL	21	PL	18
PI	56	PI	26
Natural MC (%)	30.9%	Natural MC (%)	12.0%
CLASSIFICATION		CLASSIFICATION	
CH		CL	



Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. STANTEC is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of STANTEC.

Reviewed By: Guillaume Beauce, B.Sc., P. Eng.



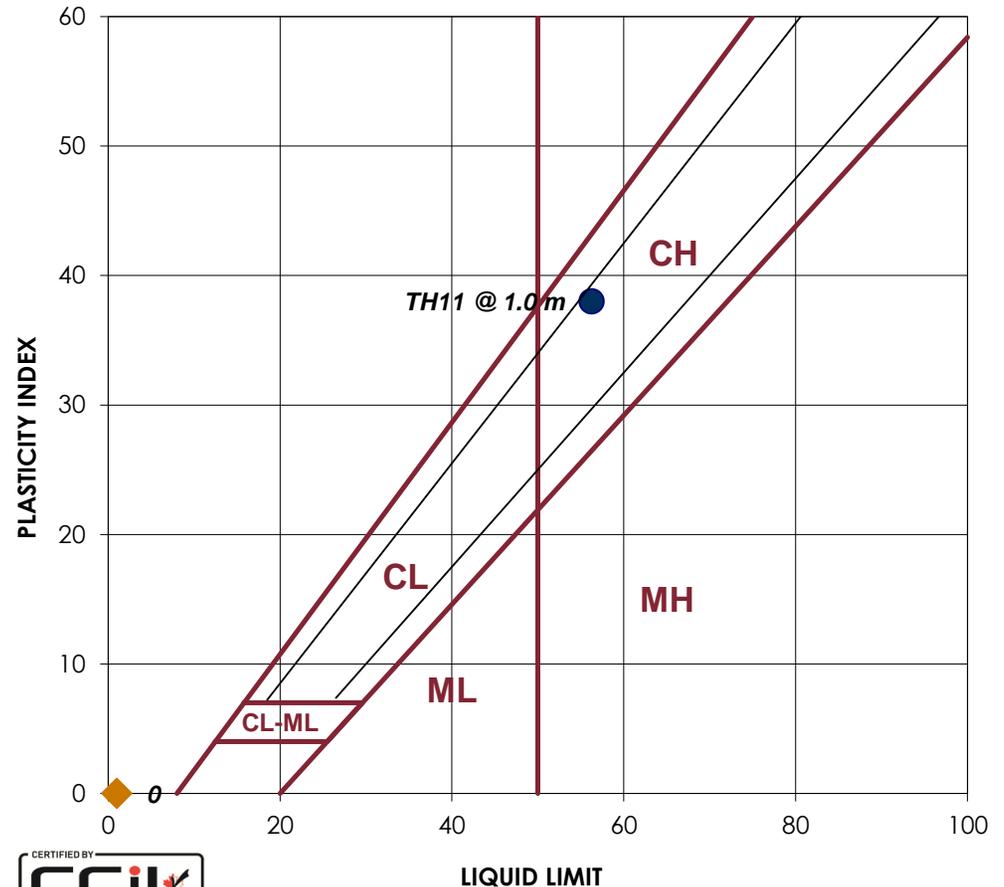
Atterberg Limits
 ASTM D4318
 Method B- One Point

Client: Stantec Consulting Ltd.
 Project Name: 2019 Street Renewal
(Assiniboine Park Drive)
 Project No: 123314117
 Date Received: December 12, 2018
 Date Tested: January 2, 2019
 Tested By: Nestor Abarca, C.Tech.

LABORATORY

199 Henlow Bay
 Winnipeg, Manitoba
 Canada R3Y 1G4
 Tel: (204) 488-6999

Sample: TH11 @ 1.0 m		Sample:	
LIQUID		LIQUID	
1	2	Trial No.	
20	20	Number of Blows	
180	210	Container Number	
33.43	37.43	Wt. Sample (wet+tare)(g)	
28.05	30.68	Wt. Sample (dry+tare)(g)	
18.74	19.01	Wt. Tare (g)	
9.3	11.7	Wt. Dry Soil (g)	
5.4	6.8	Wt. Water (g)	
57.8%	57.8%	Water Content (%)	
56.2%	56.3%	Corrected Water Content (%)	
PLASTIC		PLASTIC	
1	2	Trial No.	
223	231	Container Number	
33.45	30.86	Wt. Sample (wet+tare)(g)	
31.37	29.17	Wt. Sample (dry+tare)(g)	
19.58	19.54	Wt. Tare (g)	
11.8	9.6	Wt. Dry Soil (g)	
2.1	1.7	Wt. Water (g)	
17.6%	17.5%	Water Content (%)	
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	56	LL	
PL	18	PL	
PI	38	PI	
Natural MC (%)	25.1%	Natural MC (%)	
CLASSIFICATION		CLASSIFICATION	
CH		NON-PLASTIC	



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Reviewed By: Guillaume Beauce, B.Sc., P. Eng.



LABORATORY
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 Winnipeg MB R3Y 1G4
 Tel: (204) 488-6999

**PARTICLE SIZE ANALYSIS
 ASTM D422**

Stantec Consulting Ltd.
 500-311 Portage Avenue
 Winnipeg, Manitoba
 R3B 2B9

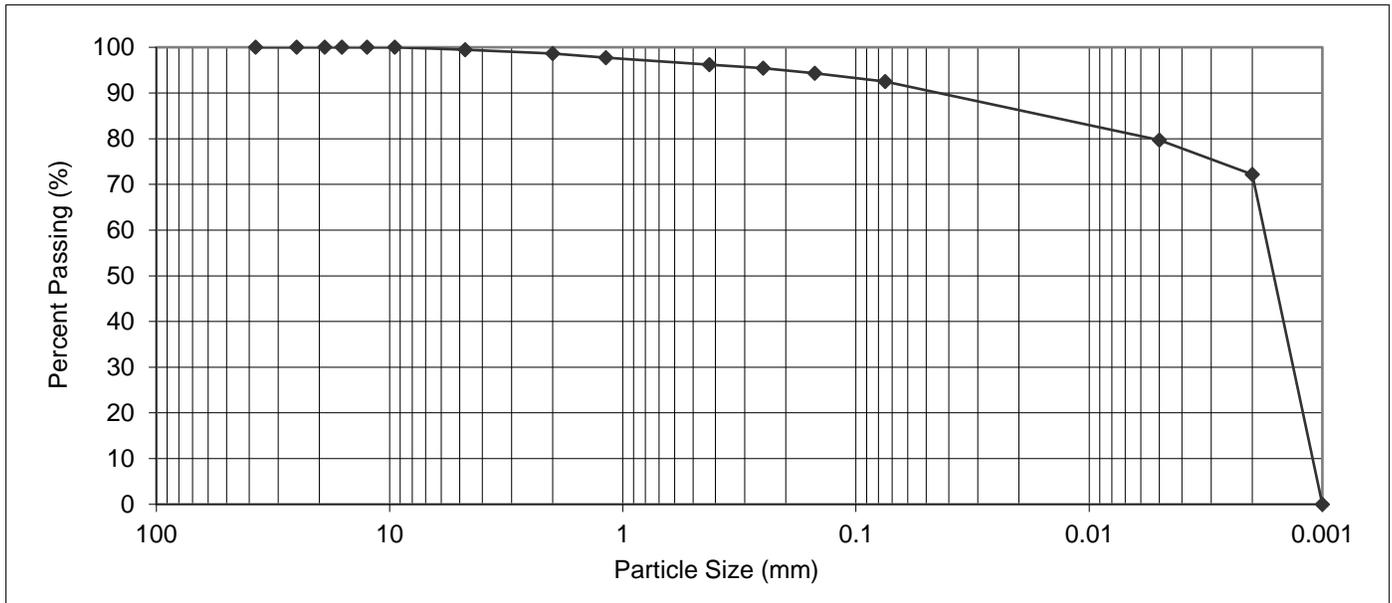
PROJECT: 2019 Street Renewal Project
 (Assiniboine Park Drive)

Attention: Guillaume Beauce

PROJECT NO.: 123314117

SAMPLED BY: Nestor Abarca, C.Tech.
 SAMPLE ID: TH4 @ 0.7 m

DATE RECEIVED: December 12, 2018
 TESTED BY: Nestor Abarca, C.Tech.



PARTICLE SIZE		PERCENT PASSING		PARTICLE SIZE		PERCENT PASSING	
37.50 mm		100.0		1.18 mm		97.7	
25.00 mm		100.0		0.425 mm		96.2	
19.00 mm		100.0		0.250 mm		95.4	
16.00 mm		100.0		0.150 mm		94.3	
12.50 mm		100.0		0.075 mm		92.5	
9.50 mm		100.0		0.005 mm		79.7	
4.75 mm		99.5		0.002 mm		72.2	
2.00 mm		98.6		0.001 mm		NT*	

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.5	0.9	2.4	3.7	20.3	72.2	NT*

NT* Sample not tested for colloids

REPORT DATE: January 8, 2019



REVIEWED BY: Guillaume Beauce, B.Sc., P. Eng.

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 Winnipeg MB R3Y 1G4
 Tel: (204) 488-6999

**PARTICLE SIZE ANALYSIS
 ASTM D422**

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 500-311 Portage Avenue
 Winnipeg, Manitoba
 R3B 2B9

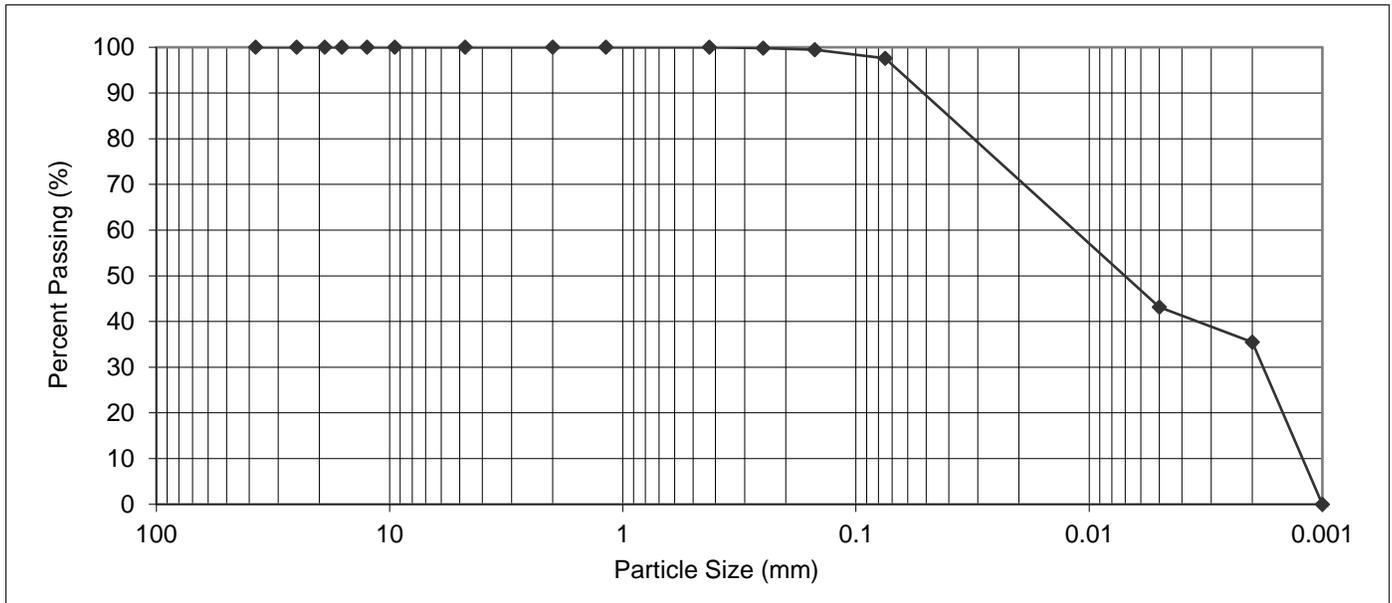
PROJECT: 2019 Street Renewal Project
 (Assiniboine Park Drive)

Attention: Guillaume Beauce

PROJECT NO.: 123314117

SAMPLED BY: Nestor Abarca, C.Tech.
 SAMPLE ID: TH10 @ 1.0 m

DATE RECEIVED: December 12, 2018
 TESTED BY: Nestor Abarca, C.Tech.



PARTICLE SIZE		PERCENT PASSING		PARTICLE SIZE		PERCENT PASSING	
37.50 mm		100.0		1.18 mm		100.0	
25.00 mm		100.0		0.425 mm		100.0	
19.00 mm		100.0		0.250 mm		99.8	
16.00 mm		100.0		0.150 mm		99.5	
12.50 mm		100.0		0.075 mm		97.6	
9.50 mm		100.0		0.005 mm		43.1	
4.75 mm		100.0		0.002 mm		35.5	
2.00 mm		100.0		0.001 mm		NT*	

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	0.0	2.4	62.1	35.5	NT*

NT* Sample not tested for colloids

REPORT DATE: January 8, 2019



REVIEWED BY: Guillaume Beauce, B.Sc., P. Eng.

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**PARTICLE SIZE ANALYSIS
 ASTM D422**

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 R3B 2B9

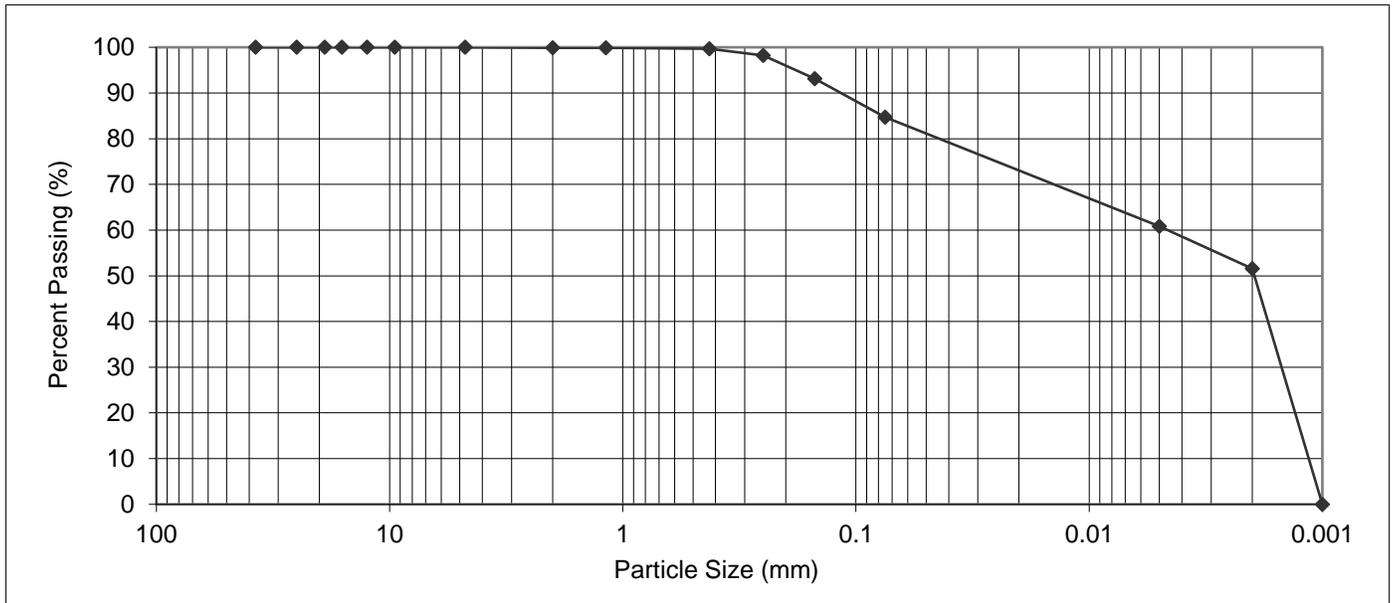
PROJECT: 2019 Street Renewal Project
 (Assiniboine Park Drive)

Attention: Guillaume Beauce

PROJECT NO.: 123314117

SAMPLED BY: Nestor Abarca, C.Tech.
 SAMPLE ID: TH11 @ 1.0 m

DATE RECEIVED: December 12, 2018
 TESTED BY: Nestor Abarca, C.Tech.



PARTICLE SIZE		PERCENT PASSING		PARTICLE SIZE		PERCENT PASSING	
37.50 mm		100.0		1.18 mm		99.9	
25.00 mm		100.0		0.425 mm		99.7	
19.00 mm		100.0		0.250 mm		98.2	
16.00 mm		100.0		0.150 mm		93.1	
12.50 mm		100.0		0.075 mm		84.7	
9.50 mm		100.0		0.005 mm		60.8	
4.75 mm		100.0		0.002 mm		51.6	
2.00 mm		99.9		0.001 mm		NT*	

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.1	0.2	15.0	33.1	51.6	NT*

NT* Sample not tested for colloids

REPORT DATE: January 8, 2019



REVIEWED BY: Guillaume Beauce, B.Sc., P. Eng.

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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' – SUB-GRADE, SUB-BASE AND BASE COURSE CONSTRUCTION

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1. DESCRIPTION

1.1 General

1.1.1 This specification covers pavement removal, excavation, preparation of sub-grade, supply and placement of sub-base and base course materials, ditch grading and boulevard grading for pavements, slab renewals, curbs, miscellaneous concrete slabs, sidewalks and other related works.

1.2 Definitions

1.2.1 Sub-grade – the natural in-situ material.

1.2.2 Sub-base – the layer of material provided between the sub-grade and the base course.

1.2.3 Base course – the layer of base course material immediately underlying the pavement wearing surface.

1.2.4 Leveling course – a non-structural layer of base course material, up to 50mm in depth, placed immediately underlying the pavement wearing surface.

1.2.5 Crushed Aggregate – Crushed aggregate from glacial till pits.

1.2.6 Crushed Limestone – Crushed limestone from a limestone quarry.

1.2.7 Crushed Granite – Crushed granite from a granite quarry.

1.2.8 Crushed Recycled Concrete – Crushed Portland Cement Concrete that has been crushed into pieces that are a group of aggregate particles cemented together which may or may not include the host (dominant) particle.

1.2.9 Deleterious Material – soft material that would decay or disintegrate from weathering, porcelain, vegetation, organic material, wood, glass, plastic, metal, reinforcing steel, building rubble, brick, shale, and friable particles.

1.3 Referenced Standard Construction Specifications

1.3.1 CW 1130 – Work Site Requirements.

1.3.2 CW 3130 – Supply and Installation of Geotextile Fabrics.

1.3.3 CW 3450 – Planing of Pavement.

2. MATERIALS

2.1 Sub-Base Materials

2.1.1 Sub-base material of the type(s) shown on the Drawings or indicated in the Specifications will be supplied in accordance with the following requirements:

- Suitable site sub-base material will be of a type approved by the Contract Administrator and meet the requirements of this Specification.
- Clay borrow sub-base material will be of a type approved by the Contract Administrator.
- Crushed sub-base material will be crushed aggregate, crushed granite, crushed limestone or crushed recycled concrete.

- Crushed sub-base material shall conform to the following grading requirements:

TABLE CW 3110.1 - Sub-Base Material Grading Requirements

Canadian Metric Sieve Size	Percent Of Total Dry Weight Passing Each Sieve	
	Maximum Aggregate Size	
	50 mm	100 mm
150 000		100%
100 000		90% - 100%
50 000	100%	50% - 75%
25 000	50% - 84%	25% - 50%
10 000	25% - 60%	20% - 40%
5 000	20% - 48%	16% - 34%
2 500	15% - 40%	12% - 28%
1 250	12% - 32%	8% - 22%
315	5% - 20%	4% - 14%
80	2% - 8%	0% - 8%

- The percentage passing the designated sieve sizes for any representative sample, when plotted on a semi-log grading chart, shall show a free flowing concave curve without sharp breaks, and shall be free from abrupt changes from one side of the grading envelope to the other to avoid gap grading.
- When crushed concrete is used, crushed concrete shall not contain loose reinforcing materials and shall have the following classifications based on weight percentages:
 - minimum of 85% Crushed Recycled Concrete
 - maximum of 8% of recycled asphaltic concrete
 - maximum of 3% clay
 - maximum of 1% deleterious material

- Crushed sub-base material shall conform to the following requirements:

TABLE CW 3110.3 - Physical Property Requirements

Tests	Testing Method	Crushed Aggregate, Granite and Limestone		Crushed Recycled Concrete	
		Maximum Aggregate Size		Maximum Aggregate Size	
		50 mm	100 mm	50 mm	100 mm
Los Angeles Abrasion, % maximum	ASTM C535 (Grading 1)	--	40	--	40
Los Angeles Abrasion, % maximum	ASTM C131 (Grading A)	35	--	35	
Liquid Limit, % maximum	ASTM D4318	--	--	22	25
Plasticity Index, % maximum	ASTM D4318	--	--	4	6

2.2 Base Course Materials

- 2.2.1 Base course material will be approved by the Contract Administrator.
- 2.2.2 Base course material will consist of sound, hard, crushed rock, crushed gravel, or crushed concrete.
- 2.2.3 Base course material should be sound durable particles produced by crushing, screening and grading of recovered materials, free from organic and soft material that would decay or disintegrate from weathering.
- 2.2.5 Crushed concrete base course material shall not contain any deleterious material.
- 2.2.6 The base course material will be well graded and conform to the following grading requirements:

TABLE CW 3110.4 - Base Course Material Grading Requirements

Canadian Metric Sieve Size	Percent Of Total Dry Weight, Passing Each Sieve
25 000	100%
20 000	94% - 100%
10 000	60% - 80%
5 000	35% - 65%
2 500	20% - 48%
1 250	12% - 34%
630	8% - 26%
315	5% - 18%
80	2% - 8%

- The percentage passing the designated sieve sizes for any representative sample, when plotted on a semi-log grading chart, shall show a free flowing concave curve without sharp breaks, and shall be free from abrupt changes from one side of the grading envelope to the other to avoid gap grading.

- Base course material shall conform to the following requirements:

TABLE CW 3110.4 - Physical Property Requirements

Tests	Testing Method	Crushed Aggregate, Granite and Limestone	Crushed Recycled Concrete
Los Angeles Abrasion, % maximum	ASTM C131 (Grading B)	35	35
Liquid Limit, % maximum	ASTM D4318	--	20
Plasticity Index, % maximum	ASTM D4318	--	Non plastic

2.3 Lime or Portland Cement

- 2.3.1 Use either Lime or General Use Cement for drying the sub-grade.
- 2.3.2 Supply Lime in accordance with CSA A82.43.
- 2.3.3 Supply Portland Cement in accordance with CSA - Section 4.

2.4 Imported Fill Material

- 2.4.1 Imported fill material will consist of low to medium plastic clays or mixtures of sand and clay, uniform in texture.
- 2.4.2 The fill material shall be free of wood, vegetation, concrete rubble or stones larger than 25 millimetres in diameter.

3. CONSTRUCTION METHODS

3.1 Pavement Removal

- 3.1.1 Remove existing concrete pavement, including curbs and asphalt overlays at locations as shown on the Drawings or as directed by the Contract Administrator. Remove all pavements to a combined thickness of 300 millimetres, unless otherwise indicated in the Specifications.
- 3.1.2 Remove existing asphalt pavement including asphalt curbs at locations as shown on the Drawings or as directed by the Contract Administrator. Remove pavement to a maximum thickness of 150 millimetres, unless otherwise indicated in the Specifications.
- 3.1.3 Saw-cut the existing pavement full-depth along the limits designated for removal.
- 3.1.4 Utilize backhoe type equipment unless approved otherwise by the Contract Administrator.
- 3.1.5 Dispose of material in accordance with Section 3.4 of CW 1130.

3.2 Excavation

- 3.2.1 Excavate in-situ material to the depth to accommodate the pavement structure as shown on the Drawings or as directed by the Contract Administrator.

- 3.2.2 Stockpile suitable in-situ material and suitable site sub-base material at locations on site as directed by the Contract Administrator.
- 3.2.3 Dispose of surplus suitable site material and unsuitable material such as frost heaving clays, silts, rocks and rubble in accordance with Section 3.4 of CW 1130.
- 3.2.4 Strip and stockpile topsoil from the site in a manner which will prevent contamination of topsoil with underlying soil materials. Stockpile the stripped topsoil at locations on site for later use.
- 3.2.5 The limits of excavation will be taken as a vertical plane 450 millimetres beyond the limits of the proposed pavement except when slip form paving equipment is specified for placement of the concrete pavement, the limits of excavation will be increased to a vertical plane 750 millimetres beyond the limits of the proposed pavement.
- 3.2.6 During excavation, the Contractor will be advised by the Contract Administrator as to which areas have an unsuitable sub-grade.
- 3.2.7 Remove wooden poles, concrete bases, or tree stumps encountered under pavements to the top of subgrade or 1 metre below the bottom of the pavement surface, whichever depth is greater.
- 3.2.8 Backfill and compact over-excavated areas with sub-base material approved by the Contract Administrator.
- 3.2.9 Excavate additional material beyond the boulevard grading and ditch grading limits as directed by the Contract Administrator.

3.3 Preparation of Sub-grade and Placement of Sub-Base Material

- 3.3.1 Compact the sub-grade after the bottom of the excavation has been approved by the Contract Administrator.
- 3.3.2 Compact areas of suitable sub-grade material, the full width of the excavation, to a minimum of 95% Standard Proctor Density.
- 3.3.3 If the sub-grade material cannot be compacted to the required density due to unstable soils, high water table, high moisture, or other conditions, the Contractor shall proceed as directed by the Contract Administrator and approved by the City of Winnipeg, Research and Standards Engineer.
- 3.3.4 Sub-base material shall not be placed over frozen subsoil.
- 3.3.5 Place and compact suitable site sub-base material before placing any new sub-base material, as directed by the Contract Administrator.
- 3.3.6 Place and compact crushed sub-base material with or without geogrid as directed by the Contract Administrator in accordance with CW 3135.
- 3.3.7 Place and compact sub-base materials in layers to a depth of 3 times the maximum aggregate size. Compact to a minimum of 100% Standard Proctor Density, for the full width of the excavation, and each layer must be levelled and approved by the Contract Administrator before the succeeding layer may be placed.
- 3.3.8 Layering, mixing or blending of crushed concrete with crushed aggregate or crushed limestone sub-base materials is not allowed.
- 3.3.9 Recompact or replace any layer, which has been rejected as directed by the Contract

Administrator.

- 3.3.10 When excess water has been applied, either by sprinkling operations or by precipitation, to cause local or continuous pondage, soil compaction will not be permitted until sufficient soil drying has occurred, creating a condition lending itself favourably to compacting operations. Exercise necessary precautions to protect compacted areas against excess wetting from any natural or artificial sources of water application.
- 3.3.11 Should excess moisture from continuous or heavy precipitation threaten to unduly delay the completion of the Contract, apply in writing to the Contract Administrator requesting permission to use Lime or Portland Cement to dry out the clay sub-grade or sub-base material at specific location(s).

3.4 Placement of Sub-Base Material With Geotextile Fabric

- 3.4.1 Install separation or separation/reinforcement geotextile fabric in accordance with CW 3130.
- 3.4.2 For stable sub-grades, place and compact sub-base material to a minimum depth of 150 millimetres.
- 3.4.3 For unstable sub-grades, place and compact sub-base material to a minimum depth of 300 millimetres or greater thickness as directed by the Contract Administrator.
- 3.4.4 Place sub-base material by end-dumping methods and level with front-end loader type of equipment as approved by the Contract Administrator to avoid damage to the geotextile fabric and minimize sub-grade failures.
- 3.4.5 Layering, mixing or blending of crushed concrete with crushed aggregate or crushed limestone sub-base materials is not allowed.
- 3.4.6 Avoid sudden stops or sharp turns by construction equipment during placement of sub-base materials.
- 3.4.7 Construction traffic will not be allowed to travel on the placed sub-base material until approved by the Contract Administrator.

3.5 Placement of Crushed Sub-base Material with Geotextile Fabric and Geogrid For Unstable Sub-grades

- 3.5.1 Prepare the subgrade in accordance with Section 3.3 of this Specification.
- 3.5.2 Supply and install separation (non-woven) geotextile fabric over the subgrade in accordance with CW 3130.
- 3.5.3 Supply and install geogrid over the separation (non-woven) fabric in accordance with CW 3135.
- 3.5.4 Supply crushed sub-base material in accordance with Section 2.1 of CW 3110.
- 3.5.5 Place crushed sub-base material by end dumping down the centre of the excavation. The sub-base shall be pushed forward and levelled using a track type dozer where possible, to build a thickened section to support the hauling operations and avoid damage to the subgrade, geotextile fabric or geogrid. This procedure shall continue until all sub-base material has been placed down the centre of the excavation.
- 3.5.6 Spread the crushed sub-base material to facilitate final grades utilizing a track type dozer.

- 3.5.7 Initial compaction of the crushed sub-base material shall consist of two complete passes utilizing vibratory type equipment capable of compacting the material. Each pass shall be overlapped by half the width of the roller. All additional compaction shall be completed utilizing static type equipment. No trucks, rubber tire loaders or graders will be allowed to travel on the sub-base material until the Contract Administrator has approved the compaction of the sub-base.

3.6 Placement of Base Course Material

- 3.6.1 Place and compact base course material to a minimum 75 millimetres thickness for pavement and approaches to a minimum of 100% Standard Proctor Density for the full width of the excavation unless otherwise shown on the Drawings or as directed by the Contract Administrator.
- 3.6.2 Level the compacted base course to the finished base course elevation.
- 3.6.3 Maintain the finished base course until the pavement is placed.
- 3.6.4 Spread base course material uniformly to avoid segregation, free of pockets of fine and coarse material.
- 3.6.5 Place and compact leveling course to a maximum thickness of 50 millimetres for sidewalks, renewal of existing curbs and miscellaneous concrete slabs, to 95% Standard Proctor Density.
- 3.6.6 Place and compact base course material immediately beneath pavement and forms to provide firm support.

3.7 Placement of Imported Fill

- 3.7.1 Place fill materials to satisfy the grading requirements of boulevard and ditches.
- 3.7.2 Supply material in accordance with Section 2.5 of this specification.
- 3.7.3 Compact to a minimum of 95% Standard Proctor Density.
- 3.7.4 Imported fill shall be free of frozen lumps and shall be placed and compacted in an unfrozen state. Imported fill shall not be placed over frozen subsoil.

3.8 Grading of Boulevards

- 3.8.1 Grading of the boulevards and medians to receive sod will be understood to mean the required excavation or backfilling to a depth up to 150 millimetres so that the boulevards and medians, after compaction, are at a uniform depth of 100 millimetres below finished boulevard grade, as shown on the Drawings.
- 3.8.2 Remove all debris, stones and concrete rubble from the boulevards and medians before commencing grading.
- 3.8.3 Grade the boulevards and medians to receive sod, unless otherwise shown on the Drawings or as directed by the Contractor Administrator.
- 3.8.4 Remove all debris, stones and concrete rubble from the boulevards and medians before commencing grading.
- 3.8.5 Excavate to a depth of up to 150 millimetres to meet the final grade 100 millimetres below finished boulevard grade.

- 3.8.6 Place and compact suitable backfill material as approved by the Contract Administrator to a depth of up to 150 millimetres to meet the final grade 100 millimetres below finished boulevard grade.
- 3.8.7 Supply backfill material in accordance with Section 2.5 of this specification.
- 3.8.8 Compact backfill materials to a minimum of 95% Standard Proctor Density.

3.9 Grading of Ditches

- 3.9.1 Grading of ditches will be understood to mean the required excavation or backfilling to a depth up to 300 millimetres so that the ditches, after compaction are at finished grade where no sodding is required or at a uniform depth of 100 millimetres below finished grade where sodding is required.
- 3.9.2 Grade ditches as shown on the Drawings or as directed by the Contract Administrator.
- 3.9.3 Excavate to a depth of up to 300 millimetres to meet the final ditch grade requirements.
- 3.9.4 Place and compact suitable backfill material as approved by the Contract Administrator to a depth of up to 300 millimetres to meet the final ditch grade requirements.
- 3.9.5 Supply backfill material in accordance with Section 2.5 of this specification.
- 3.9.6 Compact backfill materials to a minimum of 95% Standard Proctor Density.

3.10 Quality of Sub-grade, Sub-base and Base Course Layers

- 3.10.1 Utilize quality control tests to determine the acceptability of the sub-grade, sub-base and base course layers, as placed and compacted before the succeeding layer may be applied.
- 3.10.2 Promptly fill holes made by sampling with appropriate material and thoroughly compact to conform with the adjoining material.
- 3.10.3 Where Field Density Tests cannot be performed, the Contractor shall proof roll to verify the stability and uniformity of compaction. Proof rolling procedures shall comply with the following requirements:
 - The test roller equipment shall be either a tandem-axle rear dump truck or a tri-axle rear dump truck (with raised third axle) loaded to a minimum gross weight of 30 tonnes. The Contractor may, with the approval of the Contract Administrator, use alternate equipment that produces similar results;
 - Tire pressure shall be no less than 90 percent of the manufacturer's recommended maximum inflation;
 - Operate the equipment between 4.0 and 8.0 km/hr;
 - Proof rolling must be carried out the same calendar day that compaction is completed, otherwise the surface must be watered and given a minimum of three passes with the roller prior to the commencement of proof rolling;
 - Rutting in excess of 25 mm but not more than 150 mm shall not be accepted and the layer will be reworked and compacted to the required density. No substantial surface cracking or lateral movement of the layer shall be allowed; and

- Where the rutting exceeds 150 mm, proceed as directed by the Contract Administrator.

3.10.4 The frequency and number of tests will be as directed by the Contract Administrator.

3.11 Removal of Existing Concrete Bases

- 3.11.1 Remove existing concrete bases as shown on the Drawings or as directed by the Contract Administrator.
- 3.11.2 Remove to a depth of 1.0 metre below finished grade.
- 3.11.3 Dispose of material in accordance with Section 3.4 of CW 1130.
- 3.11.4 Backfill holes remaining with base course material and compact to the satisfaction of the Contract Administrator.

4. QUALITY ASSURANCE TESTING

- 4.1 The Contract Administrator shall ensure that a minimum of one sample of base course and sub-base materials are tested prior to starting construction in accordance with Sections 2.1 and 2.2. The Contract Administrator shall ensure that the materials are sampled in accordance with ASTM D75 Standard Practice for Sampling Aggregates. Copies of the test results shall be sent to the City of Winnipeg, Research and Standards Engineer.
- 4.2 The Contractor shall not deliver materials to site prior to approval of the Contract Administrator.
- 4.3 If one test fails to meet the requirements of this Specification, the material shall be re-tested. If the material fails a second test, the Contractor shall designate a new source for supply of the material. The Contractor shall reimburse the City for any additional costs the City incurs as a result of failed tests.
- 4.4 The Contract Administrator shall confirm that materials delivered to site are equal to or better than the materials tested prior to construction by sampling from site and testing in accordance with Section 4.7. The Contract Administrator shall be present to witness that the sampling is in accordance with ASTM D75 Standard Practice for Sampling Aggregates. Where required, the Contractor shall supply and operate a front-end loader to assist with sampling.
- 4.5 If circumstances make it necessary to collect samples from the quarry rather than the site, the Contractor shall provide a written explanation to the Contract Administrator and the City of Winnipeg, Research and Standards Engineer for approval.
- 4.6 The Contractor shall provide a weekly estimate of the material supplied to the Contract Administrator.
- 4.7 The Contract Administrator shall ensure the frequency of quality assurance tests during construction is as follows:

Gradation and Micro-Deval Abrasion tests for crushed aggregate, crushed granite, and crushed limestone:

For subbase: <2000 tonnes per project – The minimum testing frequency for each size shall be one sample, then sample every 3000 tonnes for 50 mm aggregate and 5000 tonnes for 100 aggregate.

For base: <500 m³ per project – The minimum testing frequency shall be one sample, then sample every 750 m³.

Gradation, Los Angeles Abrasion, Micro-Deval Abrasion, CBR, Percentage of Fractured Particles, Liquid Limit and Plasticity Index for crushed recycled concrete:

For subbase: <1200 tonnes per project – The minimum testing frequency for each size shall be one sample, then sample every 2000 tonnes for 50 mm aggregate and 3000 tonnes for 100 mm aggregate.

For base: <300 m³ per project – The minimum testing frequency shall be one sample, then sample every 500 m³.

- 4.8 When a change in the properties of the materials occurs or when the performance of materials is found to be unsatisfactory, the use of the materials shall be discontinued until the Contractor, with the approval of the Contract Administrator, proves the source to be satisfactory. Copies of the new test results shall be sent to the City of Winnipeg, Research and Standards Engineer.
- 4.9 The Contractor shall cease using the non-complying materials and at the discretion of the Contract Administrator, remove the unacceptable materials, including those that have already been placed and compacted. No payment shall be made for unacceptable materials.
- 4.10 The Contract Administrator shall be allowed access to all sampling locations and reserves the right to take a sample at any time.
- 4.11 When more than one source is used for supplying materials, test data from each source and material shall be managed independently.
- 4.12 The Contractor shall provide written notification to the Contract Administrator and the City of Winnipeg, Research and Standards Engineer prior to changing the aggregate source. The Contractor shall reimburse the City for any additional costs the City incurs as a result of the change.
- 4.13 Determine the Standard Proctor Density for the sub-grade, sub-base and base course materials at the optimum moisture content in accordance with ASTM Standard D698. The field density of each sub-grade, sub-base and base course layers will be a percentage of the applicable Standard Proctor Density, in Sections 3.3, 3.4, 3.5 and 3.6 of this specification.
- 4.14 Verify the field density of the compacted layers by Field Density Tests in accordance with ASTM Standard D1556, Test for Density of Soil in Place by the Sand-Cone Method, or ASTM Standard D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil Aggregate by Nuclear Methods (Shallow Depth). The Contractor shall reimburse the City for any additional costs the City incurs as a result of failed tests.
- 4.15 Testing in addition to the requirements of this Specification shall be as directed by the Contract Administrator.
- 4.16 There shall be no charge for any materials taken for testing purposes.

5. MEASUREMENT AND PAYMENT

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5.1 Pavement Removal

5.1.1 Pavement removal will be measured on an area basis and paid for at the Contract Unit Price per square meter for the "Items of Work" listed here below. The area to be paid for will be the total number of square metres of existing pavement removed in accordance with this specification, accepted and measured by the Contract Administrator.

Items of Work:

Pavement Removal

i.) Concrete Pavement

ii.) Asphalt Pavement

5.1.2 Disposal of material will be included in the payment for the "Items of Works" listed for pavement removal.

5.1.3 Curb and asphalt overlay will be included in the payment for the Item of Work if both are removed in one operation with the pavement.

5.1.4 Payment for pavement over 300mm in thickness will be paid in ratio to the thickness over 300mm.

5.2 Stripping and Stockpiling Topsoil

5.2.1 Stripping and stockpiling topsoil will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Stripping and Stockpiling Topsoil". The volume to be paid for will be the total number of cubic metres of existing topsoil stripped and stockpiled in accordance with this specification, accepted and measured by the Contract Administrator.

5.3 Excavation

5.3.1 Excavation will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Excavation". The volume to be paid for will be the total number of cubic metres excavated in accordance with this specification, accepted and measured by the Contract Administrator.

5.3.2 The volume of excavation will be measured by cross-sections in its original position and computed by the method of Average End Areas.

5.3.3 Only material excavated within the limits of excavation will be included in the payment for "Excavation".

5.3.4 Disposal of material, removal of miscellaneous trees, shrub and concrete bases unless otherwise indicated in the Specifications, will be included in payment for "Excavation".

5.3.5 Excavation of solid bedrock, glacial till, boulders, loose rock, concrete rubble and foundations which are located within the limits of excavation and which require the use of additional or unconventional excavation equipment will be measured and paid for in addition to the unit price for excavation.

5.4 Sub-grade Compaction

5.4.1. Sub-grade compaction will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Sub-Grade Compaction". The area to be paid for will be the total number of square metres of sub-grade compacted in accordance with this specification, accepted and measured by the Contract Administrator.

5.5 Sub-base Material

5.5.1 Suitable Site Sub-base Material

5.5.1.1 The reloading, hauling, placing and compaction of suitable site sub-base material will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Placing Suitable Site Sub-base Material". The volume to be paid for will be the total number of cubic metres of suitable site sub-base material placed in accordance with this specification, accepted and measured by the Contract Administrator.

5.5.1.2 The volume of suitable sub-base material will be measured by cross-sections and computed by the method of Average End Areas.

5.5.1.3 Only material placed within the limits of excavation will be included in the payment for "Placing Suitable Site Sub-base Material".

5.5.1.4 No measurement or payment will be made for materials rejected by the Contract Administrator.

5.5.2 Clay Borrow Sub-base Material

5.5.2.1 The supplying, placing and compaction of clay borrow sub-base material will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Supplying and Placing Clay Borrow Sub-base Material". The volume to be paid for will be the total number of cubic metres of material compacted in place in accordance with this specification, accepted and measured by the Contract Administrator.

5.5.2.2 The volume of clay borrow sub-base material will be measured by cross-sections and computed by the method of Average End Areas.

5.5.2.3 Only material placed within the limits of excavation will be included in the payment for "Supplying and Placing Clay Borrow Sub-base Material".

5.5.2.4 No measurement or payment will be made for materials rejected by the Contract Administrator.

5.5.3 Crushed Sub-base Material

5.5.3.1 The supplying, placing and compaction of crushed sub-base material will be measured on a weight basis and paid for at the Contract Unit Price per tonne for the "Items of Work" listed here below. The weight to be paid for will be the total number of tonnes of crushed sub-base material supplied and placed in accordance with this specification, accepted and measured by the Contract Administrator.

Items of Work:

Crushed Sub-Base Material

- i.) 50 mm*
- ii.) 100mm*

*Limestone, Granular or Crushed Concrete Material may be specified.

5.5.3.2 The weight to be paid for will be the total number of tonnes of crushed sub-base material as measured on a certified weigh scale.

5.5.3.3 Only material placed within the limits of excavation will be included in the payment for the "Items of Work" listed for crushed sub-base material.

5.5.3.4 No measurement or payment will be made for materials rejected by the Contract Administrator.

5.6 Base Course Material

5.6.1 The supplying, placing and compaction of base course material will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for the "Supplying and Placing Base Course Material *". The volume to be paid for will be the total number of cubic metres of base course material supplied and placed in accordance with this specification, accepted and measured by the Contract Administrator.

* Limestone, Granular or Crushed Concrete Material may be specified.

5.6.2 The volume of base course material will be measured by cross-sections and computed by the method of Average End Areas.

5.6.3 Only material placed within the limits of excavation will be included in payment for "Supplying and Placing Base Course Material" or "Asphalt Cuttings Base Course Material".

5.6.4 No measurement or payment will be made for materials rejected by the Contract Administrator.

5.7 Leveling Course

5.7.1 No payment will be made for leveling course.

5.8 Grading of Boulevards

5.8.1 The grading of boulevards will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Grading of Boulevards". The area to be paid for will be the total number of square metres of boulevards graded in accordance with this specification, accepted and measured by the Contract Administrator.

5.8.2 Additional excavation over 150 millimetres in depth required to complete boulevard grading will be paid for as "Boulevard Excavation".

5.8.3 Additional placement of backfill material over 150 millimetres in depth required to complete boulevard grading will be paid as "Imported Fill Material".

5.9 Ditch Grading

5.9.1 Ditch grading will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Ditch Grading". The area to be paid for will be the total number of square metres of ditch graded in accordance with this specification, accepted and measured by the Contract Administrator.

5.9.2 Additional excavation over 300 millimetres in depth required to complete the ditch grading will be paid for as "Ditch Excavation".

5.9.3 Additional placement of backfill material over 300 millimetres in depth required to complete

the ditch grading will be paid as "Imported Fill Material".

5.10 Boulevard Excavation

5.10.1 Boulevard excavation will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Boulevard Excavation". The volume to be paid for will be the total number of cubic metres of boulevard excavated in accordance with this specification, accepted and measured by the Contract Administrator.

5.10.2 The volume of excavation will be as measured by cross-sections in its original position and computed by the method of Average End Areas.

5.11 Ditch Excavation

5.11.1 Ditch excavation will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Ditch Excavation". The volume to be paid for will be the total number of cubic metres of ditches excavated in accordance with this specification, accepted and measured by the Contract Administrator.

5.11.2 The volume of excavation will be as measured by cross-sections in its original position and computed by the method of Average End Areas.

5.12 Removal of Existing Concrete Bases

5.12.1 Removal of existing concrete bases will be measured on a unit basis and paid for at the Contract Unit Price per unit for the "Items of Work" listed here below. The number of units to be paid for will be the total number of existing concrete bases removed in accordance with this specification, accepted and measured by the Contract Administrator.

Items of Work:

Removal of Existing Concrete Bases

i.) 600 mm Diameter or Less

ii.) Greater than 600 mm Diameter

5.12.2 No measurement or payment will be made for concrete bases removed for parking metres and precast concrete bases for traffic signs.

5.13 Imported Fill Material

5.13.1 Imported material fill will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Imported Fill Material". The volume to be paid for will be the total number of cubic metres of imported fill material supplied and placed in accordance with this specification, accepted and measured by the Contract Administrator.

5.13.2 The volume of imported fill material will be computed from cross-sections by the method of Average End Areas.

5.14 Lime or Portland Cement

5.14.1 Lime for drying the sub-grade will be measured on a weight basis and paid for at the Contract Unit Price per tonne for "Supplying and Placing Lime". The weight to be paid for will be the total number of tonnes of Lime supplied and placed in accordance with this specification, accepted and measured by the Contract Administrator.

5.14.2 Portland Cement for drying the sub-grade will be measured on a weight basis and paid for at the Contract Unit Price per tonne for "Supplying and Placing Portland Cement". The weight to be paid for will be the total number of tonnes of Portland Cement supplied and placed in

accordance with this specification, accepted and measured by the Contract Administrator.

5.14.3 The weight to be paid for will be the total number of tonnes of Lime or Portland Cement as measured on a certified weigh scale.

APPENDIX 'C' – SUPPLY AND INSTALLATION OF GEOTEXTILE FABRICS

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1. DESCRIPTION

1.1 General

1. This specification covers the supply and installation of Separation (slit-tape or slit-film woven), Separation/Filtration (nonwoven), and Subgrade Stabilization fabrics relating to Surface Works construction.
2. All property values, with the exception of apparent opening size, represent minimum average roll values (MARV) in the weakest principle direction. Values for apparent opening size represent maximum roll values.

1.2 Definitions

Nonwoven Geotextile:	A planar geosynthetic made of randomly orientated yarns produced by bonding fibres, or interlocking fibres, or both bonding and interlocking fibres by mechanical, chemical, or thermal means.
Slit-Tape / Slit-Film Woven Geotextile:	A planar geosynthetic made from flat, tape-like yarns that are produced by slitting and extruded film. Unsuitable for applications in which high groundwater or moderate to high moisture contents are present.
Multi-Filament Fibrillated Yarn High Strength Woven Geotextile:	A planar woven geotextile made from high-tenacity long-chain synthetic polymers composed of at least 95 percent by weight polyolefins. They shall form a stable network such that the filaments or yarns retain their dimensional stability relative to each other, including selvages.
Minimum Average Roll Value (MARV):	Property value calculated as typical minus two standard deviations. It shall yield a 97.7 percent degree of confidence that any sample taken during quality assurance testing will exceed value reported.
Typical Value (TV):	The mean value calculated from documented manufacturing quality control test results for a defined population obtained from one test method associated with one specific property.
Minimum Value (MV):	The lowest sample value from documented manufacturing quality control test results for a defined population from one test method associated with one specific property.
Separation:	A geosynthetic function in which a geotextile is used to prevent mixing of two dissimilar materials to maintain their engineering properties such as a subgrade soil and an aggregate cover.
Filtration:	A geosynthetic function in which a geotextile is placed between two dissimilar soils to allow for long-term passage of water into a subsurface drainage system and retain the in-situ soil.
Reinforcement:	A geosynthetic function in which a geotextile acts as a tensile member in the surface structure of a pavement.

Confinement:	A geosynthetic function in which a geosynthetic prevents the lateral movement (rutting) of aggregate.
Stabilization:	The use of a geosynthetic or combination of geosynthetics and geogrid on weak to very weak subgrade conditions (CBR \leq 3.0%) to provide the coincident functions of separation, filtration, reinforcement, and confinement.
California bearing ratio (CBR)	Standard test method for evaluation of the mechanical strength of materials in accordance with ASTM Standard D1883.

1.3 **Referenced Standard Construction Specifications**

1. CW 3110 – Sub-Grade, Sub-Base and Base Course Construction.
2. CW 3120 – Installation of Subdrains
3. CW 3135 – Supply and Installation of Geogrid.
4. Approved Products for Surface Works.

2. **MATERIALS**

2.1 **Approved Products**

1. Use only those materials listed as Approved Products for Surface Works. The Approved Products are available in Adobe Acrobat (.pdf) format at the City of Winnipeg, Corporate Finance, Material Management Internet site at:
https://www.winnipeg.ca/finance/findata/matmgt/std_const_spec/current/Docs/Approved_Products_Surface_Works.pdf
2. Assiniboine Park Drive – Asphalt Reconstruction: Geotextile fabric will be Mirafi RS380i High-tenacity Polypropylene Woven Geotextile or approved equal.

Manufacturer - TenCate Geosynthetics

Supplier - Corix Water Products Limited
1835 Hekla Avenue
Winnipeg, MB R2R 0K3

Attention: Dan Gilkes
Ph: 204-632-0331
Fax: 204-632-0391
Email: Dan.Gilkes@corix.com

2.2 **Material Identification**

1. Geotextile fabric is to be labelled in accordance with ASTM D4873/D4873M, and must clearly show the manufacturer name, product style number and roll number.
2. Products without proper identification or labelling, mislabelling, or misrepresentation of materials shall be rejected.

2.3 Shipment, Storage and Handling

1. Geotextile rolls shall be wrapped with a material that will protect the geosynthetic, including the ends of the roll, from damage due to shipment, water, sunlight, and contaminants.
2. Protective wrapping shall be maintained during shipment and storage and shall remain on the geotextile fabric until installation.
3. During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from site construction damage, precipitation, contamination of dirt or dust, extended ultraviolet radiation, and any other environmental condition that may damage the physical property values of the geosynthetic.

2.4 Certification

1. The Contractor shall provide Mill Certificate and MARV Roll Data to the Contract Administrator prior to installation. The Certification shall state that the furnished geotextile meets MARV requirements of the specification as evaluated under the Manufacturer's quality control program. The Certification shall be attested to by a person having legal authority to bind the Manufacturer.
2. The Contractor shall provide a letter to the Contract Administrator stating the product name, manufacturer, style number, chemical composition of the filaments or yarns and other pertinent information to fully describe the geotextile.
3. All testing and data to be in accordance with approved ASTM standards. Data reported in accordance with other standards will not be accepted.

2.5 Geotextile Property Requirements for Separation, Filtration, and Stabilization

2.5.1. Separation Geotextile Fabric

1. Separation geotextile fabric will be a slit-tape or slit-film woven fabric and will be used where the subgrade contains low fines (less than 15% passing the 0.075 mm sieve) with CBR \geq 3.0% and not subject to seasonal increases in moisture content or fluctuating water table.
2. Separation geotextile fabric shall meet or exceed the following requirements:

Table CW 3130.1 – Separation Fabric Requirements

Physical Property	Statistical Reporting	Standard	Test Method
Grab Tensile Strength, minimum	MARV	1400 N	ASTM D4632
Elongation, maximum	MARV	<50%	ASTM D4632
CBR Puncture, minimum	MARV	4000 N	ASTM D 6241
Trapezoid Tear, minimum	MARV	500 N	ASTM D4533
Apparent Opening Size, maximum	TV	0.43 mm	ASTM D4751
Permittivity, minimum	MV	0.05 sec ⁻¹	ASTM D4491
Flow Rate, minimum	MV	160 l/min/m ²	ASTM D4491
U.V. Resistance, minimum	MV	70% after 500 hrs	ASTM D4355

All physical property requirements shall be provided using the appropriate statistical reporting method in Table CW 3130.1 and as defined by ASTM D4759.

2.5.2. Filtration Geotextile Fabric

1. Separation/Filtration geotextile fabric will be nonwoven and will be used for unsaturated subgrade soils containing high fines (more than 15% passing the 0.075 mm sieve) with CBR \geq 3.0% and subject to seasonal increases in moisture content or fluctuating water table.
2. Separation/Filtration geotextile fabric shall meet or exceed the following requirements:

Table CW 3130.2 – Separation/Filtration Fabric Requirements

Physical Property	Statistical Reporting	Standard	Test Method
Grab Tensile Strength, minimum	MARV	900 N	ASTM D4632
Elongation, minimum	MARV	50%	ASTM D4632
CBR Puncture, minimum	MARV	2200 N	ASTM D 6241
Trapezoid Tear, minimum	MARV	350 N	ASTM D4533
Apparent Opening Size, maximum	TV	0.18 mm	ASTM D4751
Permittivity, minimum	MV	1.4 sec ⁻¹	ASTM D4491
Flow Rate, minimum	MV	3870 l/min/m ²	ASTM D4491
U.V. Resistance, minimum	MV	70% after 500 hrs	ASTM D4355

All physical property requirements shall be provided using the appropriate statistical reporting method in Table CW 3130.2 and as defined by ASTM D4759.

2.5.3. Stabilization Geotextile Fabric

1. Stabilization fabric will be either a multi-filament fibrillated yarn high strength woven geotextile or separation/filtration geotextile fabric (non-woven) and geogrid, and will be used for saturated fine-grained subgrade (more than 15% passing the 0.075 mm sieve) with CBR less than 3.0% and/or subject to thaw weakening, or erodible silt subgrades to provide the coincident functions of separation, filtration, and reinforcement.
2. The multi-filament fibrillated yarn high strength woven geotextile shall meet or exceed the following requirements:

Table CW 3130.3 – Subgrade Stabilization Geotextile Fabric Requirements

Physical Property	Statistical Reporting	Machine Direction	Cross-Machine Direction	Test Method
Ultimate Tensile Strength, minimum	MARV	70.0 kN/m	70.0 kN/m	ASTM D4595
Tensile Strength (at 5% Strain), minimum	MARV	35.0 kN/m	43.8 kN/m	ASTM D4595
Flow Rate, minimum	MV	1222 l/min/m ²		ASTM D4491
Apparent Opening Size, maximum	TV	0.60 mm – maximum		ASTM D4751
Permittivity, minimum	MV	0.5 sec ⁻¹		ASTM D4491
U.V. Resistance, minimum	MV	>70% after 500 hrs		ASTM D4355

All physical property requirements shall be provided using the appropriate statistical reporting method in Table CW 3130.3 and as defined by ASTM D4759.

3. Separation/filtration geotextile fabric (non-woven) and geogrid must meet the requirements of both CW 3130 Section 2.5.2 and CW 3135 Section 2.5.

3. CONSTRUCTION METHODS

1. Commence installation of geotextile fabric after material has been approved by the Contract Administrator and the preparation of the sub-grade has been completed and accepted in accordance with CW 3110.
2. The surface of the subgrade should be relatively smooth and level. Depressions or humps greater than 50 mm should be removed.
3. The geotextile fabric shall be laid smooth without wrinkles or folds on the prepared sub-grade in the direction of the construction traffic. The geotextile fabric shall be free from any tension or stress.
4. Adjacent geotextile rolls should be overlapped along their sides and ends as a function of subgrade strength as follows:

CBR > 3%:	450 mm overlap
3% ≥ CBR > 2%:	750 mm overlap
2% ≥ CBR > 0.5%:	900 mm overlap or sewn
CBR ≤ 0.5%:	Sewn
All roll ends	1000 mm or sewn

For every 500 metres, the average CBR value shall be used to determine the overlap.

5. On curves, the geotextile may be cut or folded to conform to the curves.
6. Install pins or place piles of sub-base material as required in order to hold geotextile fabric in place.
7. Install geotextile fabric to the complete limits of the roadway sub-grade including intersections and turning lanes or as directed by the Contract Administrator.
8. Prior to covering, the geotextile shall be inspected by the Contract Administrator for damage (e.g. holes, tears, rips) during installation.
9. Cover the damaged area with a geotextile patch that extends an amount equal to the required overlap beyond the damaged area.
10. Remove and replace geotextile fabric that is improperly installed or damaged as directed by the Contract Administrator.
11. Construction vehicles are not permitted directly on the geosynthetic. Turning of vehicles shall not be permitted on the first lift above the geotextile.
12. Install geotextile fabric in accordance with this specification and procedures recommended by the manufacturer.
13. Place and compact the sub-base over the geotextile fabric in accordance with CW3110.

14. For sub-grades with $\text{CBR} \geq 3.0\%$, place and compact sub-base material to a minimum of 150 mm over the geotextile fabric prior to allowing construction traffic to travel on the sub-base.
15. For subgrades with $\text{CBR} < 3.0\%$, place and compact sub-base material to a minimum of 300 mm over the geotextile fabric prior to allowing construction traffic to travel on the sub-base.
16. The minimum lift thickness may need to be increased for very weak subgrades to prevent spreading equipment from damaging the geosynthetic as directed by the Contract Administrator.

4. MEASUREMENT AND PAYMENT

1. Supply and installation of "Geotextile Fabric" will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Geotextile Fabric". The area to be paid for will be the total number of square metres of "Geotextile Fabric" (*), supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

(*) - Specify Separation, Separation/Filtration, or Stabilization.

2. Only material placed within the designated sub-grade limits will be included in the payment for "Geotextile Fabric".
3. No measurement or payment will be made for geotextile fabric removed and replaced due to improper installation or damaged materials.
4. No measurement or payment will be made for overlapped material described in this Specification.