THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 2-2018

2018 REGIONAL STREET RENEWAL – ROBLIN BOULEVARD EASTBOUND FROM CHALFONT ROAD TO SHAFTESBURY BOULEVARD AND ASSINIBOINE PARK DRIVE FROM ROBLIN BOULEVARD TO COMMISSARY ROAD - RECONSTRUCTION AND ASSOCIATED WORKS

Note to Bidders: Please be aware of revisions to B13.4

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 2018 REGIONAL STREET RENEWAL – ROBLIN BOULEVARD EASTBOUND FROM CHALFONT ROAD TO SHAFTESBURY BOULEVARD AND ASSINIBOINE PARK DRIVE FROM ROBLIN BOULEVARD TO COMMISSARY ROAD - RECONSTRUCTION AND ASSOCIATED WORKS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, March 22, 2018.

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 Bid Opportunity, 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 Bid Opportunity 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 Bid Opportunity 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 Bid Opportunity 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 Bid Opportunity, 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.

B5.2.1 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

B5.2.2 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.

B5.3 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.

B6. SUBSTITUTES

B6.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.

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 B16.

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) Bid Security

(i) Form G1: Bid Bond and Agreement to Bond, or
Form G2: Irrevocable Standby Letter of Credit and Undertaking, or
a certified cheque or draft.

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 Bid Opportunity 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 Bid Opportunity 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 Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B16.1(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 For the convenience of Bidders, and pursuant to B7.4.2 and B16.4.2, an electronic spreadsheet Form B: Prices in Microsoft Excel (.xls) format is available along with the Adobe PDF documents for this Bid Opportunity 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. QUALIFICATION

B11.1 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.

B11.2 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

B11.3 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).

B11.4 Further to B11.3(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™) or

(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/.

B11.5 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.

B11.6 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.

B12. BID SECURITY

B12.1 The Bidder shall provide bid security in the form of:

(a) 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); or

(b) an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Bid Price, and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form included in the Bid Submission (Form G2: Irrevocable Standby Letter of Credit and Undertaking); or

(c) a certified cheque or draft payable to "The City of Winnipeg", in the amount of at least fifty percent (50%) of the Total Bid Price, drawn on a bank or other financial institution registered to conduct business in Manitoba.

B12.1.1 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.

B12.1.2 All signatures on bid securities shall be original.

B12.1.3 The Bidder shall sign the Bid Bond.

B12.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.

B12.2 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 performance security furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B12.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B12.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.

B12.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.

B12.3 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 Bid Opportunity.

B13. OPENING OF BIDS AND RELEASE OF INFORMATION

B13.1 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.

B13.1.1 Bidders or their representatives may attend.

B13.1.2 Bids determined by the Manager of Materials, or his/her designate, to not include the bid security specified in B12 will not be read out.

B13.2 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/

B13.3 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/

B13.4 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).

B13.4.1 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.

B14. IRREVOCABLE BID

B14.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.

B14.2 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 performance security 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.

B15. WITHDRAWAL OF BIDS

B15.1 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.

B15.1.1 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.

B15.1.2 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.

B15.1.3 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 B15.1.3(b), declare the Bid withdrawn.

B15.2 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 B14.2 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.

B16. EVALUATION OF BIDS

B16.1 Award of the Contract shall be based on the following bid evaluation criteria:

(a) compliance by the Bidder with the requirements of the Bid Opportunity, or acceptable deviation therefrom (pass/fail);

(b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B11 (pass/fail);

(c) Total Bid Price;

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

B16.2 Further to B16.1(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.

B16.3 Further to B16.1(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 responsible and qualified.

B16.4 Further to B16.1(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.

B16.4.1 Further to B16.1(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.

B16.4.2 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.

B17. AWARD OF CONTRACT

B17.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B17.2 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 responsible and qualified, and the Bids are determined to be responsive.

B17.2.1 Without limiting the generality of B17.2, 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.

B17.3 The Work of this Contract is contingent upon Council approval of sufficient funding in the 2018 Capital Budget. If the Capital Budget approved by Council does not include sufficient funding for the Work, the City will have no obligation to award a Contract.

B17.4 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B16.

B17.4.1 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 2006 12 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 Bid Opportunity 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 Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard

(b) Rehabilitation and Associated Works
  (i) Roblin Boulevard Multi-Use Pathway from Chalfont Road to Shaftesbury Boulevard

(c) Asphalt Reconstruction and Associated Works
  (i) Assiniboine Park Drive from Roblin Boulevard to Commissary Road

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

(a) Concrete Reconstruction and Associated Works
  (i) Planing of existing asphalt and at intersections as required;
  (ii) Construction of asphalt pavement for asphalt cross-overs;
  (iii) Removal of existing pavement;
  (iv) Removal of existing curb, splash strip, bullnose and sidewalk;
  (v) Removal of existing trees;
  (vi) Removal of existing catch basin;
  (vii) Abandon existing catch basin;
  (viii) Abandon existing spillways;
  (ix) Installation of 250mm LDS, 300mm LDS, 450mm LDS and manholes;
  (x) Installation of catch basins and sewer service pipe;
  (xi) Installation of subdrains;
  (xii) Relocation of existing hydrants and water valves;
  (xiii) Insulation of watermain;
  (xiv) Relocation of electrical works for Outfront Media Bus Stop Shelter;
  (xv) Excavation;
  (xvi) Compaction of existing sub-grade;
  (xvii) Adjustment of existing pavement and boulevard structures;
  (xviii) Placement of separation geotextile fabric and geogrid;
  (xix) Placement of limestone sub-base material;
  (xx) Construction of French Drains;
  (xxi) Placement of limestone base course material;
  (xxii) Construction of 200mm concrete pavement(plain dowelled);
  (xxiii) Construction of 250mm concrete pavement(plain-dowelled);
  (xxiv) Construction of 250mm concrete pavement(plain-dowelled) and integral 180mm barrier curb utilizing slip form paving equipment;
  (xxv) Installation of curb inlet frames;
  (xxvi) Construction of reinforced concrete spillways with riprap;
  (xxvii) Construction of separate concrete splash strip;

(xxviii) Construction of monolithic concrete splash strip utilizing slip form paving equipment;
(xxix) Construction of barrier curb utilizing slip form paving equipment;
(xxx) Construction of concrete sidewalk;
(xxxi) Construction of separate barrier curb at asphalt cross-overs;
(xxxii) Renewal of existing curbs as required;
(xxxiii) Renewal of existing sidewalks as required;
(xxxiv) Installation of detectable warning surface tiles;
(xxxv) Construction of asphalt overlay(average thickness 80mm);
(xxxvi) Construction of asphalt pavement at tie-ins and median openings as required;
(xxxvii) Removal of existing culverts;
(xxxviii) Installation of corrugated steel pipe culvert;
(xxxix) Installation of culvert end markers;
(xl) Installation of ditch inlet grates with cast-in-place concrete collar;
(xli) Construction of grouted stone riprap;
(xlii) Ditching; and
(xliii) Boulevard restoration.

(b) Rehabilitation and Associated Works – Roblin Boulevard Multi-use Pathway
(i) Removal of existing bollard;
(ii) Excavation;
(iii) Removal of existing culverts;
(iv) Installation of corrugated steel pipe culvert;
(v) Installation of culvert end markers;
(vi) Compaction of sub-grade;
(vii) Placement of crushed sub-base material;
(viii) Planing of existing asphalt pavement;
(ix) Preparation of pathway base course(asphalt cuttings);
(x) Placement of scratch asphalt pavement(50mm - Type 1A asphalt);
(xi) Placement of pavement repair fabric(Glas Grid);
(xii) Placement of final lift asphalt pavement(50mm - Type 1A asphalt);
(xiii) Placement of asphalt pavement at tie-ins as required;
(xiv) Construction of concrete sidewalk;
(xv) Ditching as required; and
(xvi) Boulevard restoration.

(c) Asphalt Reconstruction and Associated Works – Assiniboine Park Drive
(i) Construction of temporary asphalt widenings;
(ii) Removal of existing asphalt pavement;
(iii) Excavation;
(iv) Compaction of sub-grade;
(v) Placement of separation geotextile fabric and geogrid;
(vi) Placement of limestone sub-base material;
(vii) Placement of limestone base course material;
(viii) Placement of scratch asphalt pavement(70mm - Type III asphalt);
(ix) Placement of final lift asphalt pavement(50mm - Type 1A asphalt);
(x) Placement of asphalt pavement at tie-ins as required;
(xi) Restoration of temporary asphalt widenings;
(xii) Ditching as required;
(xiii) Installation of culvert end markers;

(xiv) Placement of limestone surface material; and

(xv) Boulevard restoration.

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 D6.2

D6.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator identified in D3.1.

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 Bid Opportunity. If the Contractor requires additional sets of the Bid Opportunity, 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:

(a) commercial general liability insurance, in the amount of at least two million dollars ($2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed

motor vehicle liability, non-owned automobile liability, broad form property damage cover and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;

(b) if applicable, 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 provide the City Solicitor with a certificate(s) of insurance, 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.

D10.4 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.

D11. PERFORMANCE SECURITY

D11.1 The Contractor shall provide and maintain performance security 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; or

(b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or

(c) a certified cheque or draft payable to “The City of Winnipeg”, drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.

D11.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.

D11.2 If the bid security provided in his/her Bid was not a certified cheque or draft pursuant to B12.1(c), the Contractor shall provide the City Solicitor with the required performance security 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 and in no event later than the date specified in the C4.1 for the return of the executed Contract.

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.

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 performance security specified in D11;
  (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 7, 2018, and shall commence the Work on Site no later than May 22, 2018, as directed by the Contract Administrator and weather permitting.

D14.4 The City intends to award this Contract by April 30, 2018.

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(jj);

D15.1.1 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.

D15.1.2 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.

D15.1.3 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 Saturdays, 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;

(c) City of Winnipeg Water and Waste – inspection of new land drainage sewer, new hydrant assemblies and watermain repairs;

(d) City of Winnipeg Geomatics – various works on survey monuments;

(e) City of Winnipeg Urban Forestry Branch – review tree conditions; and

(f) Outfront Media – remove and reinstall bus stop shelters and benches.

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 3 Phases. Each Phase shall be subdivided into stages. Stages are further subdivided into major items of work.

D18.1.2 **Phase I** – Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard, and Roblin Boulevard Multi-use Pathway from Chalfont Road to Station 9+50

(a) **Stage I** – Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Ditching, Land Drainage Sewer, Hydrants, Asphalt Cross-over Construction 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 250mm LDS, 300mm LDS, 450mm LDS and manholes;

(vi) Abandon and removal of existing catch basin;

(vii) Installation of catch basins and sewer service pipe;

(viii) Installation of ditch inlet grates with cast-in-place concrete collar;

(ix) Construction of grouted stone riprap;

(x) Relocation of existing hydrants and water valves;

(xi) Insulation of watermain;

(xii) Adjustment of existing pavement and boulevard structures;

(xiii) Removal of existing trees;

(xiv) Removal of existing median, as shown on drawing; and

(xv) Construction of asphalt pavement for asphalt cross-overs at Assiniboine Park Drive and Station 7+40, as shown on drawing.

(b) **Stage II** – Roblin Boulevard Eastbound Left Turn Lane and Median Lane at Shaftesbury Boulevard – Concrete Reconstruction

(i) Removal of existing median, as shown on drawing;

(ii) Removal of existing tree;
(iii) Removal of existing pavement;
(iv) Excavation;
(v) Compaction of existing sub-grade;
(vi) Adjustment of existing pavement and boulevard structures;
(vii) Placement of separation geotextile fabric and geogrid;
(viii) Placement of limestone sub-base material;
(ix) Placement of limestone base course material;
(x) Construction of 250mm concrete pavement(plain dowelled); and
(xi) Construction of asphalt pavement for asphalt cross-over at Shaftesbury Boulevard, as shown on drawing.

(c) **Stage III** – Roblin Boulevard Multi-use Pathway from Chalfont Road to Station 9+50 – Rehabilitation
(i) Removal of existing bollard;
(ii) Excavation;
(iii) Removal of existing culverts;
(iv) Installation of corrugated steel pipe culvert;
(v) Compaction of existing sub-grade;
(vi) Placement of crushed sub-base material;
(vii) Planing of existing asphalt pavement;
(viii) Preparation of pathway base course(asphalt cuttings);
(ix) Placement of scratch asphalt pavement(50mm - Type 1A asphalt);
(x) Placement of pavement repair fabric(Glas Grid);
(xi) Placement of final lift asphalt pavement(50mm - Type 1A asphalt);
(xii) Placement of asphalt pavement at tie-ins as required;
(xiii) Construction of concrete sidewalk(@ Chalfont Road);
(xiv) Installation of culvert end markers;
(xv) Ditching as required; and
(xvi) Boulevard restoration.

(d) 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.

(e) Construction in all Stages of Phase I may run concurrently. Roblin Boulevard Eastbound and Westbound traffic must be maintained at all times.

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 Multi-use Pathway from Station 9+50 to Shaftesbury Boulevard, Assiniboine Park Drive from Roblin Boulevard to Commissary Road, Roblin Boulevard Eastbound from Assiniboine Park Drive to Station 7+40

(a) **Stage I** – Roblin Boulevard Multi-use Pathway from Station 9+50 to Shaftesbury Boulevard – Rehabilitation
(i) Excavation;
(ii) Removal of existing culverts;
(iii) Installation of corrugated steel pipe culvert;
(iv) Compaction of existing sub-grade;
(v) Placement of crushed sub-base material;
(vi) Planing of existing asphalt pavement;

(vii) Preparation of pathway base course(asphalt cuttings);
(viii) Placement of scratch asphalt pavement(50mm - Type 1A asphalt);
(ix) Placement of pavement repair fabric(Glas Grid);
(x) Placement of final lift asphalt pavement(50mm - Type 1A asphalt);
(xi) Placement of asphalt pavement at tie-ins as required;
(xii) Installation of culvert end markers;
(xiii) Ditching as required; and
(xiv) Boulevard restoration.

(b) **Stage II** – Assiniboine Park Drive from centreline of #700 Assiniboine Park Drive Approach to Commissary Road – Asphalt Reconstruction
(i) Construction of temporary asphalt widening at #700 Assiniboine Park Drive approach;
(ii) Removal of existing asphalt pavement;
(iii) Excavation;
(iv) Compaction of existing sub-grade;
(v) Placement of separation geotextile fabric and geogrid;
(vi) Placement of limestone sub-base material;
(vii) Placement of limestone base course material;
(viii) Placement of scratch asphalt pavement(70mm - Type III asphalt);
(ix) Placement of scratch asphalt pavement at tie-ins as required(70mm - Type III asphalt);
(x) Ditching as required;
(xi) Placement of limestone surface material; and
(xii) Boulevard restoration.

(c) **Stage III** - Assiniboine Park Drive from Roblin Boulevard to the centreline of #700 Assiniboine Park Drive – Asphalt Reconstruction
(i) Construction of temporary asphalt widening at #700 Assiniboine Park Drive approach;
(ii) Removal of existing asphalt pavement;
(iii) Excavation;
(iv) Compaction of existing sub-grade;
(v) Placement of separation geotextile fabric and geogrid;
(vi) Placement of limestone sub-base material;
(vii) Placement of limestone base course material;
(viii) Placement of scratch asphalt pavement(70mm - Type III asphalt);
(ix) Placement of scratch asphalt pavement at tie-ins as required(70mm - Type III asphalt);
(x) Restoration of temporary asphalt widenings;
(xi) Ditching as required;
(xii) Boulevard restoration;
(xiii) Installation of culvert end markers;
(xiv) Placement of final lift asphalt pavement – Stage II & Stage III(50mm - Type 1A asphalt); and
(xv) Placement of limestone surface material.

(d) **Stage IV** – Roblin Boulevard Eastbound from Assiniboine Park Drive to Station 7+40 – Concrete Reconstruction
(i) Removal of existing pavement;
(ii) Removal of existing curb, splash strip, median, bullnose and sidewalk;

(iii) Removal of existing trees;
(iv) Abandon existing spillways;
(v) Abandon existing catch basin;
(vi) Installation of catch basins and sewer service pipe;
(vii) Installation of subdrains;
(viii) Relocation of electrical works for Outfront Media Bus Stop Shelters;
(ix) Excavation;
(x) Compaction of existing sub-grade;
(xi) Adjustment of existing pavement and boulevard structures;
(xii) Placement of separation geotextile fabric and geogrid;
(xiii) Placement of limestone sub-base material;
(xiv) Placement of limestone base course material;
(xv) Construction of 250mm concrete pavement(plain dowelled) and integral 180mm curb utilizing slip form paving equipment;
(xvi) Installation of curb inlet frames;
(xvii) Construction of 250mm concrete pavement(plain dowelled);
(xviii) Construction of reinforced concrete spillway with riprap;
(xix) Construction of separate concrete splash strip;
(xx) Construction of monolithic concrete splash strip utilizing slip form paving equipment;
(xxi) Construction of concrete sidewalk;
(xxii) Installation of detectable warning surface tiles;
(xxiii) Construction of separate barrier curb at asphalt cross-over at Assiniboine Park Drive;
(xxiv) Renewal of existing curb as required;
(xxv) Renewal of existing sidewalk as required;
(xxvi) Planing of existing asphalt and at intersections as required;
(xxvii) Construction of asphalt overlay(average thickness 80mm);
(xxviii) Construction of asphalt pavement at tie-ins and median openings as required; and
(xxix) Boulevard restoration.

(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 specified in D18.1.2.

(g) No construction Works in Stage II and Stage III shall commence prior to Stage I completion as specified in D18.1.4(a).

(h) Construction in Stage I and Stage IV may run concurrently. Roblin Boulevard Eastbound and Westbound 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.

D18.1.6 **Phase III** – Roblin Boulevard Eastbound from Station 7+40 to Shaftesbury Boulevard

(a) **Stage I** – Roblin Boulevard Eastbound from Station 7+40 to Shaftesbury Boulevard – Concrete Reconstruction

(i) Removal of existing pavement;
(ii) Removal of existing curb, splash strip, median, bullnose and sidewalk;

(iii) Abandon existing spillways;
(iv) Abandon existing catch basin;
(v) Installation of catch basin and sewer service pipe;
(vi) Installation of subdrains;
(vii) Excavation;
(viii) Compaction of existing sub-grade;
(ix) Adjustment of existing pavement and boulevard structures;
(x) Placement of separation geotextile fabric and geogrid;
(xi) Placement of limestone sub-base material;
(xii) Construction of French Drains;
(xiii) Placement of limestone base course material;
(xiv) Construction of 250mm concrete pavement(plain dowelled) and integral 180mm curb utilizing slip form paving equipment;
(xv) Installation of curb inlet frames;
(xvi) Construction of 250mm concrete pavement(plain dowelled);
(xvii) Construction of 200mm concrete pavement(plain dowelled);
(xviii) Construction of reinforced concrete spillway with riprap;
(xix) Construction of separate concrete splash strip;
(xx) Construction of barrier curb utilizing slip form paving equipment;
(xxi) Construction of concrete sidewalk;
(xxii) Installation of detectable warning surface tiles;
(xxiii) Construction of separate barrier curb at asphalt cross-over at Station 7+40 and Shaftesbury Boulevard;
(xxiv) Renewal of existing curb as required;
(xxv) Renewal of existing sidewalk as required;
(xxvi) Planing of existing asphalt and at intersections as required;
(xxvii) Construction of asphalt pavement at tie-ins and median openings as required; and
(xxviii) Boulevard restoration.

(b) No construction Works in Phase III shall commence prior to Phase II completion as specified in D18.1.4.

D18.1.7 Immediately following the completion of the asphaltic concrete works of Phase III, 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) Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard as specified in D18.1.2(c) and D18.1.4(a) to be completed no later than June 22, 2018, as directed by the Contract Administrator.

(b) Assiniboine Park Drive from Roblin Boulevard to Commissary Road as specified in D18.1.4(b) and D18.1.4(c) shall not commence before July 3, 2018 and shall be completed no later than August 17, 2018, 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 Stages, 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) Phase II – Stage I as specified in D18.1.4(a) – one thousand five hundred dollars ($1500.00);

(b) Phase II – Stage III as specified in D18.1.4(c) – one thousand five hundred dollars ($1500.00);

(c) Substantial Performance – three thousand dollars ($3000.00);

(d) Total Performance – one thousand dollars ($1000.00).

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 B11.4, 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 B11.4.

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 two (2) years thereafter unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

FORM H1: PERFORMANCE BOND
(See D11)

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

BID OPPORTUNITY NO. 2-2018

2018 REGIONAL STREET RENEWAL – ROBLIN BOULEVARD EASTBOUND FROM CHALFONT ROAD TO SHAFTESBURY BOULEVARD AND ASSINIBOINE PARK DRIVE FROM ROBLIN BOULEVARD TO COMMISSARY ROAD - 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: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)
(See D11)

_____
(Date)

The City of Winnipeg
Legal Services Department
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1

RE: PERFORMANCE SECURITY – BID OPPORTUNITY NO. 2-2018

2018 REGIONAL STREET RENEWAL – ROBLIN BOULEVARD EASTBOUND FROM CHALFONT ROAD TO SHAFTESBURY BOULEVARD AND ASSINIBOINE PARK DRIVE FROM ROBLIN BOULEVARD TO COMMISSARY ROAD - RECONSTRUCTION AND ASSOCIATED WORKS

Pursuant to the request of and for the account of our customer,

_____ ,
(Name of Contractor)

_____
(Address of Contractor)

WE HEREBY ESTABLISH in your favour our irrevocable Standby Letter of Credit for a sum not exceeding in the aggregate

_____

_____ Canadian dollars.

This Standby Letter of Credit may be drawn on by you at any time and from time to time upon written demand for payment made upon us by you. It is understood that we are obligated under this Standby Letter of Credit for the payment of monies only and we hereby agree that we shall honour your demand for payment without inquiring whether you have a right as between yourself and our customer to make such demand and without recognizing any claim of our customer or objection by the customer to payment by us.

The amount of this Standby Letter of Credit may be reduced from time to time only by amounts drawn upon it by you or by formal notice in writing given to us by you if you desire such reduction or are willing that it be made.

Partial drawings are permitted.

We engage with you that all demands for payment made within the terms and currency of this Standby Letter of Credit will be duly honoured if presented to us at:

_____
(Address)

and we confirm and hereby undertake to ensure that all demands for payment will be duly honoured by us.

All demands for payment shall specifically state that they are drawn under this Standby Letter of Credit.

Subject to the condition hereinafter set forth, this Standby Letter of Credit will expire on

_____ .
(Date)

It is a condition of this Standby Letter of Credit that it shall be deemed to be automatically extended from year to year without amendment from the present or any future expiry date, unless at least 30 days prior to the present or any future expiry date, we notify you in writing that we elect not to consider this Standby Letter of Credit to be renewable for any additional period.

This Standby Letter of Credit may not be revoked or amended without your prior written approval.

This credit is subject to the Uniform Customs and Practice for Documentary Credit (2007 Revision), International Chamber of Commerce Publication Number 600.

_____
(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

FORM J: SUBCONTRACTOR LIST
(See D12)

2018 REGIONAL STREET RENEWAL – ROBLIN BOULEVARD EASTBOUND FROM CHALFONT ROAD TO SHAFTESBURY BOULEVARD AND ASSINIBOINE PARK DRIVE FROM ROBLIN BOULEVARD TO COMMISSARY ROAD - RECONSTRUCTION AND ASSOCIATED WORKS

Portion of the Work	Name	Address
SURFACE WORKS:		
Supply of Materials:		
Separation Geotextile Fabric and Geogrid		
Pavement Repair Fabric(Glas Grid)		
Limestone Sub-base Material		
Limestone Base Course Material		
Limestone – Surface Material		
Crushed Sub-base Material		
Concrete		
Asphalt		
Topsoil, Salt Tolerant Seed and Sod		
Installation and Placement:		
Separation Geotextile Fabric and Geogrid		
Pavement Repair Fabric(Glas Grid)		
Limestone Sub-base Material		
Limestone Base Course Material		
Limestone – Surface Material		
Crushed Sub-base Material		
Concrete		
Asphalt		
Topsoil, Salt Tolerant Seed and Sod		
UNDERGROUND WORKS:		

FORM J: SUBCONTRACTOR LIST
(See D12)

2018 REGIONAL STREET RENEWAL – ROBLIN BOULEVARD EASTBOUND FROM CHALFONT ROAD TO SHAFTESBURY BOULEVARD AND ASSINIBOINE PARK DRIVE FROM ROBLIN BOULEVARD TO COMMISSARY ROAD - RECONSTRUCTION AND ASSOCIATED WORKS

Portion of the Work	Name	Address
Supply of Materials:		
Pre-cast Concrete Catch Basins and Manholes		
Sewer Service Pipe/LDS Pipe/Outlet Restrictor		
Subdrains		
Catch Basin Frames, Curb Inlet Frames, Covers and Lifter Rings		
Ditch Inlet Grate		
Hydrant Assembly and Watermain Valves		
Watermain Pipe		
Corrugated Steel Pipe		
Culvert End Markers		
Installation and Placement:		
Pre-cast Concrete Catch Basins and Manholes		
Sewer Service Pipes/LDS Pipe/Outlet Restrictor		
Subdrains		
Catch Basin Frames, Curb Inlet Frames, Covers and Lifter Rings		
Ditch Inlet Grate		
Hydrant Assembly and Watermain Valves		
Watermain Pipe		
Corrugated Steel Pipe		
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 Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.3 The following are applicable to the Work:

Drawing No.	Drawing Name/Title	Drawing (Original) Sheet Size
	Cover Sheet	A1
P-3490-01	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works from Chalfont Road to Sta. 2+30	A1
P-3490-02	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works from Sta. 2+30 to Sta. 3+40	A1
P-3490-03	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works from Sta. 3+40 to Sta. 4+60	A1
P-3490-04	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works from Sta. 4+60 to Sta. 5+80	A1
P-3490-05	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works from Sta. 5+80 to Sta. 7+00	A1
P-3490-06	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to	A1

Drawing No.	Drawing Name/Title	Drawing (Original) Sheet Size
	Shaftesbury Boulevard – Rehabilitation and Associated Works from Sta. 7+00 to Sta. 8+20	
P-3490-07	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works from Sta. 8+20 to Sta. 9+30	A1
P-3490-08	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works from Sta. 9+30 to Sta. 10+60	A1
P-3490-09	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works from Sta. 10+60 to Sta. 11+80	A1
P-3490-10	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works from Sta. 11+80 to Sta. 13+00	A1
P-3490-11	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works from Sta. 13+00 to Sta.14+10	A1
P-3490-12	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works from Sta. 14+10 to Sta. 15+40	A1
P-3490-13	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works from Sta. 15+40 to Sta. 16+60	A1
P-3490-14	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works Detail Drawing	A1
P-3490-15	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works Detail Drawing	A1

Drawing No.	Drawing Name/Title	Drawing (Original) Sheet Size
P-3490-16	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works Detail Drawing	A1
P-3490-17	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Roblin Boulevard Multi-use Pathway from Chalfont Road to Shaftesbury Boulevard – Rehabilitation and Associated Works Detail Drawing	A1
P-3490-18	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works Traffic Staging – Phase I, Phase II & Phase III	A1
P-3490-19	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 1+00 to Sta. 11+70 Horizontal Geometry	A1
P-3490-20	Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard – Concrete Reconstruction and Associated Works from Sta. 11+70 to Sta. 17+00 Horizontal Geometry	A1
P-3490-21	Assiniboine Park Drive from Roblin Boulevard to Commissary Road – Asphalt Reconstruction and Associated Works from Sta. 1+20 to Sta. 2+00	A1
P-3490-22	Assiniboine Park Drive from Roblin Boulevard to Commissary Road - Asphalt Reconstruction and Associated Works from Sta. 2+00 to Sta. 3+00	A1
P-3490-23	Assiniboine Park Drive from Roblin Boulevard to Commissary Road - Asphalt Reconstruction and Associated Works from Sta. 3+00 to Sta. 4+00	A1
P-3490-24	Assiniboine Park Drive from Roblin Boulevard to Commissary Road - Asphalt Reconstruction and Associated Works from Sta. 4+00 to Sta. 5+00	A1
P-3490-25	Assiniboine Park Drive from Roblin Boulevard to Commissary Road - Asphalt Reconstruction and Associated Works from Sta. 5+00 to Sta. 5+50	A1
P-3490-26	Assiniboine Park Drive from Roblin Boulevard to Commissary Road - Asphalt Reconstruction and Associated Works from Sta. 5+50 to Sta. 6+00	A1
P-3490-27	Assiniboine Park Drive from Roblin Boulevard to Commissary Road - Asphalt Reconstruction and Associated Works from Sta. 6+00 to Sta. 6+70	A1
P-3490-28	Assiniboine Park Drive from Roblin Boulevard to Commissary Road - Asphalt Reconstruction and Associated Works from Sta. 6+70 to Sta. 7+40	A1
P-3490-29	Assiniboine Park Drive from Roblin Boulevard to Commissary Road - Asphalt Reconstruction and Associated Works from Sta. 7+40 to Commissary Road	A1
P-3490-30	Assiniboine Park Drive from Roblin Boulevard to Commissary Road - Asphalt Reconstruction and Associated Works Traffic Staging – Phase II: Stage II & Stage III	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 is 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 ventalation 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^{o}C or 24-25^{o}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 Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard and Assiniboine Park Drive from Roblin Boulevard to Commissary Road.

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

(a) Maintain one lane of traffic eastbound and one lane of traffic westbound.

(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) City of Winnipeg Traffic Services Branch to maintain traffic cross-overs at Assiniboine Park Drive, Station 7+40 and Shaftesbury Boulevard, and delineation of eastbound and westbound traffic for Phase II and Phase III construction of Roblin Boulevard Eastbound from Assiniboine Park Drive to Shaftesbury Boulevard, including advance warning construction signage. Contractor responsible for general construction signage and barricades between traffic cross-overs within the area under construction.

(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.

(e) 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.

(f) Assiniboine Park Drive at Roblin Boulevard will be closed to vehicular traffic during Phase II – Stage III construction of Assiniboine Park Drive.

(g) Assiniboine Park Zoo Bus Loop at Station 7+40 must be maintained during construction to allow bus traffic to enter Bus Loop from the westbound and eastbound direction and allow bus traffic to exit Bus Loop in the westbound and eastbound direction.

(h) 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 and to 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.

(i) Intersecting street and private approach access shall be maintained at all times.

(j) Closures of side streets not permitted unless approved by the Contract Administrator.

(k) Pedestrian and ambulance/emergency vehicle access must be maintained at all times.

(l) 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.

(m) Winnipeg Transit service shall be maintained at all times.

E6.1.3 Roblin Boulevard Eastbound from Assiniboine Park Drive to Station 7+40 – Phase II:

(a) Maintain one lane of traffic eastbound and one lane of traffic westbound in the westbound lanes of Roblin Boulevard from Assiniboine Park Drive to Station 7+40.

(b) Roblin Boulevard eastbound traffic to be diverted to the westbound median lane of Roblin Boulevard at asphalt traffic cross-over at Assiniboine Park Drive.

(c) Roblin Boulevard eastbound traffic to be diverted back to the eastbound gutter lane of Roblin Boulevard at asphalt traffic cross-over at Station 7+40.

(d) City of Winnipeg Traffic Services Branch responsible for maintaining traffic cross-over area signage, and delineation of eastbound and westbound traffic in the westbound lanes of Roblin Boulevard, and any regulatory signage.

(e) Left turns are prohibited in the eastbound direction of Roblin Boulevard at Commissary Road and most westerly Assiniboine Park Zoo Entrance/Exit approach. (Note: City of Winnipeg Transit Buses and School Buses will be allowed left turns entering Assiniboine Park Zoo Bus Loop at Station 7+40 and exiting Assiniboine Park Zoo Bus Loop at Station 7+40).

E6.1.4 Roblin Boulevard Eastbound from Station 7+40 to Shaftesbury Boulevard – Phase III:

(a) Maintain one lane of traffic eastbound and one lane of traffic westbound in the westbound lanes of Roblin Boulevard from Station 7+40 to Shaftesbury Boulevard.

(b) Roblin Boulevard eastbound traffic to be diverted to the westbound median lane of Roblin Boulevard at asphalt traffic cross-over at Station 7+40.

(c) Roblin Boulevard eastbound traffic to be diverted back to the eastbound gutter lane of Roblin Boulevard at asphalt traffic cross-over at Shaftesbury Boulevard/Conservatory Drive intersection.

(d) City of Winnipeg Traffic Services Branch responsible for maintaining traffic cross-over area signage, and delineation of eastbound and westbound traffic in the westbound lanes of Roblin Boulevard, and any regulatory signage.

(e) Left turns are prohibited in the eastbound direction of Roblin Boulevard at most easterly Assiniboine Park Zoo Entrance/Exit approach and east Assiniboine Park Zoo Entrance approach. (Note: City of Winnipeg Transit Buses and School Buses will be allowed left turns entering Assiniboine Park Zoo Bus Loop at Station 7+40 and exiting Assiniboine Park Zoo Bus Loop at Station 7+40).

E6.1.5 Assiniboine Park Drive from Roblin Boulevard to Commissary Road – All Phases:

(a) 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.

(b) Alterations to the Traffic Staging shown herein must be presented and approved by the Contract Administrator at least 48 hours prior to implementing change.

(c) Intersecting street and private approach access shall be maintained at all times.

(d) Pedestrian and ambulance/emergency vehicle access must be maintained at all times.

(e) 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.

E6.1.6 Assiniboine Park Drive from #700 Assiniboine Park Drive to Commissary Road – Phase II:

(a) Assiniboine Park Drive shall be closed for construction from the centre line of #700 Assiniboine Park Drive approach to Commissary Road and no vehicular traffic will be allowed.

(b) Maintain one lane of traffic southbound and one lane of traffic northbound of Assiniboine Park Drive from Roblin Boulevard to the centre line of #700 Assiniboine Park Drive approach.

(c) Access to the City of Winnipeg Service Yard shall be maintained at all times.

(d) Access to #700 Assiniboine Park Drive shall be maintained at all times.

E6.1.7 Assiniboine Park Drive from Roblin Boulevard to #700 Assiniboine Park Drive – Phase II:

(a) Assiniboine Park Drive shall be closed for construction from Roblin Boulevard to the centre line of #700 Assiniboine Park Drive approach and no vehicular traffic will be allowed.

(b) Maintain one lane of traffic southbound and one lane of traffic northbound of Assiniboine Park Drive from the centre line of #700 Assiniboine Park Drive approach to Commissary Road.

(c) Access to the City of Winnipeg Service Yard shall be maintained at all times.

(d) Access to #700 Assiniboine Park Drive shall be maintained at all times.

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-3490-14

CONSTRUCTION METHODS

E11.2 Construction of Reinforced Concrete Spillway with Riprap

E11.2.1 Curb inlet frames to be installed with 250mm 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. TREE REMOVAL

E12.1 Further to CW 3010 – Clearing and Grubbing, tree removal including the roots shall be measured on a unit basis for the number of trees removed in accordance with CW 3010. Payment shall be at the Contract Unit Price bid for “Tree Removal” measured as specified herein for the total number of trees removed in accordance with this Specification, accepted and measured by the Contract Administrator

E13. REMOVAL OF EXISTING BOLLARD

DESCRIPTION

E13.1 General

E13.1.1 This Specification shall cover removal and disposal of existing bollard located in the Roblin Boulevard Multi-use Pathway at the southeast corner of Roblin Boulevard and Chalfont Road as indicated on the Contract Drawing.

CONSTRUCTION METHODS

E13.2 Removal of Existing Bollard

E13.2.1 Remove and dispose of existing bollard as shown on the Drawing and identified by the Contract Administrator.

E13.2.2 Backfill remaining holes to the elevation of existing grade using acceptable fill material as approved by the Contract Administrator.

MEASURMENT AND PAYMENT

E13.3 Removal and disposal of existing bollard will be measured on a unit basis and paid for at the Contract Unit Price for "Remove Existing Bollard", which price shall be payment in full for suppling all materials and for performing all operations herein described including the cost of furnishing all necessary labour, materials and other items incidental to the work included in this Specification.

E14. ELECTRICAL WORKS

GENERAL PROVISIONS

E14.1 Refer also to Contract Drawings.

E14.2 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.

E14.3 All sites to be left in a safe manner for installation of new Work.

E14.4 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.

E14.5 Conform with all Codes and pay all permits and Fees. Upon completion, present a "Certificate of Approval" for electrical Work from the Inspection Department.

E14.6 Examine the Site and local conditions affecting the Work under this contract.

E14.7 Install all Work promptly and in advance of concrete pouring and/or construction.

E14.8 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.

E14.9 All Work shall be executed in a first class and workmanlike manner. 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.

E14.10 Provide corrected "as-built" drawings on completion of the project. All underground services shall be indicated on as-builts and dimensioned.

E14.11 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.

E14.12 Identify circuits/equipment with lamacoid nameplates.

E14.13 All electrical apparatus shall be properly grounded according to the latest edition of the "Canadian Electrical Code".

E14.14 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.

E14.15 Wiring shall be copper, RWU-90, insulated, minimum #12 AWG.

E14.16 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.

E14.17 Co-ordinate disconnection, reconnection and installation with Manitoba Hydro and City of Winnipeg. Installation to conform with all utility requirements.

E14.18 Obtain all permits and inspections. Provide copies of all paperwork to the Contract Administrator prior to completion of the Work.

E14.19 Provide ground rod and grounding connections to suit Manitoba Hydro and City of Winnipeg Inspection Department.

E14.20 All distribution equipment to be weather proof.

E14.21 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.

E14.22 The Contractor shall be responsible for any damage caused the City or their Contractors by improperly carrying out this contract.

E14.23 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

E14.24 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.

E15. SUPPLY AND INSTALL DITCH INLET GRATE WITH CAST-IN-PLACE CONCRETE COLLAR

DESCRIPTION

E15.1 General

E15.1.1 This Specification shall cover the supply and installation of ditch inlet grates complete with cast-in-place concrete collars on ditch catch basins on Roblin Boulevard.

E15.1.2 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-3490-14.

MATERIALS

E15.2 All steel shall be supplied in accordance with the Detail Drawing.

E15.3 All steel shall be hot dip galvanized and all hardware shall be stainless steel.

E15.4 Ditch inlet grates shall be Shopost Iron Works MK-A1 or approved equal.

CONSTRUCTION METHODS

E15.5 Installation of Ditch Inlet Grate with Cast-In-Place Concrete Collar

E15.5.1 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.

E15.5.2 The Contractor shall form the concrete collar on top of the existing catch basin to the dimensions shown on the Detail Drawing.

E15.5.3 The Contractor shall place reinforcing steel as shown on the Detail Drawing.

E15.5.4 The Contractor shall pour the cast-in-place concrete collar.

E15.5.5 The Contractor shall drill anchor bolts into the concrete collar as shown on the Detail Drawing.

E15.5.6 The Contractor shall install the ditch inlet grate.

MEASURMENT AND PAYMENT

E15.6 The supply and install of ditch inlet grates complete with cast-in-place concrete collars shall be measured on a unit basis and paid for at the Contract Unit Price for "Supply and Install Ditch Inlet Grate c/w Cast-In-Place Concrete Collar" supplied and installed in accordance with this Specification, accepted and measured by the Contract Administrator.

E16. FRENCH DRAINS

DESCRIPTION

E16.1 General

E16.1.1 This Specification shall cover the operations relating to the construction of French drains adjacent to the road structure on Roblin Boulevard, as shown on the Contract Drawings. 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.

E16.1.2 Referenced Standard Construction Specifications and Detail Drawing:

(a) CW 1130 – Site Requirements;

(b) CW 3130 – Supply and Installation of Geotextile Fabrics; and

(c) Detail Drawing P-3490-16.

MATERIALS

E16.2 Drainage material will consist of natural gravel, crushed stone or other materials of similar characteristics having clean, hard, strong, durable, uncoated particles free from injurious amounts of soft, friable, thin, elongated or laminated pieces, alkali, organic or other deleterious matter.

E16.2.1 Drainage material will meet the following requirements:

Drainage Material Grading Requirements

CANADIAN METRIC SIEVE SIZE	PERCENTAGE OF TOTAL DRY WEIGHT PASSING EACH SIEVE
40 000	100%
25 000	50% - 80%
20 000	5% - 20%
12 500	0% - 5%
80	0% - 3%

E16.2.2 Soundness – Drainage material when subject to five cycles of the soundness test will have a weighted loss of not more than 13% in accordance with ASTM Standard C88, test for soundness of Aggregates by Use of Magnesium Sulphate.

E16.2.3 Abrasion – Drainage material when subjected to the abrasion test will have a loss of not more than 30% when tested in accordance with grading A of ASTM C131, Test for Resistance to Degradation of Small-Size Aggregate by Abrasion and Impact in the Los Angeles Machine.

E16.2.4 Drainage fabric will be non-woven and meet or exceed the requirements in accordance with Section 2.5 – Separation Geotextile Fabric of Specification CW 3130.

CONSTRUCTION METHODS

E16.3 Construction of French Drains

E16.3.1 Installation of the French Drains shall not take place until installation of the sub-base materials is complete and the ditch slopes have been backfilled and compacted adjacent to the road structure.

E16.3.2 Excavate a trench to the grade and dimensions shown on the Detail Drawing or as directed by the Contract Administrator. Excavate into the road structure as shown to ensure a physical connection between the sub-base and the French Drain. Repair any non-conforming trenches as directed by the Contract Administrator.

E16.3.3 Dispose of trench excavation material in accordance with Section 3.4 of Specification CW 1130 or as directed by the Contract Administrator.

E16.3.4 Compact sub-grade in the base of the trench to a minimum standard proctor of 90%.

E16.3.5 Place non-woven separation geotextile fabric such that it overlaps above the separation geotextile fabric in the road structure to a minimum of 300 millimetres. Ensure adequate separation geotextile fabric is placed to allow for wrapping of the drainage material, including overlap joints above and at the ends of the French Drain.

E16.3.6 Overlap joints in the separation geotextile fabric to a minimum of 500 millimetres.

E16.3.7 Backfill the trench with drainage material in 300 millimetre lifts and compact to the satisfaction of the Contract Administrator. Place drainage material to the grade and dimensions shown on the Detail Drawing or as directed by the Contract administrator.

E16.3.8 Place drainage material to ensure no damage occurs to the separation geotextile fabric.

E16.3.9 Backfill above the French Drain with suitable site material and compact to a standard proctor of 90% to the grade and dimensions shown on the Detail Drawing or as directed by the Contract Administrator.

E16.3.10 Ensure this suitable site material does not cover the end of the French Drain as to block the flow of water into the ditch.

MEASUREMENT AND PAYMENT

E16.4 Construction of French Drains

E16.4.1 Construction of French Drains will be measured on a unit basis and paid for at the Contract Unit Price for “Installation of French Drains”. The number of units to be paid for will be the total number of French Drains constructed in accordance with this Specification, accepted and measured by the Contract Administrator.

E16.4.2 All costs for removal, excavation, compaction, fabric, drainage material, superintendence and all other incidental items necessary to complete the Work described in this Specification will be included in payment for “Installation of French Drains”.

E17. CLEARING AND GRUBBING

DESCRIPTION

E17.1 General

E17.1.1 This Specification shall amend the units of measurement specified in the Standard Construction Specification CW 3010 - Clearing and Grubbing. All other specifications from CW 3010 shall still apply.

MEASUREMENT

E17.2 Method of Measurement

E17.2.1 Clearing and grubbing will be measured on an area basis in square metre units.

PAYMENT

E17.3 Basis of Payment

E17.3.1 Clearing and grubbing will be paid for at the Contract Unit Price per square metre for "Clearing and Grubbing". The area to be paid for will be the total number of square metres of clearing and grubbing in accordance with this Specification, accepted and measured by the Contract Administrator.

E18. CONSTRUCTION OF SEPARATE SPLASH STRIP WITH THICKENED EDGE

DESCRIPTION

E18.1 This Specification covers the construction of separate concrete splash strip on Roblin Boulevard.

GENERAL

E18.2 Referenced Standard Construction Specifications and Detail Drawing:

(a) CW 3310 – Portland Cement Concrete Pavement Works; and

(b) Detail Drawing P-3490-17.

CONSTRUCTION METHODS

E18.3 Further to CW 3310, the contractor shall construct the separate concrete splash strip with a thickened concrete edge as per Detail Drawing.

E18.4 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

E18.5 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.

E18.6 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.

E19. REMOVAL OF EXISTING CONCRETE SPILLWAYS

DESCRIPTION

E19.1 General

E19.1.1 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 eastbound Roblin Boulevard roadway.

CONSTRUCTION

E19.2 Removal of Existing Concrete Spillways

E19.2.1 The existing concrete spillways will be removed with the pavement removal operations.

MEASUREMENT AND PAYMENT

E19.3 Removal of Existing Concrete Spillways

E19.3.1 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.

E20. OUTLET FLOW RESTRICTOR

DESCRIPTION

E20.1 General

E20.1.1 This Specification shall cover the supply and installation of an outlet flow restrictor to a land drainage sewer pipe on Roblin Boulevard.

E20.1.2 Referenced Standard Construction Specifications:

(a) CW 2130 – Gravity Sewers; and

(b) Standard Detail SD-025B – Standard Pre-cast Concrete Catch Basin c/w Outlet Restrictor.

CONSTRUCTION METHODS

E20.2 Install outlet flow restrictor to land drainage sewer out flow pipe of the land drainage sewer manhole as per Standard Detail SD-025B.

MEASURMENT AND PAYMENT

E20.3 The supply and installation of outlet flow restrictor shall be measured on a unit basis and paid for at the Contract Unit Price for “Outlet Flow Restrictor” supplied and installed in accordance with this Specification, accepted and measured by the Contract Administrator.

E21. PLANING OF PAVEMENT

E21.1 Further to CW 3450, the asphalt cuttings will be left in place to be utilized as base course material as per Specification E22 on the Roblin Boulevard Multi-use Pathway.

MEASURMENT AND PAYMENT

E21.2 Planing of pavement will be measured on an area basis and paid for at the Contract Unit Price per square metre 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 planed in accordance with this Specification, accepted and measured by the Contract Administrator.

E21.3 Stockpiling and placement of the asphalt cuttings material will be incidental to the planing of pavement.

E22. PREPARATION OF EXISTING PATHWAY

E22.1 Further to CW 3150 – Gravel Surfacing, the gravel surface material (asphalt cuttings) compaction shall be to 100% Standard Proctor Density or as directed by the Contract Administrator on the Roblin Boulevard Multi-use Pathway.

E22.2 Preparation of existing pathway will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Preparation of Existing Roadway". The area to be paid for will be the total number of square metres of existing pathway that is scarified, regraded, shaped and compacted in accordance with this Specification, accepted and measured by the Contract Administrator.

E23. SUPPLY AND INSTALLATION OF PAVEMENT REPAIR FABRIC

DESCRIPTION

E23.1 General

E23.1.1 This specification covers the supply and installation of pavement repair fabric.

E23.1.2 Referenced Standard Construction

(a) CW 3130 – Supply and Installation of Geotextile Fabrics.

MATERIALS

E23.2 Storage and Handling

E23.2.1 Store and handle material in accordance with Section 2 of CW 3130.

E23.3 Pavement Repair Fabric

E23.3.1 Pavement repair fabric will be Glas Grid Road Reinforcement Mesh - Style 8501.

CONSTRUCTION METHODS

E23.4 General

E23.4.1 Install pavement repair fabric over the entire area of the asphalt leveling course or as directed by the Contract Administrator.

E23.4.2 The extent of the placement limits and quantities required will be determined by the Contract Administrator and provided 48 hours prior to the placement of asphalt.

E23.4.3 Proceed with installation upon completion and acceptance of the asphalt levelling course.

E23.4.4 Install fabric in accordance with the manufacturer's specifications and recommendations.

E23.4.5 Only construction equipment required to place the final asphalt surface course will be allowed to travel on the exposed fabric.

E23.4.6 Replace damaged or improperly placed fabric.

E23.4.7 Ensure temperature of the asphalt material does not exceed the melting point of the fabric.

MEASUREMENT AND PAYMENT

E23.5 Pavement Repair Fabric

E23.5.1 The supply and installation of the pavement repair fabric will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Pavement Repair Fabric". The area to be paid for will be the total number of square metres of pavement repair fabric

supplied and installed in accordance with this Specification, accepted and measured by the Contract Administrator.

E24. SUPPLY AND INSTALL WATERMAIN AND WATER SERVICE INSULATION

DESCRIPTION

E24.1 Notwithstanding 3.12 of CW 2110, this specification covers the supply and installation of insulation in roadway excavations over watermains.

E24.2 Referenced Standard Construction Specifications

(a) CW 2030 – Excavation Bedding and Backfill

(b) CW 3110 – Sub –grade, Sub-base and Base Course Construction

E24.3 Referenced Standard Details

(a) SD-018 - Watermain and Water Service Insulation

MATERIALS

E24.4 Acceptable insulation is:

(a) Extruded Polystyrene rigid foam insulation – Type 4, 4" in thickness.

DOW Roofmate or Highload 40

Owen's Corning – Foamular 350 or Foamular 400.

2" X 48" X 96", 2" X 24" X 96", 4" X 24" X 96"

E24.5 Sand Bedding:

(a) In accordance with CW 2030

CONSTRUCTION METHODS

E24.6 Prior to the installation, soft dig to locate existing watermain.

E24.7 Stockpile excavated material in accordance with CW 3110.

E24.8 Thickness of insulation is 100mm (4"). If using 50mm (2") panels 2 layers are required. Total width of insulation to be as directed by the Contract Administrator. Place sufficient full width panels to meet or exceed the specified width.

E24.9 Place insulation panels adjacent to each other over the specified area with no gaps between panels and less than 15mm of elevation difference along the adjoined edges. Where 2" thick panels are being used, offset the top layer to prevent the panel joints from aligning with the joints in the lower layer.

E24.10 Use full panels of insulation where possible. Where necessary cut insulation panels to obtain coverage to specified lengths. Insulation pieces shall be a minimum dimension of 300mm in width or length.

E24.11 Take appropriate measures to ensure panels are not displaced during backfilling operations.

MEASUREMENT AND PAYMENT

E24.12 Watermain and Water Service Insulation shall be measured on an area basis and paid for at the Contract Unit Price per square metre of "Watermain and Water Service Insulation". The area to be paid for shall be the total square meters of watermain and water service insulation supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E24.13 Location of existing watermain to be included in payment for “Watermain and Water Service Insulation”.

APPENDIX 'A' - GEOTECHNICAL REPORT

GEOTECHNICAL REPORTS FOR:

I. Roblin Boulevard from Assiniboine Park Drive to Shaftesbury Boulevard
II. Assiniboine Park Drive from Roblin Boulevard to Commissary Road

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.

ENG-TECH
CONSULTING LIMITED

420 Turenne Street, Winnipeg, Manitoba R2J 3W8
Phone: (204) 233-1694 Fax: (204) 235-1579
E-mail: engtech@mymts.net
www.eng-tech.ca

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

PROVINCE OF MANITOBA
C. D. HRYHORUK
Jan 12/18
REGISTERED PROFESSIONAL ENGINEER

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

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

CDH/pfpc

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)

ENGINEERS
GEOSCIENTISTS
MANITOBA
Certificate of Authorization
ENG-TECH Consulting Limited
No.2475

ENG-TECH CONSULTING LIMITED

420 Turenne Street, Winnipeg, Manitoba R2J 3W8
Phone: (204) 233-1694 Fax: (204) 235-1579
Email: engtech@mymts.net
www.eng-tech.ca

Table 1
Summary of Pavement Structure

File No.: 17-037-03

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
1	Roblin Blvd Westbound	Asphalt	86	Granular Fill (20 to 50 mm)	305	Granular Fill	0.1	22.6							
						Clay	0.4	33.8							
							0.7	39.9							
						Silty Clay	1.0	39.4	0.2	1.3	35.0	63.5	75	22	53
		Concrete (Rubble)	214			Clay	1.3	47.3							
							1.6	57.5							
							1.9	57.7							
2	Roblin Blvd Westbound	Asphalt	78	Granular Fill (20 to 50 mm)	343	Granular Fill	0.1	12.2							
						Clay Fill	0.4	15.7							
						Clay	0.7	30.0							
							1.0	33.4							
		Concrete	192				1.3	43.6							
							1.6	46.2							
							1.9	55.9							

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
3	Roblin Blvd Westbound	Asphalt	115	Granular Fill (20 to 50 mm)	305	Granular Fill	0.1	9.1							
						Clay Fill	0.4	17.7							
						Clay	0.7	26.7							
							1.0	30.3							
		Concrete	185				1.3	41.3							
							1.6	42.2							
							1.9	54.4							
4	Roblin Blvd Westbound	Asphalt	90	Granular Fill (20 to 50 mm)	318	Granular Fill	0.1	10.6							
						Clay Fill	0.4	19.1							
						Clay	0.7	32.3							
							1.0	36.6							
		Concrete	195				1.3	40.6							
							1.6	42.9							
							1.9	46.5							

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
7	Roblin Blvd Westbound	Asphalt	46	Granular Fill (20 to 50 mm)	978	Granular Fill	0.1	7.2							
							0.4	9.3							
							0.7	9.4							
		Concrete	194			Clay	1.0	34.4							
							1.3	38.0							
							1.6	39.1							
							1.9	42.3							
8	Roblin Blvd Westbound	Asphalt	85	Granular Fill (20 to 50 mm)	409	Granular Fill	0.1	7.9							
							0.4	10.3							
						Clay	0.7	35.5							
							1.0	32.8							
		Concrete	205				1.3	38.7							
							1.6	42.6							
							1.9	42.7							

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
9	Roblin Blvd Westbound	Asphalt	86	Granular Fill (20 to 50 mm)	940	Granular Fill	0.1	7.3							
							0.4	7.3							
							0.7	8.1							
		Concrete	201			Clay	1.0	31.9							
							1.3	38.3							
							1.6	39.2							
							1.9	41.5							
10	Roblin Blvd Westbound	Asphalt	83	Granular Fill (20 to 50 mm)	726	Granular Fill	0.1	6.4							
							0.4	6.5							
							0.7	7.8							
		Concrete	196			Clay	1.0	34.4							
							1.3	35.1							
							1.6	36.3							
							1.9	43.2							

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
11	Roblin Blvd Westbound	Asphalt	62	Granular Fill (20 to 50 mm)	739	Granular Fill	0.1	17.5							
							0.4	8.9							
							0.7	8.0							
						Clay	1.0	27.4							
		Concrete	204			Silty Clay	1.3	20.1							
							1.6	24.0							
						Clay	1.9	30.5							
12	Roblin Blvd Westbound	Asphalt	77	Granular Fill (20 to 50 mm)	343	Granular Fill	0.1	9.1							
							0.4	8.1							
						Clay Fill	0.7	16.5							
		Concrete	186			Clay	1.0	32.1							
							1.3	34.1							
							1.6	41.3							
							1.9	41.4							

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							
						Clay	0.4	34.5							
							0.7	34.3							
							1.0	38.4							
		Concrete	200				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							
						Clay Fill	0.4	15.7							
						Clay	0.7	36.6							
							1.0	35.0	0.0	2.9	9.6	87.5	84	25	59
		Concrete	200				1.3	38.2							
							1.6	41.2							
							1.9	45.6							

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
15	Roblin Blvd Eastbound	Asphalt	80	Granular Fill (20 to 50 mm)	267	Granular Fill	0.1	13.9							
						Clay	0.4	22.9							
							0.7	38.1							
						Clayey Silt	1.0	40.2	0.1	2.8	51.3	45.9	66	22	44
		Concrete	188			Clay	1.3	49.6							
							1.6	57.7							
							1.9	59.6							
16	Roblin Blvd Eastbound	Asphalt	52	Granular Fill (20 to 50 mm)	127	Clay Fill	0.1	19.8							
							0.4	26.6							
						Clay	0.7	31.6							
							1.0	33.7							
		Concrete	194				1.3	40.1							
							1.6	42.0							
							1.9	52.5							

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							
						Clay	0.7	31.3							
							1.0	34.0							
		Concrete	204				1.3	46.7							
							1.6	44.4							
							1.9	53.7							
18	Roblin Blvd Eastbound	Asphalt	53	Granular Fill (20 to 50 mm)	203	Granular Fill	0.1	12.9							
						Clay Fill	0.4	13.6							
						Clay	0.7	33.9							
							1.0	37.2							
		Concrete	197				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
19	Roblin Blvd Eastbound	Asphalt	59	Granular Fill (20 to 50 mm)	102	Clay Fill	0.1	12.9							
							0.4	12.8							
						Silty Clay	0.7	18.0	5.5	26.7	40.4	27.3	48	14	34
						Clay	1.0	25.5							
		Concrete	198				1.3	35.5							
							1.6	36.6							
							1.9	44.3							
20	Roblin Blvd Eastbound	Asphalt	126	Granular Fill (20 to 50 mm)	102	Clay Fill	0.1	21.2							
							0.4	27.6							
						Clay	0.7	38.1							
							1.0	38.9							
		Concrete	103				1.3	37.5							
							1.6	40.2							
							1.9	43.4							

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
21	Roblin Blvd Eastbound	Asphalt	82	Clay Fill	635	Clay Fill	0.1	35.6							
							0.4	35.8							
						Clay	0.7	34.3							
							1.0	34.6							
		Concrete	185				1.3	37.4							
							1.6	39.3							
							1.9	41.4							
22	Roblin Blvd Eastbound	Asphalt	73	Granular Fill (20 to 50 mm)	102	Clay Fill	0.1	25.0							
						Clay	0.4	42.7							
							0.7	39.4							
							1.0	32.1							
		Concrete	206				1.3	38.2							
							1.6	39.6							
							1.9	43.0							

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
23	Roblin Blvd Eastbound	Asphalt	125	Clay Fill	256	Granular Fill/Rubble	0.1	10.8							
						Clay Fill	0.4	33.5							
						Clay	0.7	36.7							
							1.0	35.9							
		Concrete	No concrete recovered 76 mm of rubble				1.3	36.2							
							1.6	36.3							
							1.9	40.4							
24	Roblin Blvd Eastbound	Asphalt	112	Clay Fill	368	Clay Fill	0.1	41.4							
						Clay	0.4	31.7							
							0.7	36.1							
							1.0	35.5	0.0	1.2	18.3	80.5	85	25	60
		Concrete	130				1.3	34.9							
							1.6	41.5							
							1.9	42.1							

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
25	Roblin Blvd Eastbound	Asphalt	73	Clay Fill	394	Clay Fill	0.1	33.2							
						Clay	0.4	34.7							
							0.7	35.8							
							1.0	33.5							
		Concrete	143				1.3	37.1							
							1.6	42.7							
							1.9	44.1							
26	Roblin Blvd Eastbound	Asphalt	68	Clay Fill	368	Clay Fill	0.1	37.1							
						Clay	0.4	35.6							
							0.7	39.2							
							1.0	37.0							
		Concrete	173				1.3	40.7							
							1.6	39.4							
							1.9	45.7							

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							
						Silty Clay	1.0	19.2	14.7	19.0	48.9	17.4	32	17	15
		Concrete	243				1.3	28.6							
						Clay	1.6	39.1							
							1.9	43.5							
28	Roblin Blvd Eastbound	Asphalt	0	Granular Fill (20 to 50 mm)	711	Granular Fill	0.1	13.8							
							0.4	8.2							
						Clay	0.7	29.6							
							1.0	35.8							
		Concrete	204				1.3	37.1							
							1.6	42.0							
							1.9	44.3							

lotes:

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 :oblin Boulevard.
Most of the test holes located at Roblin Boulevard (Eastbound) did not contain significant amount of granular material.

ENG-TECH CONSULTING LIMITED

420 Turenne Street, Winnipeg, Manitoba R2J 3W8
Phone: (204) 233-1694 Fax: (204) 235-1579
Email: engtech@mymts.net
www.eng-tech.ca

Table 2
Summary of Pavement Structure

File No.: 17-037-03

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
29	Assiniboine Park Drive	Asphalt	125	Granular Fill (20 mm)	305	Granular Fill	0.1	10.5							
						Clay Fill	0.4	30.9							
							0.7	28.7							
		Concrete	0			Clay	1.0	30.9							
							1.3	40.0							
							1.6	41.1							
							1.9	48.8							
30	Assiniboine Park Drive	Asphalt	157	Granular Fill (20 mm)	406	Granular Fill	0.1	3.3							
							0.4	5.3							
						Clay Fill	0.7	22.4							
						Clayey Silt	1.0	22.9	0.0	8.4	66.1	25.5	34	18	16
							1.3	21.8							
		Concrete	0			Clay	1.6	38.7							
							1.9	42.7							

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
31	Assiniboine Park Drive	Asphalt	77	Granular Fill (20 mm)	229	Granular Fill	0.1	8.3							
						Clay Fill	0.4	21.9							
							0.7	27.3							
		Concrete	0			Clay	1.0	31.5							
							1.3	40.0							
							1.6	49.6							
							1.9	51.7							
32	Assiniboine Park Drive	Asphalt	76	Granular Fill (20 mm)	229	Granular Fill	0.1	7.6							
						Clay Fill	0.4	25.5							
							0.7	29.6							
							1.0	33.6							
		Concrete	0			Clay	1.3	40.5							
							1.6	45.2							
							1.9	47.4							

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
33	Assiniboine Park Drive	Asphalt	72	Granular Fill (20 mm)	229	Granular Fill	0.1	5.1							
						Clay Fill	0.4	27.0							
							0.7	29.2							
							1.0	24.0							
		Concrete	0			Clay	1.3	36.8							
							1.6	40.4							
							1.9	50.0							
34	Assiniboine Park Drive	Asphalt	97	Granular Fill (20 mm)	203	Granular Fill	0.1	7.3							
						Clay	0.4	21.0							
							0.7	32.3							
							1.0	36.0							
		Concrete	0				1.3	41.6							
							1.6	42.8							
							1.9	49.9							

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
35	Assiniboine Park Drive	Asphalt	96	Granular Fill (20 mm)	203	Granular Fill	0.1	8.5							
						Clay	0.4	41.0							
							0.7	39.2							
							1.0	42.5							
		Concrete	0				1.3	50.7							
							1.6	50.1							
							1.9	50.8							
36	Assiniboine Park Drive	Asphalt	76	Granular Fill (20 mm)	229	Granular Fill	0.1	10.9							
						Clay	0.4	25.7							
							0.7	33.0							
		Concrete	0			Clayey Silt	1.0	28.5							
							1.3	28.6							
							1.6	30.8							
							1.9	30.5							

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	Granular Fill	0.1	9.4							
						Clay	0.4	32.1							
						Clayey Silt	0.7	32.5	0.0	1.8	53.1	45.1	72	25	47
							1.0	33.3							
		Concrete	0				1.3	33.3							
							1.6	31.6							
							1.9	34.8							
38	Assiniboine Park Drive	Asphalt	72	Granular Fill (20 mm)	229	Granular Fill	0.1	10.8							
						Clay	0.4	25.9							
							0.7	33.4							
							1.0	35.3							
		Concrete	0				1.3	35.5							
							1.6	37.0							
							1.9	39.0							

Notes:

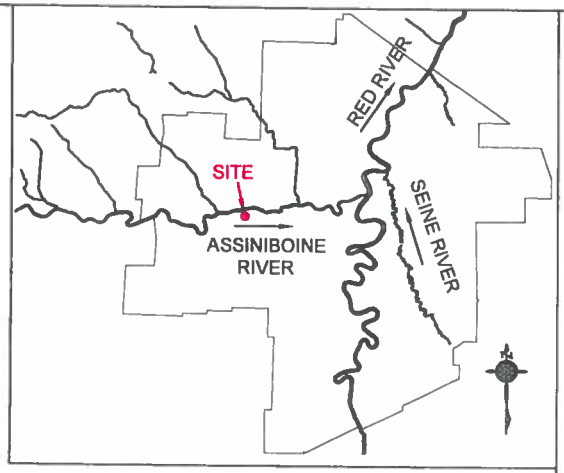
No water seepage was encountered in the test holes.

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

CORING AND TEST HOLE LOCATION TABLE ROBLIN BLVD - WESTBOUND		
TH #	GPS COORDINATES NOVEMBER, 2017	
	UTM	14U
1	5525426	0625929
2	5525416	0626037
3	5525416	0626115
4	5525405	0626214

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

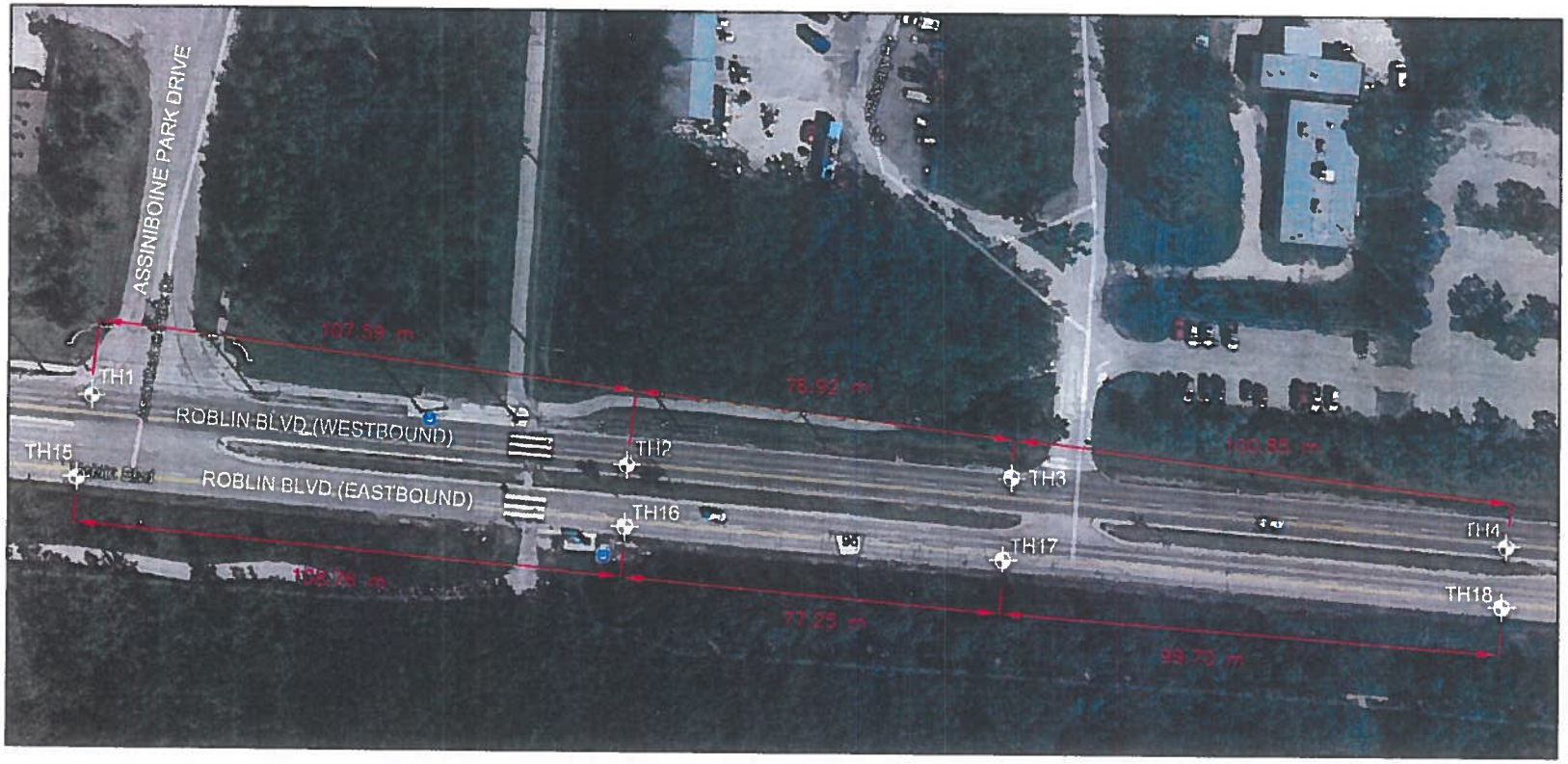
CORING AND TEST HOLE LOCATION TABLE ROBLIN BLVD - EASTBOUND		
TH #	GPS COORDINATES NOVEMBER, 2017	
	UTM	14U
15	5525414	0625927
16	5525404	0626036
17	5525403	0626114
18	5525393	0626213



KEYMAP

LEGEND

TH1 TEST HOLE



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

ENG-TECH Consulting Limited
420 Turenne Street
Winnipeg, MB
R2J 3W8
Phone: (204) 233-1694
Fax: (204) 235-1579

ENG. STAMP:

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
ENG-TECH Consulting Limited
No.2475

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: PFPC

DATE: NOVEMBER 2017

FILE No.: 17-037-03

CLIENT DWG/FIG. No.:

ENG-TECH DWG/FIG. No.: 1 OF 6

NO.: 1

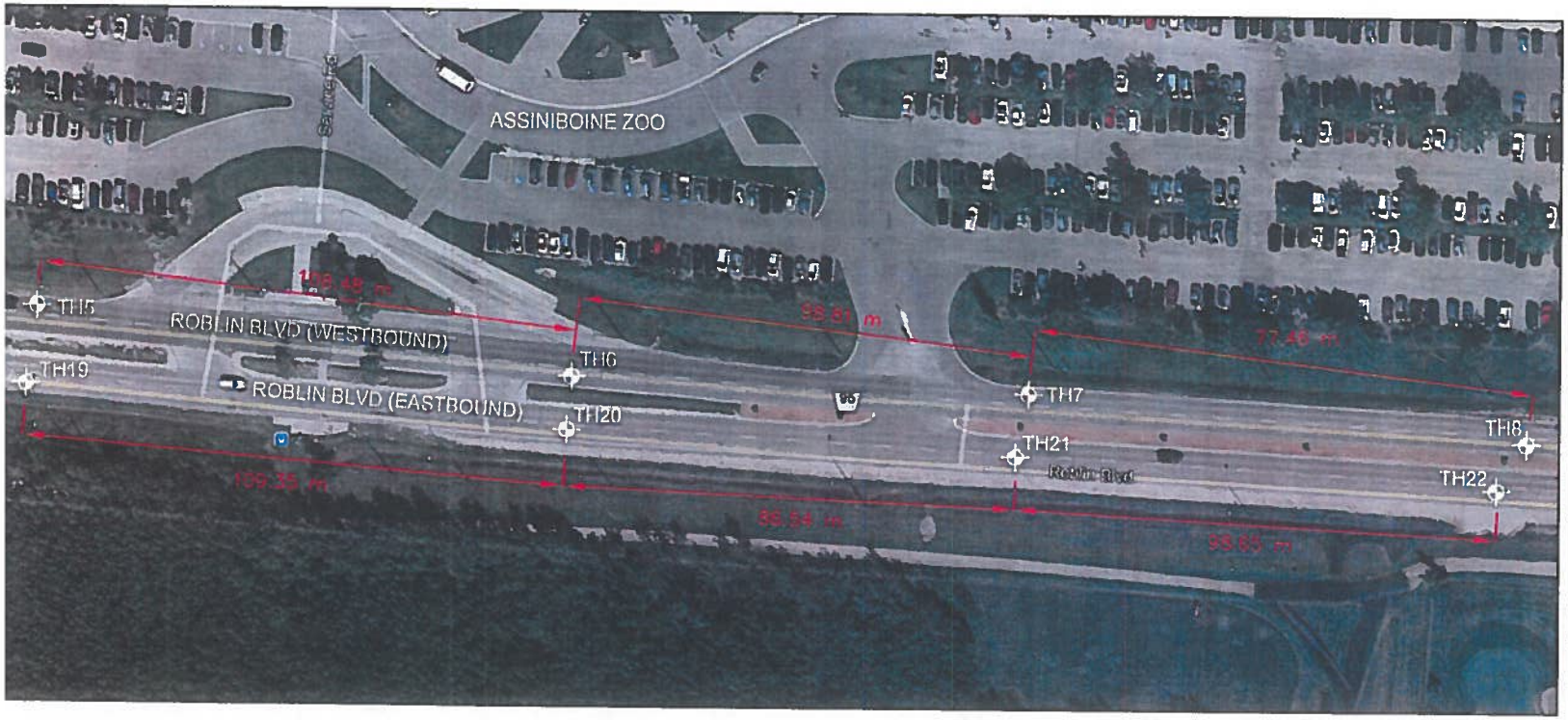
P:\2017\Projects\037(C.O.W)\03(Geo_2018 Street Reconstruction Program, Roblin & Assiniboine)\Drawings\Figure 1 – Test Hole Location Plan (Roblin Blvd).dwg

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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ENG-TECH CONSULTING LIMITED
420 Turenne Street
Winnipeg, MB
R2J 3W8
Phone: (204) 233-1694
Fax: (204) 235-1579

ENG. STAMP:

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
ENG-TECH Consulting Limited
No.2475

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 6

NO.: 1

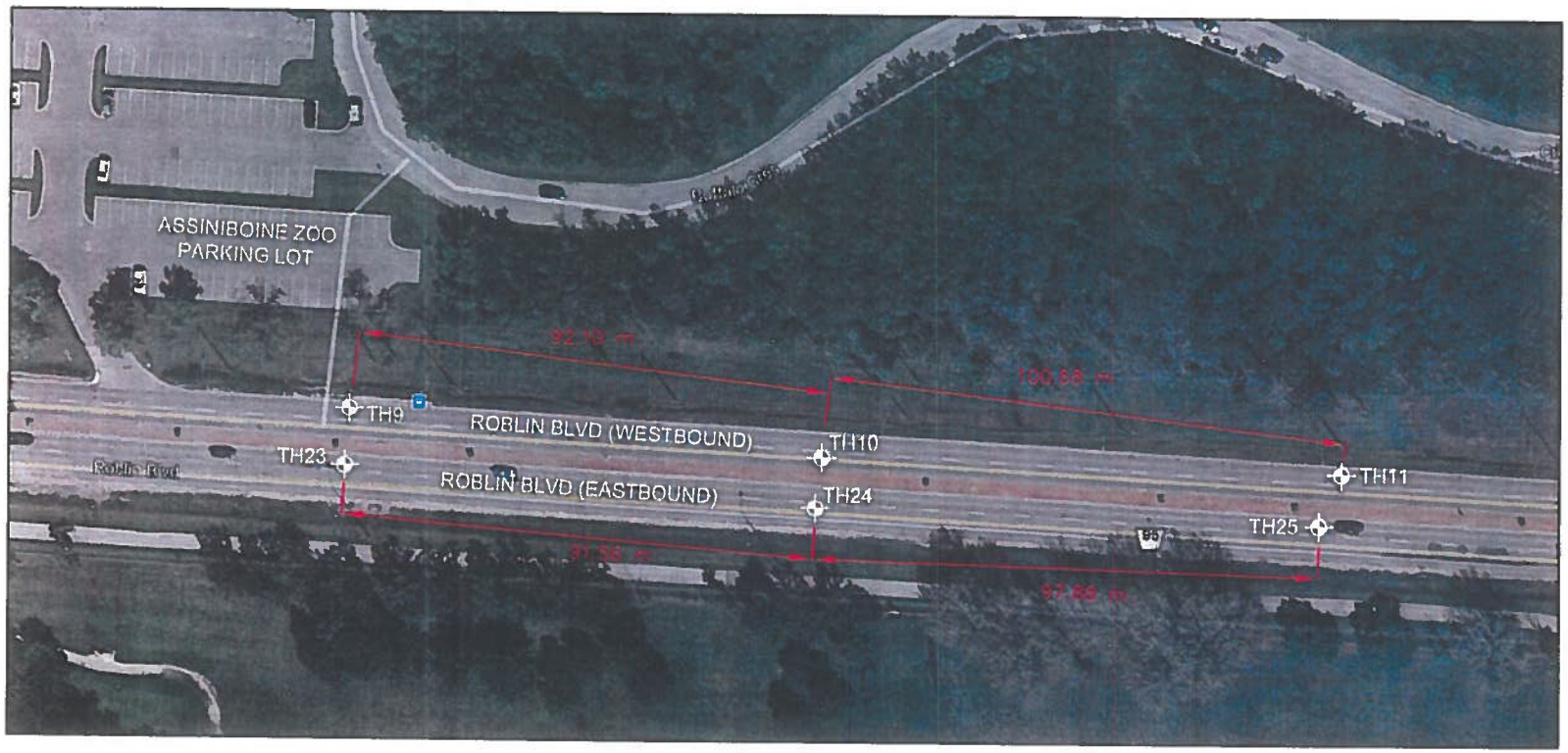
:\2017\Projects\037(C.O.W)\03(Geo_2018 Street Reconstruction Program, Roblin & Assiniboine)\Drawings\Figure 2 – Test Hole Location Plan (Roblin Blvd).dwg

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	
	UTM	14U
9	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	
	UTM	14U
23	5525374	0626716
24	5525368	0626808
25	5525368	0626906



LEGEND

TH11 TEST HOLE

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

ENG-TECH CONSULTING LIMITED
420 Turenne Stree
Winnipeg, ME
R2J 3W
Phone: (204) 233-169
Fax: (204) 235-157

ENG. STAMP:

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
ENG-TECH Consulting Limited
No.2475

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.:

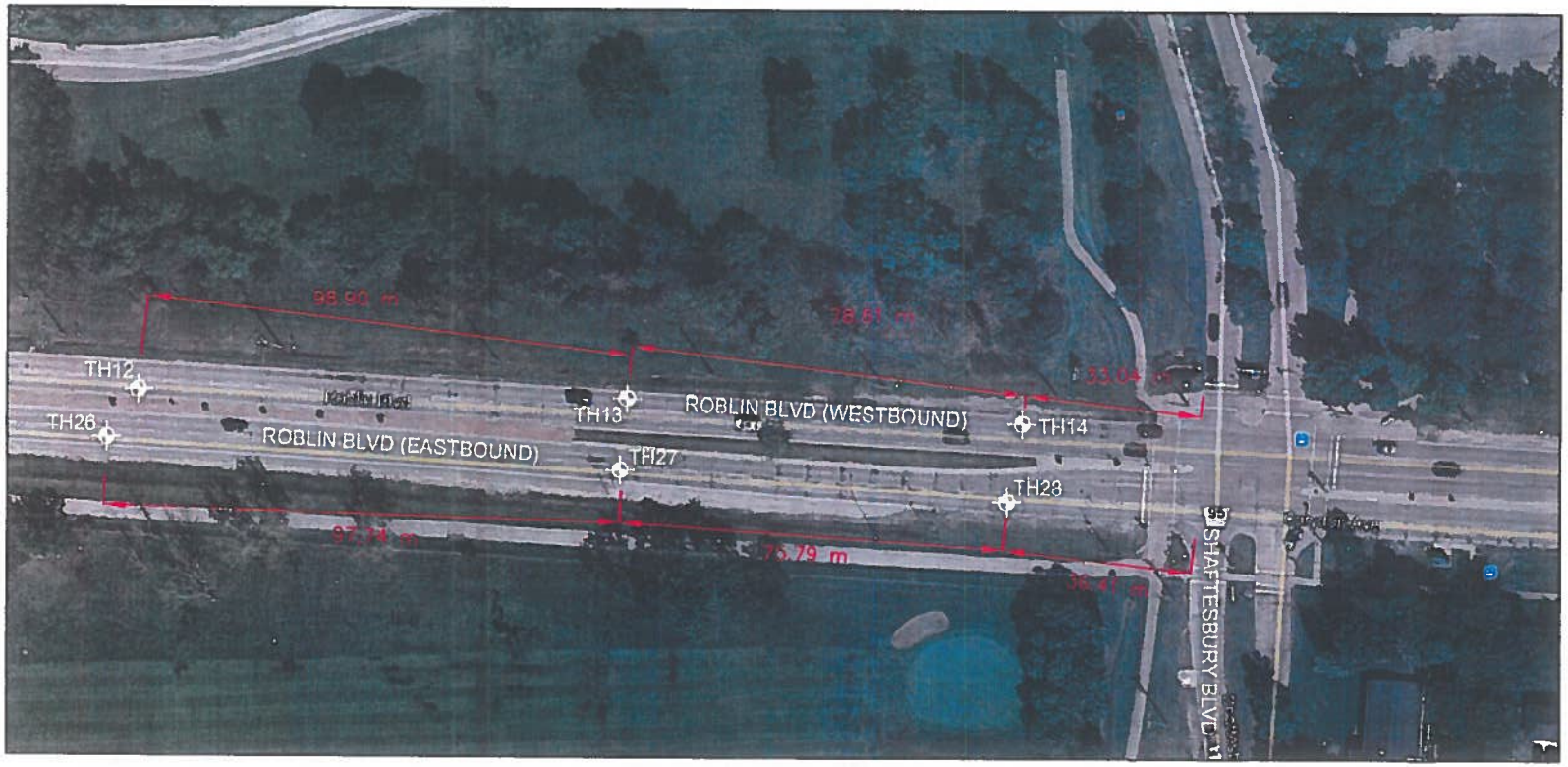
NO:

TEST HOLE No.	OFFSET OF TEST HOLES ROBLIN BLVD - WESTBOUND
TH12	1.53 m FROM CURB LANE
TH13	1.6 m FROM MEDIAN LANE
TH14	1.25 m FROM CURB LANE

CORING AND TEST HOLE LOCATION TABLE ROBLIN BLVD - WESTBOUND		
TH #	GPS COORDINATES NOVEMBER, 2017	
	UTM	14U
12	5525371	0627010
13	5525372	0627106
14	5525369	0627184

TEST HOLE No.	OFFSET OF TEST HOLES ROBLIN BLVD - EASTBOUND
TH26	1.8 m FROM CURB LANE
TH27	1.4 m FROM CURB LANE
TH28	1.7 m FROM CURB LANE

CORING AND TEST HOLE LOCATION TABLE ROBLIN BLVD - EASTBOUND		
TH #	GPS COORDINATES NOVEMBER, 2017	
	UTM	14U
26	5525362	0627004
27	5525360	0627105
28	5525353	0627181



LEGEND

TH12 TEST HOLE

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

ENG-TECH CONSULTING LIMITED
420 Turenne Street
Winnipeg, MB
R2J 3W8
Phone: (204) 233-1694
Fax: (204) 235-1579

ENG. STAMP:

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
ENG-TECH Consulting Limited
No.2475

CLIENT:
CITY OF WINNIPEG

PROJECT:
GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTIONS

DWG DESCRIPTION:
TEST HOLE LOCATION PLAN - ROBLIN BOULEVARD (WESTBOUND TH12 TO TH14) (EASTBOUND TH26 TO TH28)

SCALE: NTS

DRAWN BY: PFPC

DATE: NOVEMBER 2017

FILE No.: 17-037-03

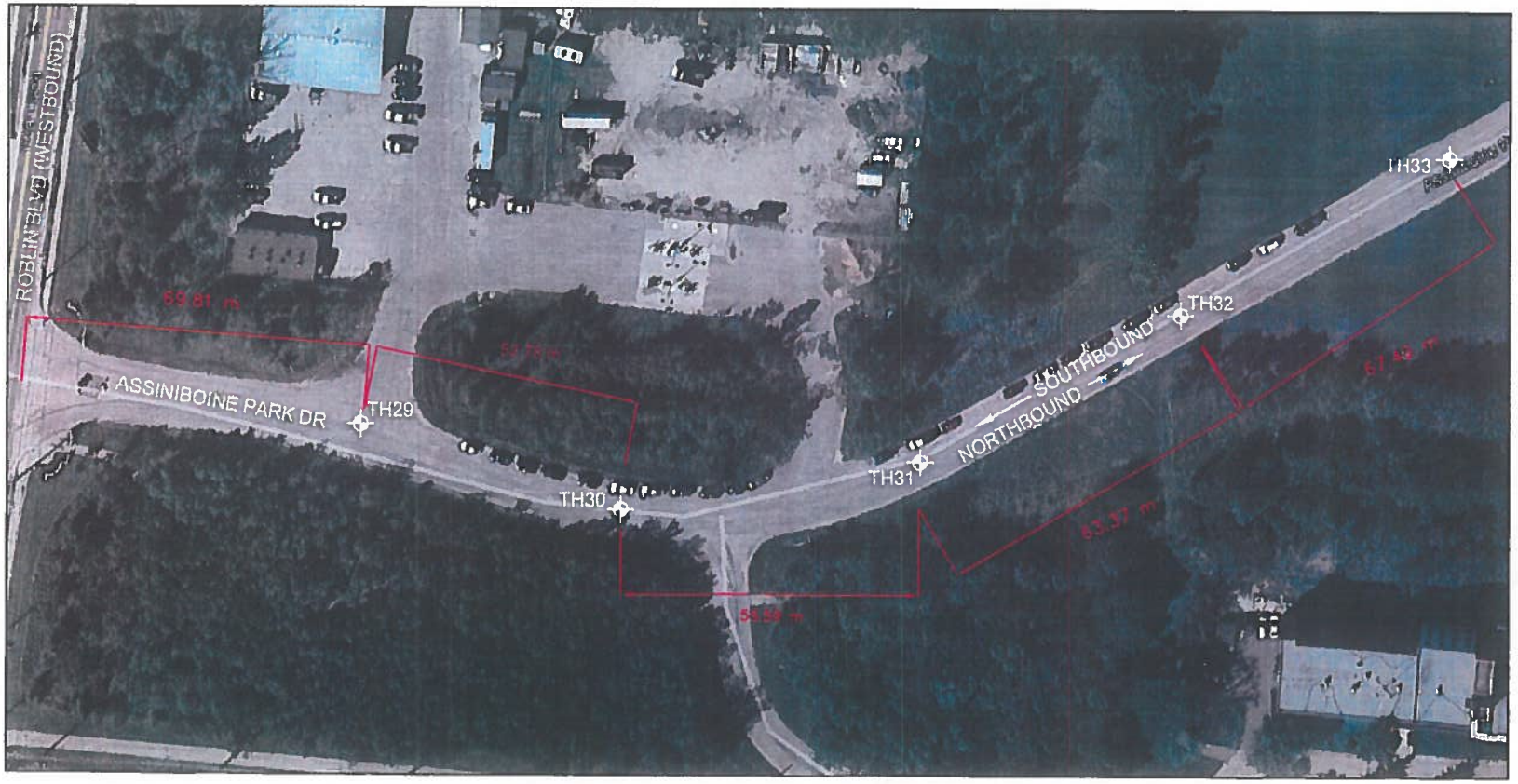
CLIENT DWG/FIG. No.:

ENG-TECH DWG/FIG. No.: 4

NO.:

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

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



LEGEND

TH29 TEST HOLE

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

ENG-TECH CONSULTING LIMITED
420 Turenne Street
Winnipeg, MB
R2J 3W8
Phone: (204) 233-1694
Fax: (204) 235-1579

ENG. STAMP:

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
ENG-TECH Consulting Limited
No.2475

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.:

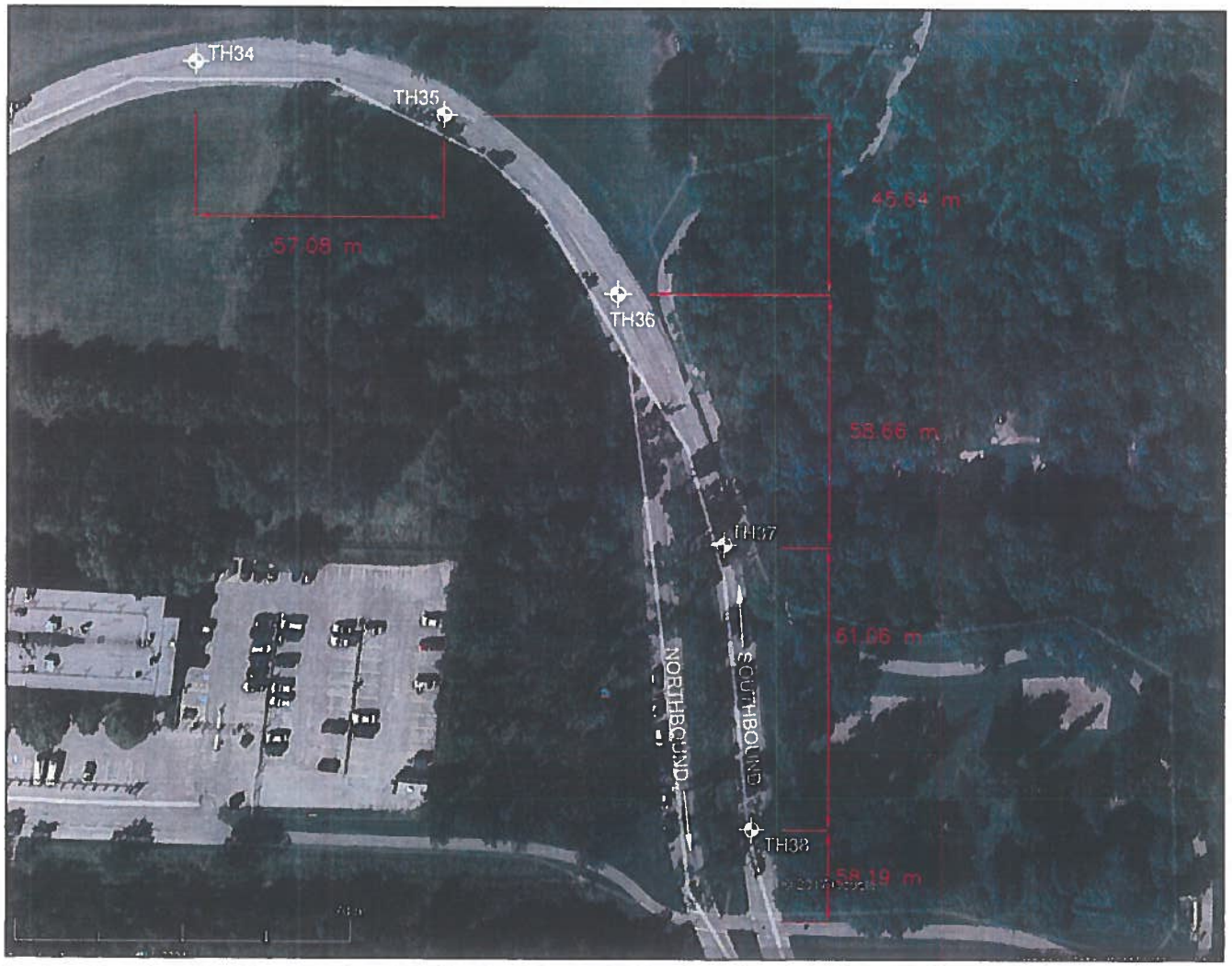
ENG-TECH DWG/FIG. No.: 5 OF 6

NO.: 1

P:\2017\Projects\037(C.O.W)\03(Geo_2018 Street Reconstruction Program, Roblin & Assiniboine)\Drawings\Figure 5 -- Test Hole Location Plan (Assiniboine Park Drive).dgn

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		
TH #	GPS COORDINATES NOVEMBER, 2017	
	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
1	JAN. 2018	revision
0	Nov. 2017	report

ENG-TECH Consulting Limited
420 Turenne Street
Winnipeg, MB
R2J 3W8
Phone: (204) 233-1694
Fax: (204) 235-1579

ENG. STAMP:

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
ENG-TECH Consulting Limited
No.2475

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

DRAWN BY: PFPC

DATE: NOVEMBER 2017

FILE No.: 17-037-03

CLIENT DWG/FIG. No.:

ENG-TECH DWG/FIG. No.: 6

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		WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	$C_U = \frac{D_{60}}{D_{10}} > 4$; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ TO 3
			GP		POORLY GRADED GRAVELS, GRAVEL- SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
		DIRTY GRAVELS (WITH SOME OR MORE FINES)	GM		SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I. LESS THAN 4
			GC		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		WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_U = \frac{D_{60}}{D_{10}} > 6$; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ TO 3
			SP		POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
		DIRTY SANDS (WITH SOME OR MORE FINES)	SM		SILTY SANDS, SAND-SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I. LESS THAN 4
			SC		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 NEGLIGIBLE ORGANIC CONTENT	LL ≤ 50%	ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHTY PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (SEE BELOW)
		LL > 50%	MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS	
	CLAYS ABOVE "A" LINE NEGLIGIBLE ORGANIC CONTENT	LL ≤ 30%	CL		INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY OR SILTY CLAYS, LEAN CLAYS	
		30% < LL ≤ 50%	CI		INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS	
		LL > 50%	CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	ORGANIC SILTS & CLAYS BELOW "A" LINE	LL < 50%	OL		ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
		LL > 50%	OH		ORGANIC CLAYS OF HIGH PLASTICITY	
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOUR OR ODOUR, AND OFTEN FIBROUS TEXTURE

ADDITIONAL SYMBOLS

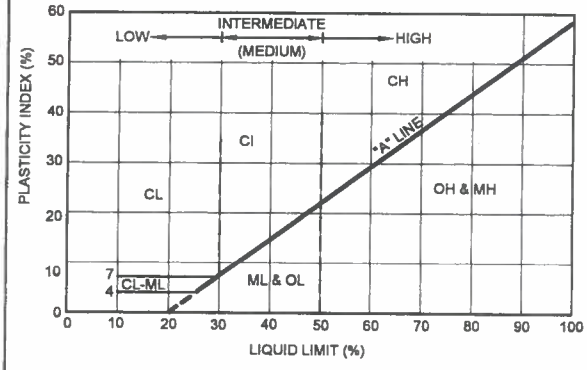
TILL		SANDSTONE	
		GRANITE	
FILL			
TOPSOIL			
CONCRETE			
SHALE			
LIMESTONE			

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		GYPSUM	STIFF	1.0 - 2.0	8 - 15
		ETC.	VERY STIFF	2.0 - 4.0	15 - 30
			HARD	> 4.0	> 30

TSF x 95.8 = kPa (q_U) $S_U = \frac{1}{2} \times q_U$

PLASTICITY CHART FOR SOILS PASSING 425 µm SIEVE



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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
P.I. = PLASTICITY INDEX
C_U = COEFFICIENT OF UNIFORMITY
q_U = UNCONFINED COMPRESSIVE STRENGTH
S_U = UNDRAINED SHEAR STRENGTH
C_C = COMPRESSION INDEX
PL = PLASTIC LIMIT

ENG-TECH CONSULTING LIMITED
6 - 854 Marion Street
Winnipeg, MB R2J 0K4
Phone: (204) 233-1694
Fax: (204) 235-1579

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

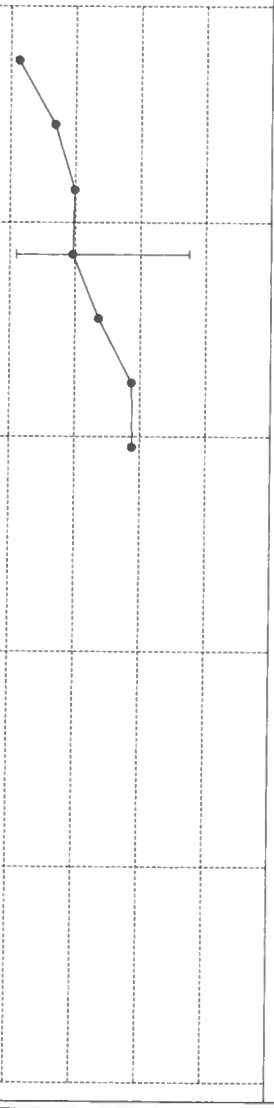
Test Hole #: TH1

Client: City of Winnipeg
Site: See Figure 1
Location: Roblin Boulevard (Westbound)
Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

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

Depth (m)	Soil Symbol	Description	Elevation (m)
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.	
1.0		*Clay (CH)* - dark brown, moist, firm, highly plastic, trace silt.	99.0
		Silty Clay (CH) - medium brown, moist, soft, highly plastic, trace gravel & sand, and silt.	
		Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.	
2.0			98.0
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

Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
S1		22.6	
S2		33.8	
S3		39.9	
S4		39.4	
S5		47.3	
S6		57.5	
S7		57.7	



SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH2

Client: City of Winnipeg
Site: See Figure 1
Location: Roblin Boulevard (Westbound)
Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

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

Depth (m)	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
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		12.2	
			S2		15.7	
1.0	*Clay Fill (CI)* -dark brown, moist, firm, medium plastic, some to with gravel.	99.0	S3		30.0	
	Clay (CI) - dark brown, moist, firm, medium plastic, trace silt.		S4		33.4	
			S5		43.6	
2.0		98.0	S6		46.2	
			S7		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				

Moisture Content (%): PL I——X——I LL; 20 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH3

Client: City of Winnipeg
Site: See Figure 1
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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
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	9.1
	Clay Fill (CI) - dark brown, moist, firm, medium plastic, some to with gravel.		S2	17.7
1.0		99.0	S3	26.7
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S4	30.3
	- below 1.5 m, medium brown, medium plastic.		S5	41.3
2.0		98.0	S6	42.2
			S7	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		

Moisture Content (%): PL I——X——I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen, Torvane, UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH4

Client: City of Winnipeg
Site: See Figure 1
Location: Roblin Boulevard (Westbound)
Project: Geotechnical Investigation - 2018 Street Reconstruction, Winnipeg, MB

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

Depth (m)	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
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		10.6	
	Clay Fill (CI) -black, moist, firm, medium plastic, trace silt and gravel.		S2		19.1	
1.0		99.0	S3		32.3	
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S4		36.6	
	- below 1.2 m, medium brown, medium plastic, trace silt.		S5		40.6	
2.0		98.0	S6		42.9	
			S7		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				

Moisture Content (%): PL 20 — X — LL 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
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		99.0	S3	10.7
	Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.		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		

Moisture Content (%): PL 20 — X 40 60 — LL 80

SHEAR STRENGTH (kPa): P. Pen; Torvane; UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH6

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 6, 2017
Grade Elevation: 100.0 m
Water Elevation: --

Depth (m)	Description	Elevation (m)
0.0	Ground Surface	100.0
	Asphalt (110 mm)	
	Concrete (197 mm)	
	Granular Fill (701 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained, some clay & gravel, with silt, and sand.	
1.0	*Clay (CH)* - dark brown, moist, firm, highly plastic, trace silt.	99.0
2.0		98.0
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

Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
S1	Auger Cuttings	11.3	
S2	Auger Cuttings	11.5	
S3	Auger Cuttings	12.1	
S4	Auger Cuttings	34.0	
S5	Auger Cuttings	37.2	
S6	Auger Cuttings	42.6	
S7	Auger Cuttings	44.0	

Moisture Content (%): PL I——X——I LL; 20 40 60 80

SHEAR STRENGTH (kPa): P. Pen, Torvane, UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH7

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
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	7.2
			S2	9.3
1.0		99.0	S3	9.4
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S4	34.4
			S5	38.0
			S6	39.1
2.0		98.0	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		

Moisture Content (%): PL 20 — X — LL 40 60 80

SHEAR STRENGTH (kPa): P. Pen, Torvane, UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH8

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 3, 2017
Grade Elevation: 100.0 m
Water Elevation: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Asphalt (85 mm)			
	Concrete (205 mm)			
	Granular Fill (409 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	7.9
			S2	10.3
1.0	*Clay (CH)* - dark brown, moist, firm, highly plastic, trace silt.	99.0	S3	35.5
			S4	32.8
			S5	38.7
2.0		98.0	S6	42.6
			S7	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		

Moisture Content (%): PL 20 — X 40 60 — LL 80

SHEAR STRENGTH (kPa): P. Pen; Torvane; UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

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

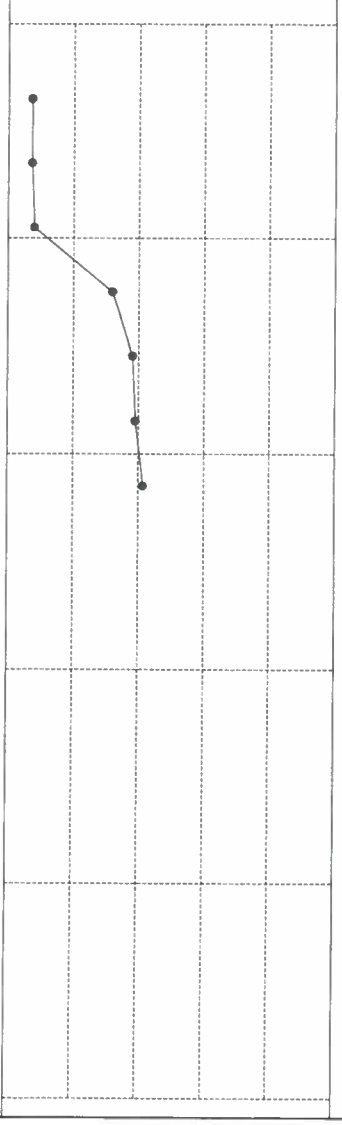
Date Drilled: November 2, 2017

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Description	Elevation (m)
0.0	Ground Surface	100.0
	Asphalt (86 mm)	
	Concrete (201 mm)	
	Granular Fill (940 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.	
1.0		99.0
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.	
2.0		98.0
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

Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
S1	Auger Cuttings	7.3	
S2	Auger Cuttings	7.3	
S3	Auger Cuttings	8.1	
S4	Auger Cuttings	31.9	
S5	Auger Cuttings	38.3	
S6	Auger Cuttings	39.2	
S7	Auger Cuttings	41.5	



SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH10

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 3, 2017
Grade Elevation: 100.0 m
Water Elevation: --

Depth (m)	Description	Elevation (m)
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.	
1.0	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.	99.0
2.0		98.0
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

Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
S1	Auger Cuttings	6.4	
S2	Auger Cuttings	6.5	
S3	Auger Cuttings	7.8	
S4	Auger Cuttings	34.4	
S5	Auger Cuttings	35.1	
S6	Auger Cuttings	36.3	
S7	Auger Cuttings	43.2	

Moisture Content (%): PL I--------X--------I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen, Torvane, UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH11

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: –

Depth (m)	Description	Elevation (m)
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.	
1.0	**Clay (CI)** - dark brown, moist, firm, medium plastic, trace to some silt.	99.0
	Silty Clay (CI) -medium brown, moist, firm, medium plastic, with to and silt. - below 1.3 m, medium to light brown.	
2.0	**Clay (CH)** - medium brown, moist, firm, highly plastic, trace silt.	98.0
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

Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
S1	Auger Cuttings	17.5	
S2	Auger Cuttings	8.9	
S3	Auger Cuttings	8.0	
S4	Auger Cuttings	27.4	
S5	Auger Cuttings	20.1	
S6	Auger Cuttings	24.0	
S7	Auger Cuttings	30.5	

Moisture Content (%): PL 20 — X — LL 80 (40, 60)

SHEAR STRENGTH (kPa): P. Pen, Torvane, UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
0.0	Ground Surface	100.0				
	Asphalt (77 mm)					
	Concrete (186 mm)					
	Granular Fill (343 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1		9.1	
	Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace silt and gravel.		S2		8.1	
1.0		99.0	S3		16.5	
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S4		32.1	
			S5		34.1	
			S6		41.3	
2.0		98.0	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				

Moisture Content (%): PL I——X——I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: PFPC

Reviewed by:

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: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ENG-TECH CONSULTING LIMITED

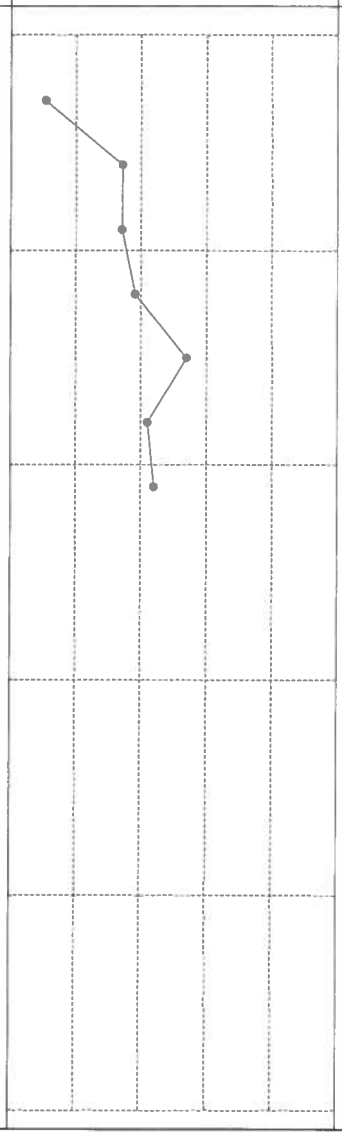
Engineering And Testing Solutions That Work For You

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Asphalt (53 mm)			
	Concrete (200 mm)			
	Granular Fill (254 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	10.9
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S2	34.5
1.0		99.0	S3	34.3
			S4	38.4
			S5	54.1
			S6	42.2
2.0		98.0	S7	44.2
	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.			
3.0		97.0		
4.0		96.0		
5.0		95.0		



SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

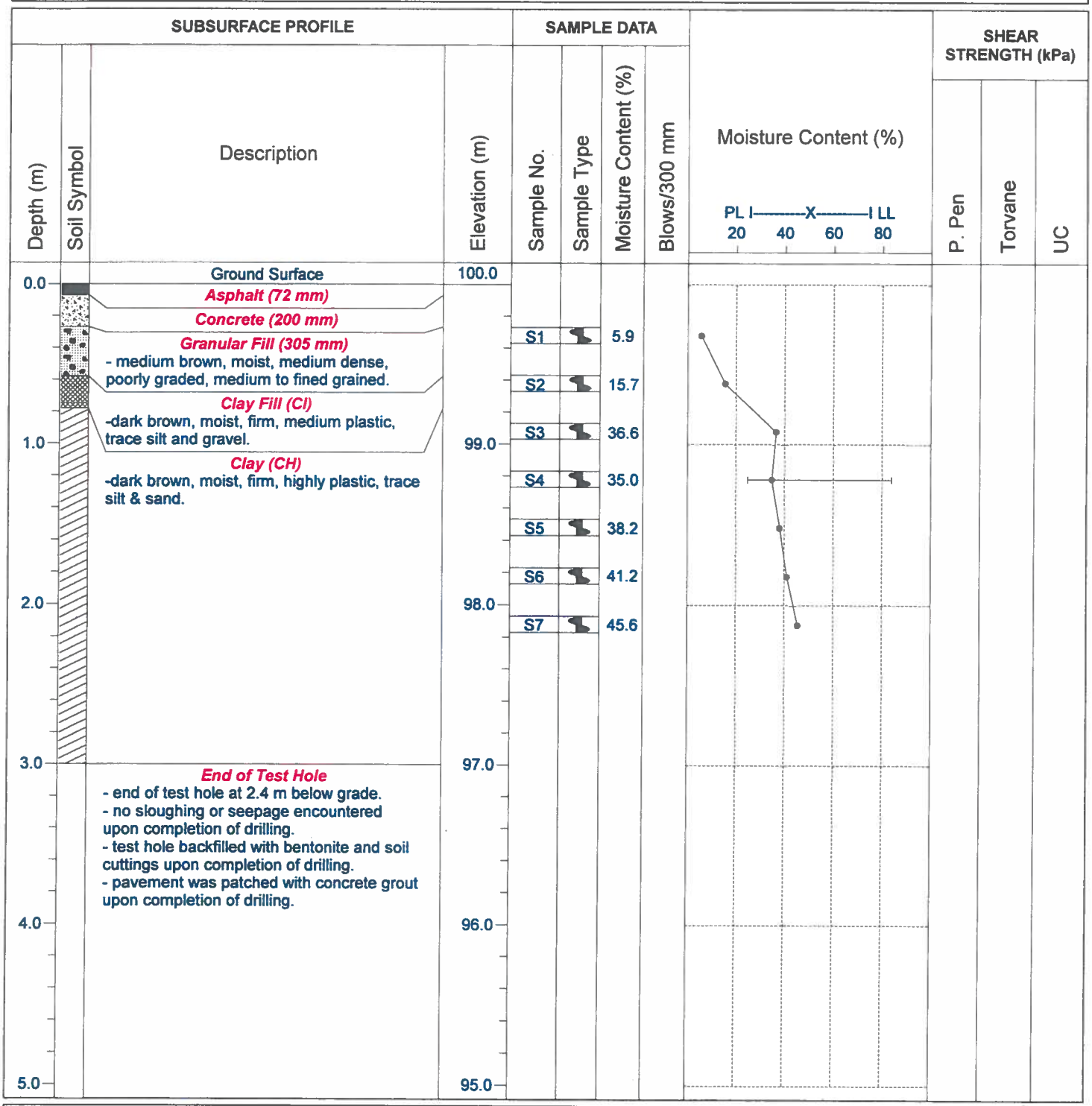
ENG-TECH CONSULTING LIMITED

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: --



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: 2.4 m
Completion Elevation: 97.6 m
Sheet: 1 of 1

SAMPLE TYPE — SPLIT BARREL — SHELBY TUBE — AUGER CUTTINGS — SPLIT SPOON

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Asphalt (80 mm)			
	Concrete (188 mm)			
	Granular Fill (267 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	13.9
	Clay (CI) - black, moist, firm, medium plastic, trace silt and gravel.		S2	22.9
1.0		99.0	S3	38.1
	Clayey Silt (CH) - dark brown, moist, soft to firm, highly plastic, trace gravel & sand, and clay.		S4	40.2
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S5	49.6
2.0		98.0	S6	57.7
			S7	59.6
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		

Moisture Content (%): PL I——X——I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
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		99.0	S3	31.6
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S4	33.7
	- below 1.5 m, medium brown, medium plastic, trace to some silt.		S5	40.1
	- below 1.8 m, dark brown, highly plastic.		S6	42.0
2.0		98.0	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		

Moisture Content (%): PL I——X——I LL; 20 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH Consulting Limited

Engineering And Testing Solutions That Work For You

Test Hole #: TH17

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: –

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Asphalt (40 mm)			
	Concrete (204 mm)			
	Granular Fill (102 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	25.5
	Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace silt.		S2	27.3
1.0		99.0	S3	31.3
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S4	34.0
			S5	46.7
			S6	44.4
2.0		98.0	S7	53.7
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		

Moisture Content (%): PL I——X——I LL; 20 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
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	12.9
	Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace silt and gravel.		S2	13.6
1.0		99.0	S3	33.9
	Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.		S4	37.2
			S5	39.4
			S6	43.7
2.0		98.0	S7	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		

Moisture Content (%): PL I——X——I LL; 20 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

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: --

Depth (m)	Description	Elevation (m)
0.0	Ground Surface	100.0
	Asphalt (59 mm)	
	Concrete (198 mm)	
	Granular Fill (102 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.	
1.0	*Clay Fill (CI)* -black, moist, firm, medium plastic, trace gravel, some silt.	99.0
	Silty Clay (CI) -black, moist, firm, medium plastic, trace gravel, with sand, and silt.	
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.	
2.0		98.0
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

Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
S1		12.9	
S2		12.8	
S3		18.0	
S4		25.5	
S5		35.5	
S6		36.6	
S7		44.3	

Moisture Content (%): PL I——X——I LL; 20 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
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		99.0	S3	38.1
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		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		

Moisture Content (%): PL 20 — X — LL 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
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	35.6
			S2	35.8
1.0	*Clay (CH)* - dark brown, moist, firm, highly plastic, trace silt.	99.0	S3	34.3
			S4	34.6
			S5	37.4
			S6	39.3
2.0		98.0	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		

Moisture Content (%): PL 20 — X 40 60 — LL 80

SHEAR STRENGTH (kPa): P. Pen, Torvane, UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
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	25.0
	Clay Fill (CI) - black, moist, medium plastic, trace gravel.		S2	42.7
1.0	Clay (CH) - black, moist, firm, highly plastic, trace silt.	99.0	S3	39.4
	- below 1.0 m, medium brown.		S4	32.1
			S5	38.2
2.0		98.0	S6	39.6
			S7	43.0
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		

Moisture Content (%): PL 20 — X — LL 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Asphalt (125 mm)			
	Concrete Rubble (76 mm)			
	Clay Fill (CI) - black, moist, firm, medium plastic, trace silt.		S1	10.8
			S2	33.5
	Clay (CI) - medium brown, moist, firm, medium plastic, trace silt.		S3	36.7
1.0		99.0	S4	35.9
			S5	36.2
			S6	36.3
2.0		98.0	S7	40.4
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		

Moisture Content (%): PL I——X——I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen; Torvane; UC

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

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Asphalt (112 mm)			
	Concrete (130 mm)			
	Clay Fill (Cl) - black, moist, firm, medium plastic, trace silt.		S1	41.4
			S2	31.7
1.0	Clay (CH) - medium brown, moist, firm, highly plastic, trace sand, some silt.	99.0	S3	36.1
			S4	35.5
			S5	34.9
			S6	41.5
2.0		98.0	S7	42.1
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		

Moisture Content (%): PL I——X——I LL; 20 40 60 80

SHEAR STRENGTH (kPa): P. Pen; Torvane; UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Asphalt (73 mm)			
	Concrete (143 mm)			
	Clay Fill (CI) - black, moist, firm, medium plastic, trace silt.		S1	33.2
			S2	34.7
1.0	Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.	99.0	S3	35.8
			S4	33.5
			S5	37.1
			S6	42.7
2.0		98.0	S7	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		

Moisture Content (%): PL I——X——I LL; 20 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Asphalt (68 mm)			
	Concrete (173 mm)			
	Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace silt.		S1	37.1
			S2	35.6
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S3	39.2
1.0		99.0	S4	37.0
			S5	40.7
			S6	39.4
2.0		98.0	S7	45.7
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		

Moisture Content (%): PL I——X——I LL; 20 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH27

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Concrete (243 mm)			
	Granular Fill (965 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	10.2
			S2	7.8
1.0		99.0	S3	8.1
			S4	19.2
	Silty Clay (CI) - light brown, moist, soft, medium plastic, some gravel & sand, and silt.		S5	28.6
	Clay (CH) - medium brown, moist, firm, highly plastic, trace silt. - below 1.8 m, dark brown.		S6	39.1
2.0		98.0	S7	43.5
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		

Moisture Content (%): PL 20 — X 40 60 — LL 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Concrete (204 mm)			
	Granular Fill (711 mm) - medium brown, moist, frozen, poorly graded, medium to fined grained.		S1	13.8
			S2	8.2
1.0		99.0	S3	29.6
	Clay (CH) -dark brown, moist, firm, highly plastic, trace silt.		S4	35.8
			S5	37.1
	-below 1.6 m, medium brown, some to with silt.		S6	42.0
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		

Moisture Content (%): PL I——X——I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
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		99.0	S3	28.7
	Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.		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		

Moisture Content (%): PL 20 — X — LL 80 (40, 60)

SHEAR STRENGTH (kPa): P. Pen, Torvane, UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH30

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: –

Depth (m)	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
0.0	Ground Surface	100.0				
	Asphalt (157 mm)					
	Granular Fill (406 mm) - medium brown, moist, medium dense, poorly graded, medium to fined grained, and sand.		S1		3.3	
			S2		5.3	
	Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace to some silt.		S3		22.4	
1.0		99.0	S4		22.9	
	Clayey Silt (CI) - light brown, moist, soft to firm, medium plastic, trace sand, with clay.		S5		21.8	
	Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.		S6		38.7	
2.0		98.0	S7		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				

Moisture Content (%): PL 20 — X — LL 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

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: –

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Asphalt (77 mm)		S1	8.3
	Granular Fill (229 mm) - medium brown, moist, poorly graded, medium to fined grained.		S2	21.9
	Clay Fill (CI) - dark brown, moist, firm, medium plastic, trace to some silt.		S3	27.3
1.0		99.0	S4	31.5
	Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.		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		

Moisture Content (%): PL 20 — X — 40 — 60 — LL 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: PFPC
Reviewed by: CM

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH32

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: –

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
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		

Moisture Content (%): PL I——X——I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH33

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Asphalt (72 mm)			
	Granular Fill (229 mm) - medium brown, moist, medium dense, poorly graded, medium to fined grained.		S1	5.1
			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
			S5	36.8
	Clay (CH) - medium brown, moist, firm, highly plastic, trace to some silt.		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		

Moisture Content (%): PL I——X——I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen, Torvane, UC

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

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	**Ground Surface**	100.0		
	Asphalt (97 mm)			
	Granular Fill (203 mm) - medium brown, moist, medium dense, poorly graded, fined grained, trace clay, and sand.		S1	7.3
			S2	21.0
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S3	32.3
1.0		99.0	S4	36.0
			S5	41.6
			S6	42.8
2.0		98.0	S7	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		

Moisture Content (%): PL I——X——I LL; 20 40 60 80

SHEAR STRENGTH (kPa): P. Pen; Torvane; UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

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: –

Depth (m)	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
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	
			S2		41.0	
	Clay (CH) - medium brown, moist, firm, highly plastic, trace silt.		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				

Moisture Content (%): PL I——X——I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Asphalt (76 mm)			
	Granular Fill (229 mm) - medium brown, moist, medium dense, poorly graded, fined grained, trace clay.		S1	10.9
	Clay (CI) - dark brown, moist, firm, medium plastic, trace silt.		S2	25.7
1.0		99.0	S3	33.0
	Clayey Silt (CI) -medium brown, moist, soft to firm, medium plastic, trace sand, with clay.		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		

Moisture Content (%): PL I——X——I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen, Torvane, UC

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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

ENG-TECH CONSULTING LIMITED

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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
0.0	Ground Surface	100.0		
	Asphalt (72 mm)		S1	9.4
	Granular Fill (229 mm) - medium brown, moist, medium dense, poorly graded, fined grained, trace clay, and sand.		S2	32.1
	Clay (CH) - dark brown, moist, firm, highly plastic, trace silt.		S3	32.5
1.0	*Clayey Silt (CH)* - medium brown, moist, firm, highly plastic, trace sand, and clay.	99.0	S4	33.3
			S5	33.3
			S6	31.6
2.0		98.0	S7	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		

Moisture Content (%): PL I——X——I LL; 20 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

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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: --

Depth (m)	Description	Elevation (m)	Sample No.	Moisture Content (%)
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		

Moisture Content (%): PL I--------X--------I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

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

ENG-TECH CONSULTING LIMITED
420 Turenne Street
Winnipeg, Manitoba
R2J 3W8
engtech@mymts.net
www.eng-tech.ca

PARTICLE SIZE ANALYSIS

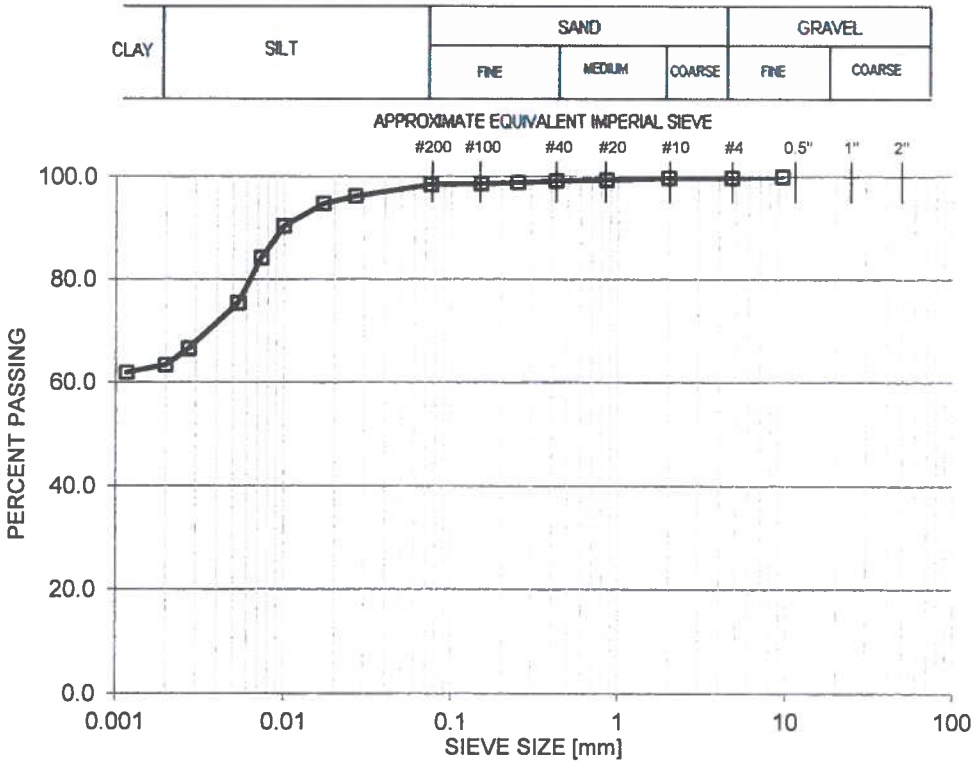
City of Winnipeg Public Works Department
106 - 1155 Pacific Avenue
Winnipeg, Manitoba
R3E 3P1

File No.: 17-037-03
Ref. No.: 17-37-3-2

Attention: Richard Weibel, C.E.T
Project: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTION PROGRAM

Test Hole No.	1	**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
9.5	100.0
4.75	99.8
2.0	99.8
0.850	99.4
0.425	99.2
0.250	98.8
0.150	98.7
0.075	98.5
0.027	96.2
0.017	94.7
0.010	90.4
0.007	84.2
0.005	75.4
0.003	66.5
0.002	63.4
0.001	61.9

Percent of: GRAVEL (0.2 %), SAND (1.3 %), SILT (35.0 %), CLAY (63.5 %)
Sample Description:
Comments: Insitu Moisture content is 39.4%.

ENG-TECH Consulting Limited

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

420 Turenne Street
Winnipeg, Manitoba
R2J 3W8
engtech@mymts.net
www.eng-tech.ca

PARTICLE SIZE ANALYSIS

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

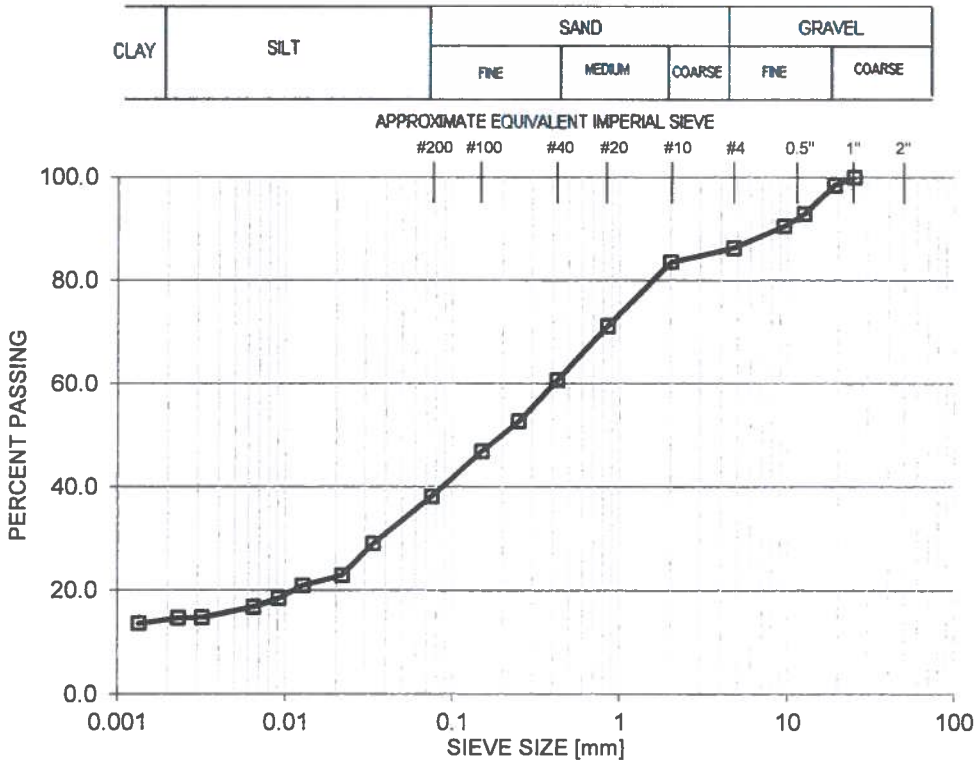
File No.: 17-037-03
Ref. No.: 17-37-3-3

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



SIEVE SIZE (mm)	PERCENT PASSING
25.0	100.0
19.0	98.5
12.5	92.9
9.5	90.5
4.75	86.3
2.0	83.5
0.850	71.1
0.425	60.7
0.250	52.7
0.150	46.9
0.075	38.1
0.033	29.0
0.022	22.9
0.013	20.9
0.009	18.5
0.006	16.8
0.003	14.8
0.002	14.7
0.001	13.6

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

ENG-TECH CONSULTING LIMITED
420 Turenne Street
Winnipeg, Manitoba
R2J 3W8
engtech@mymts.net
www.eng-tech.ca

PARTICLE SIZE ANALYSIS

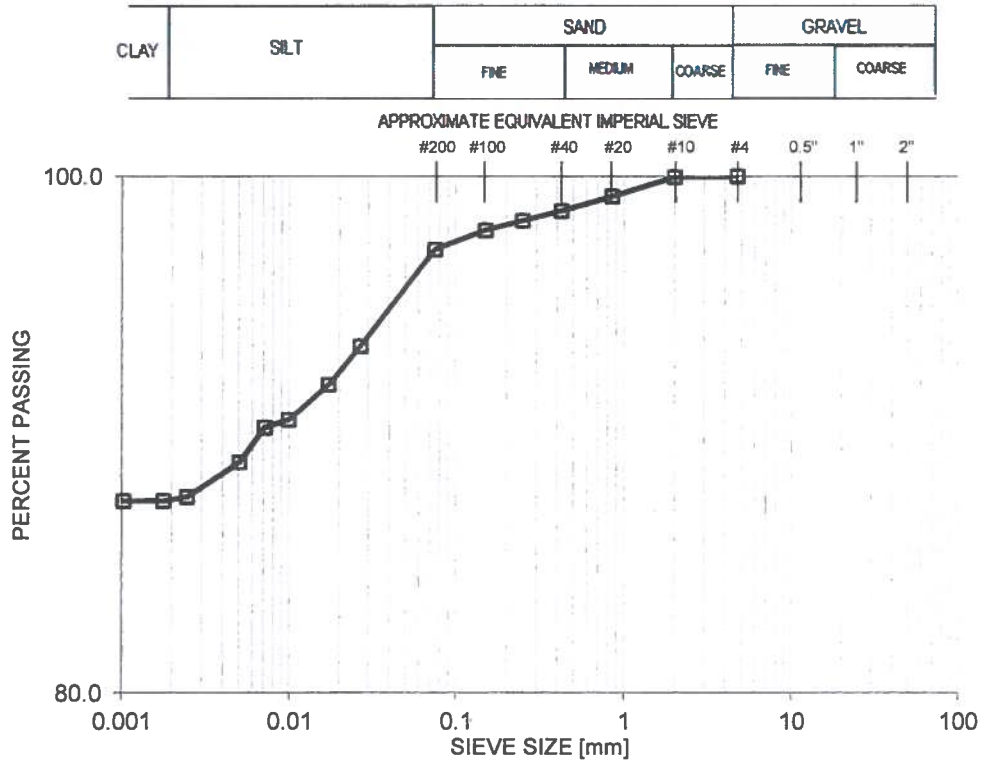
City of Winnipeg - Public Works Department
106 - 1155 Pacific Avenue
Winnipeg, Manitoba
R3E 3P1

File No.: 17-037-03
Ref. No.: 17-37-3-4

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



SIEVE SIZE (mm)	PERCENT PASSING
4.75	100.0
2.0	100.0
0.850	99.2
0.425	98.7
0.250	98.3
0.150	97.9
0.075	97.1
0.027	93.4
0.017	91.9
0.010	90.6
0.007	90.3
0.005	88.9
0.002	87.6
0.002	87.4
0.001	87.4

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

Comments: Insitu Moisture content is 35.0%.

ENG-TECH Consulting Limited

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

ENG-TECH CONSULTING LIMITED
420 Turenne Street
Winnipeg, Manitoba
R2J 3W8
engtech@mymts.net
www.eng-tech.ca

PARTICLE SIZE ANALYSIS

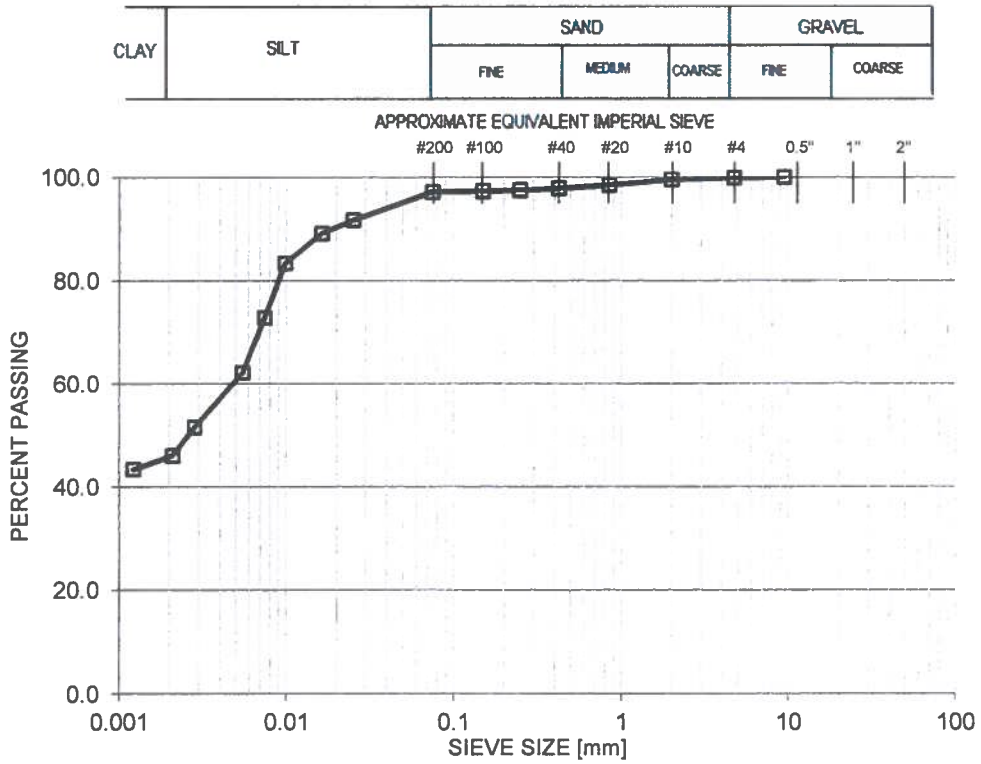
City of Winnipeg - Public Works Department
106 - 1155 Pacific Avenue
Winnipeg, Manitoba
R3E 3P1

File No.: 17-037-03
Ref. No.: 17-37-3-5

Attention: Richard Weibel, C.E.T.

Project: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTION PROGRAM

Test Hole No.	15	**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
9.5	100.0
4.75	99.9
2.0	99.5
0.850	98.5
0.425	97.8
0.250	97.5
0.150	97.3
0.075	97.2
0.025	91.7
0.016	89.2
0.010	83.4
0.007	72.8
0.005	62.2
0.003	51.6
0.002	46.1
0.001	43.4

Percent of: GRAVEL (0.1 %), SAND (2.8 %), SILT (51.3 %), CLAY (45.9 %)
Sample Description:

Comments: Insitu Moisture content is 40.2%.

ENG-TECH Consulting Limited

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

ENG-TECH CONSULTING LIMITED
420 Turenne Street
Winnipeg, Manitoba
R2J 3W8
engtech@mymts.net
www.eng-tech.ca

PARTICLE SIZE ANALYSIS

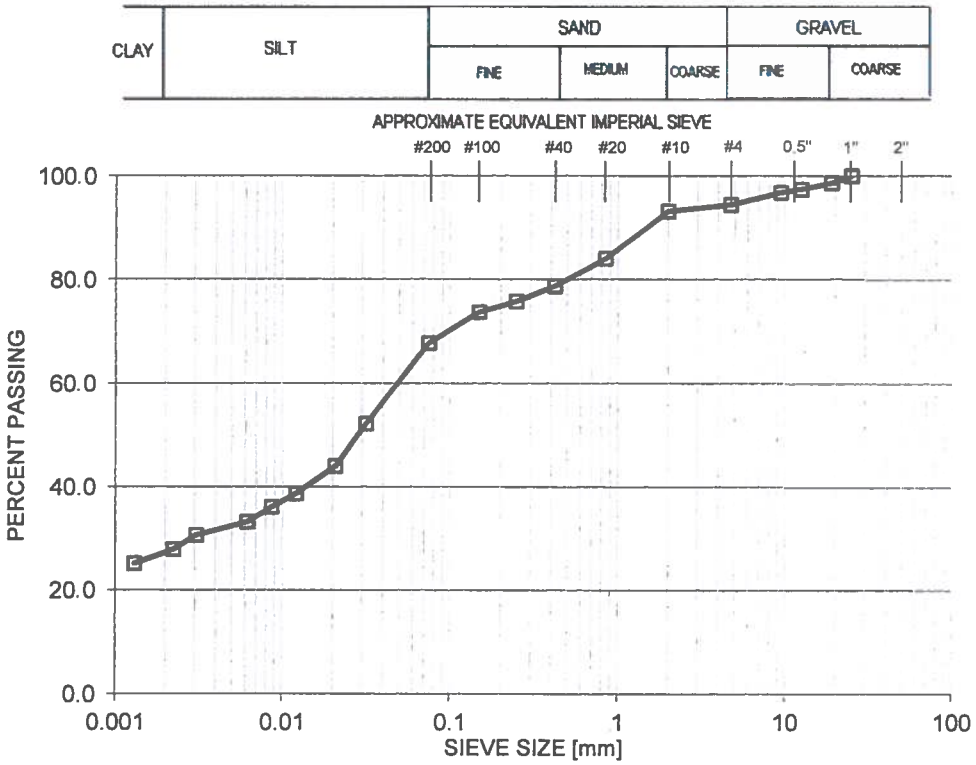
City of Winnipeg - Public Works Department
106 - 1155 Pacific Avenue
Winnipeg, Manitoba
R3E 3P1

File No.: 17-037-03
Ref. No.: 17-37-3-6

Attention: Richard Weibel, C.E.T.

Project: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTION PROGRAM

Test Hole No.	19	**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



SIEVE SIZE (mm)	PERCENT PASSING
25.0	100.0
19.0	98.6
12.5	97.5
9.5	96.8
4.75	94.5
2.0	93.2
0.850	84.1
0.425	78.7
0.250	75.8
0.150	73.7
0.075	67.7
0.032	52.2
0.021	44.0
0.012	38.7
0.009	36.1
0.006	33.2
0.003	30.6
0.002	27.9
0.001	25.2

Percent of: GRAVEL (5.5 %), SAND (26.7 %), SILT (40.4 %), CLAY (27.3 %)
Sample Description:

Comments: Insitu Moisture content is 18.0%.

ENG-TECH Consulting Limited

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

ENG-TECH CONSULTING LIMITED
420 Turenne Street
Winnipeg, Manitoba
R2J 3W8
engtech@mymts.net
www.eng-tech.ca

PARTICLE SIZE ANALYSIS

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

File No.: 17-037-03
Ref. No.: 17-37-3-7

Attention: Richard Weibel, C.E.T.

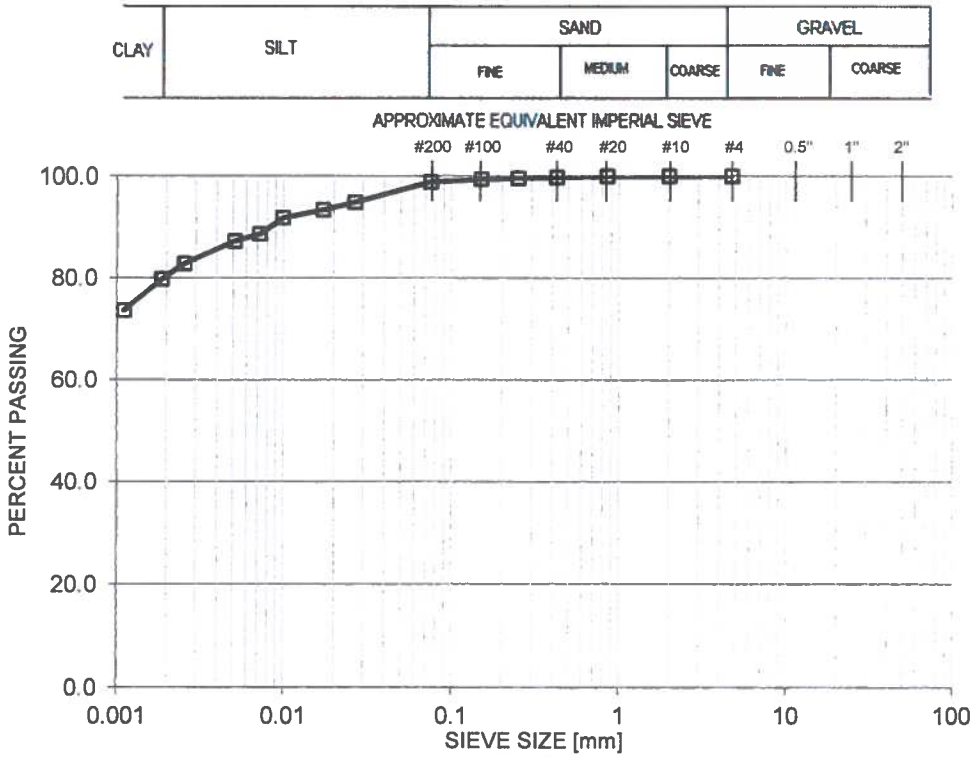
Project: GEOTECHNICAL INVESTIGATION - 2018 STREET RECONSTRUCTION PROGRAM

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



SIEVE SIZE (mm)	PERCENT PASSING
4.75	100.0
2.0	99.9
0.850	99.9
0.425	99.8
0.250	99.6
0.150	99.4
0.075	98.8
0.027	94.8
0.017	93.3
0.010	91.8
0.007	88.6
0.005	87.2
0.003	82.8
0.002	79.7
0.001	73.7

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

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

ENG-TECH CONSULTING LIMITED
420 Turenne Street
Winnipeg, Manitoba
R2J 3W8
engtech@mymts.net
www.eng-tech.ca

PARTICLE SIZE ANALYSIS

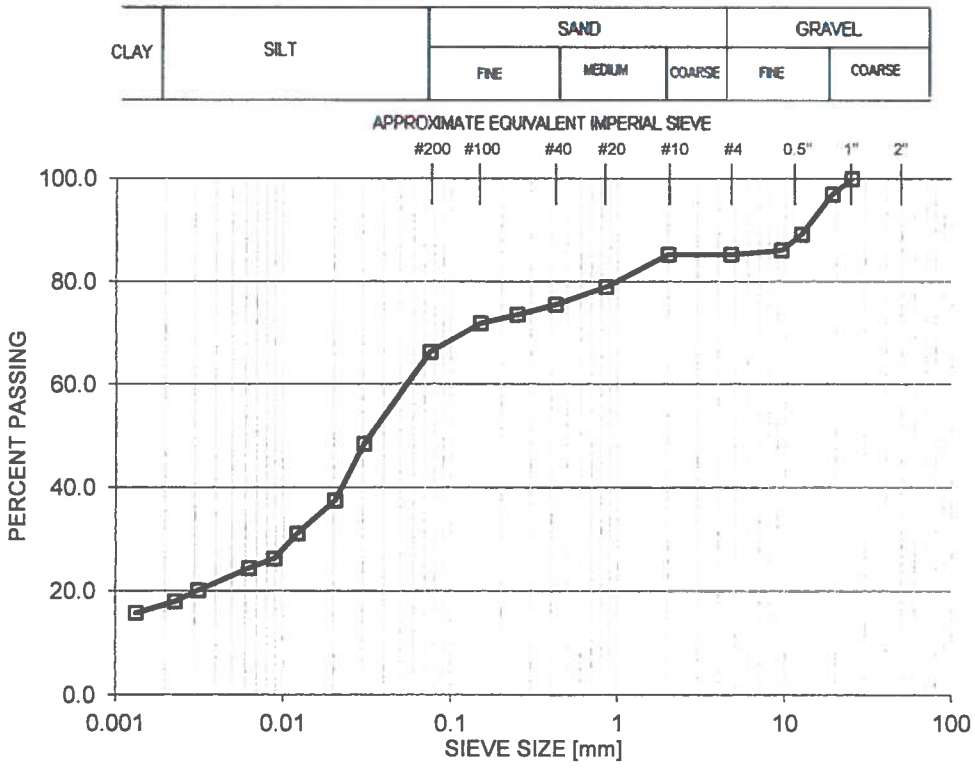
City of Winnipeg
104 - 1155 Pacific Avenue
Winnipeg, Manitoba
R3B 3P1

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



SIEVE SIZE (mm)	PERCENT PASSING
25.0	100.0
19.0	97.0
12.5	89.3
9.5	86.2
4.75	85.3
2.0	85.3
0.850	79.0
0.425	75.5
0.250	73.6
0.150	71.9
0.075	66.3
0.030	48.5
0.020	37.5
0.012	31.1
0.009	26.3
0.006	24.4
0.003	20.1
0.002	17.9
0.001	15.8

Percent of: GRAVEL (14.7 %), SAND (19.0 %), SILT (48.9 %), CLAY (17.4 %)
Sample Description:
Comments: Insitu Moisture content is 19.2%.

ENG-TECH Consulting Limited

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

ENG-TECH CONSULTING LIMITED
420 Turenne Street
Winnipeg, Manitoba
R2J 3W8
engtech@mymts.net
www.eng-tech.ca

PARTICLE SIZE ANALYSIS

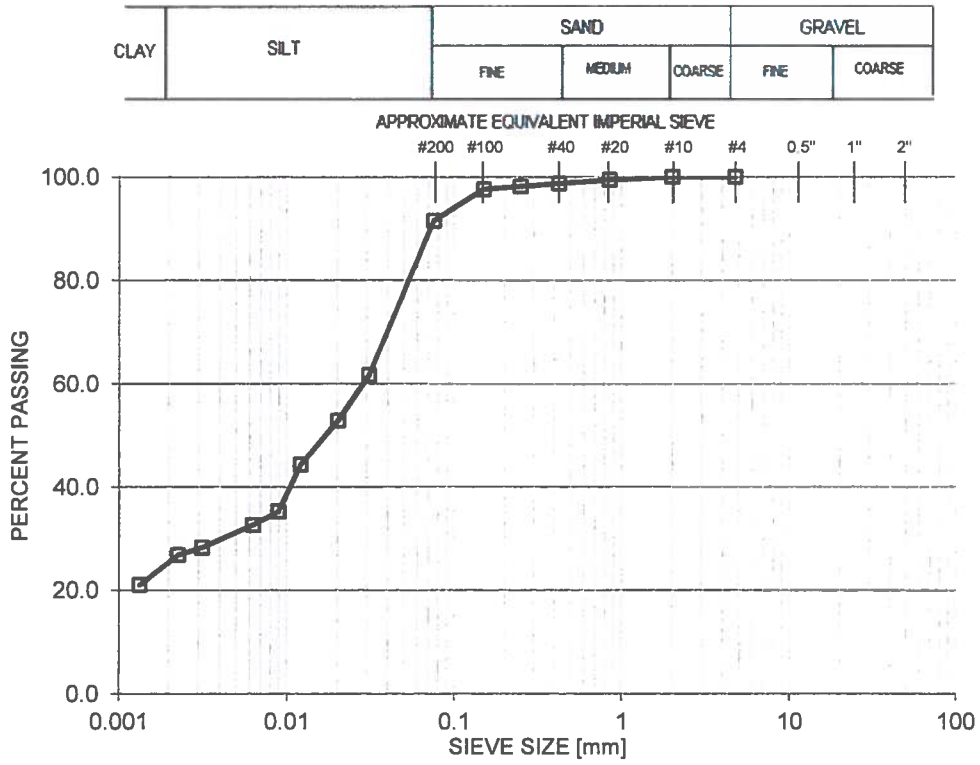
City of Winnpeg - Public Works Department
106 - 1155 Pacific Avenue
Winnipeg, Manitoba
R3E 3P1

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

420 Turenne Street
Winnipeg, Manitoba
R2J 3W8
engtech@mymts.net
www.eng-tech.ca

PARTICLE SIZE ANALYSIS

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

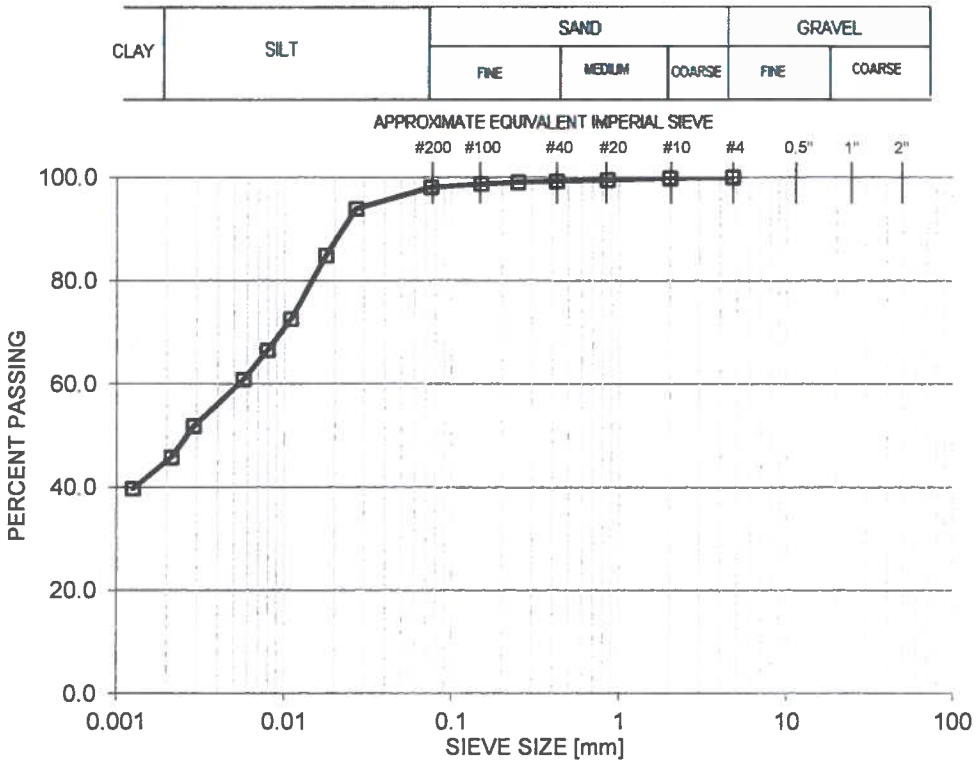
File No.: 17-037-03
Ref. No.: 17-37-3-10

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

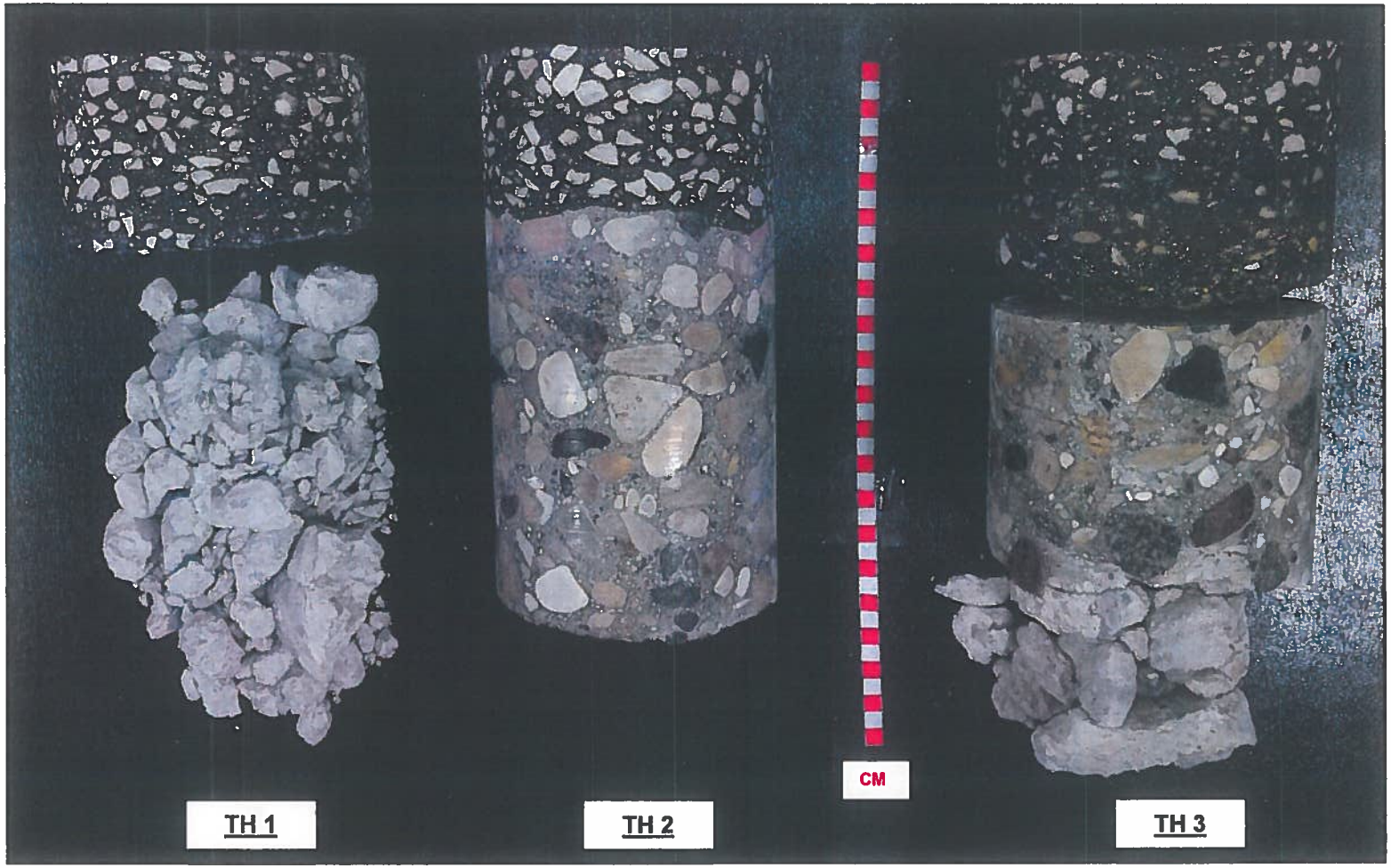


SIEVE SIZE (mm)	PERCENT PASSING
4.75	100.0
2.0	99.9
0.850	99.5
0.425	99.3
0.250	99.1
0.150	98.7
0.075	98.2
0.027	93.9
0.018	84.9
0.011	72.6
0.008	66.5
0.006	60.8
0.003	51.8
0.002	45.8
0.001	39.7

Percent of: GRAVEL (0.0 %), SAND (1.8 %), SILT (53.1 %), CLAY (45.1 %)
Sample Description:
Comments: Insitu Moisture content is 32.5%.

ENG-TECH Consulting Limited

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



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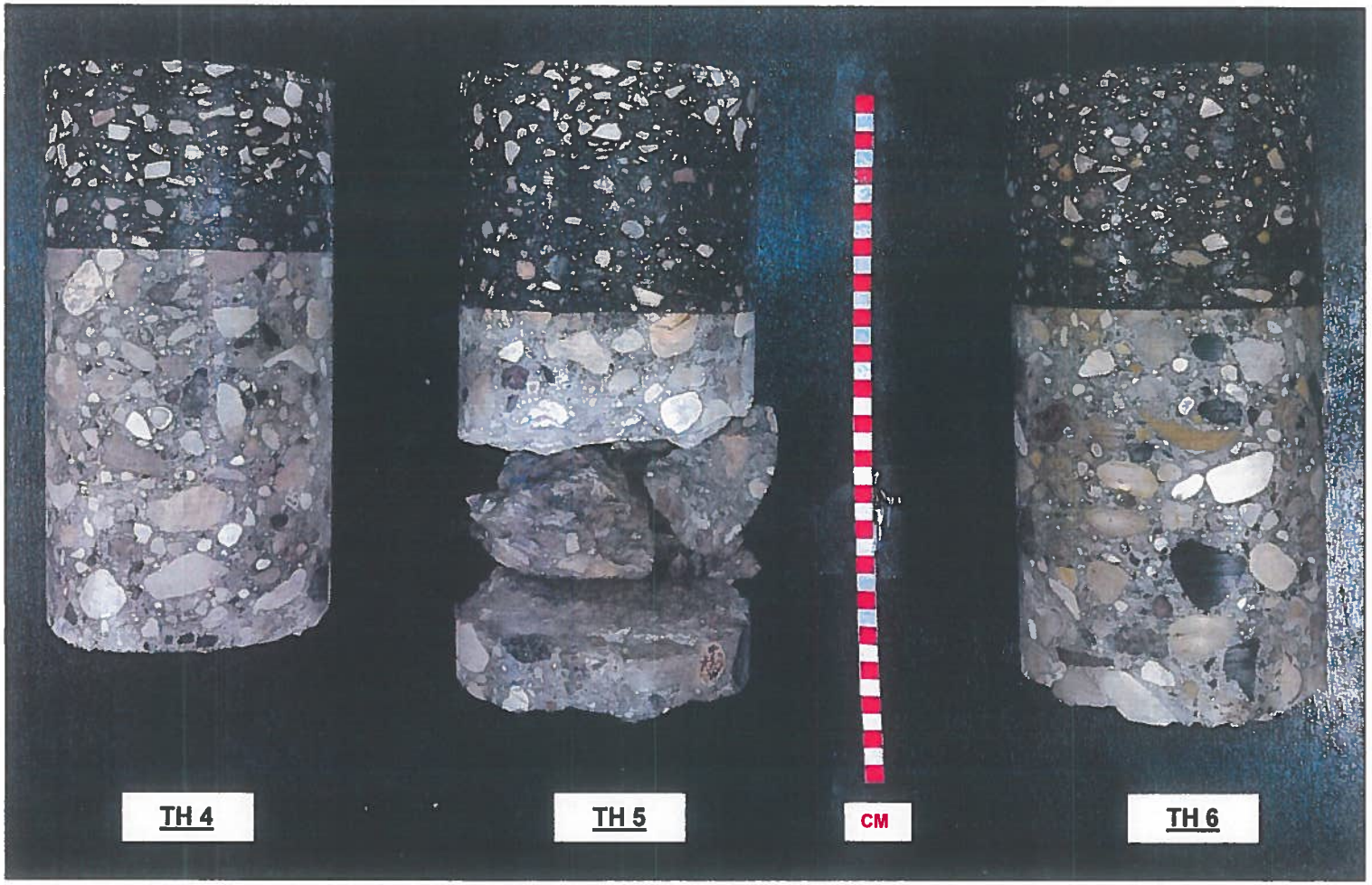

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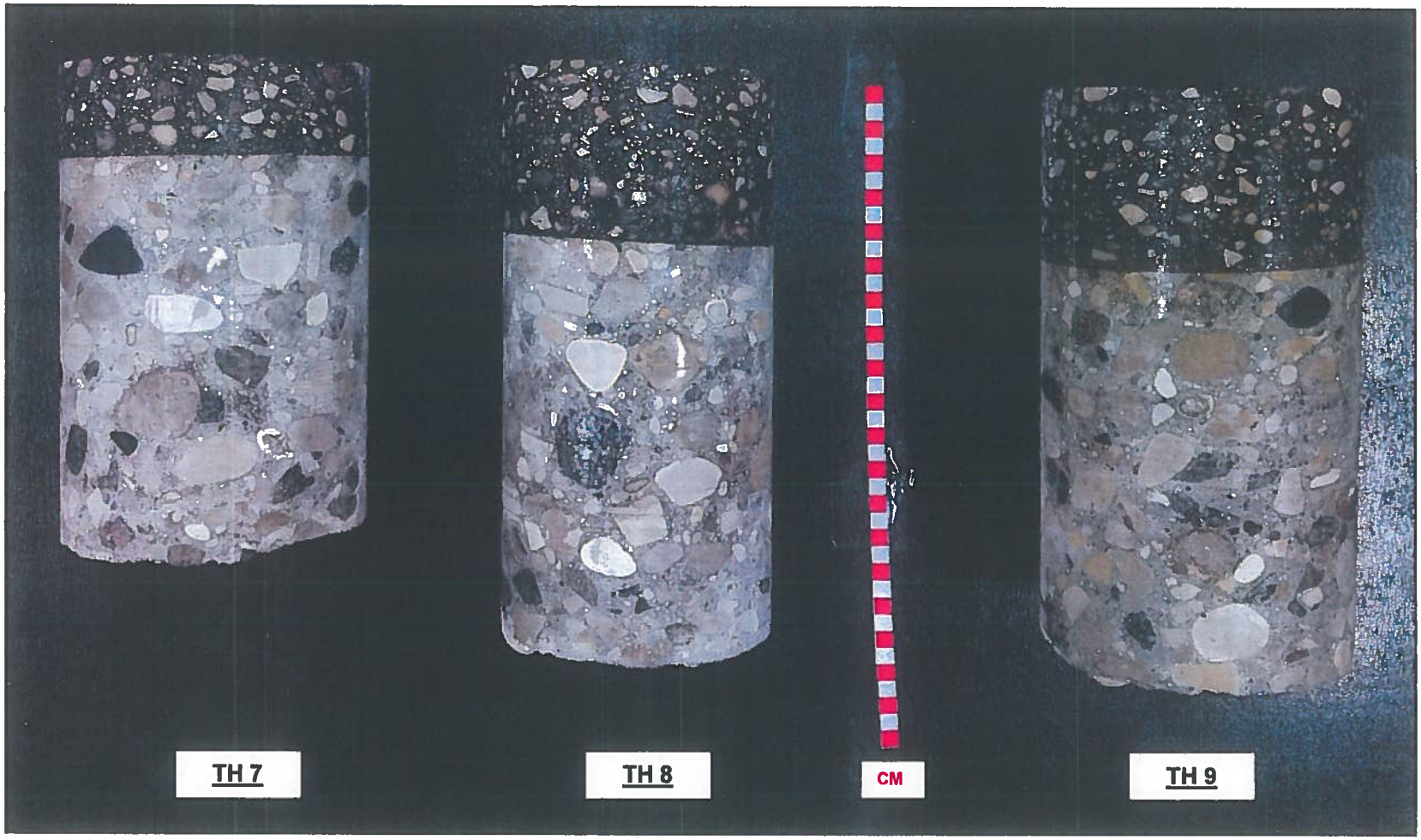

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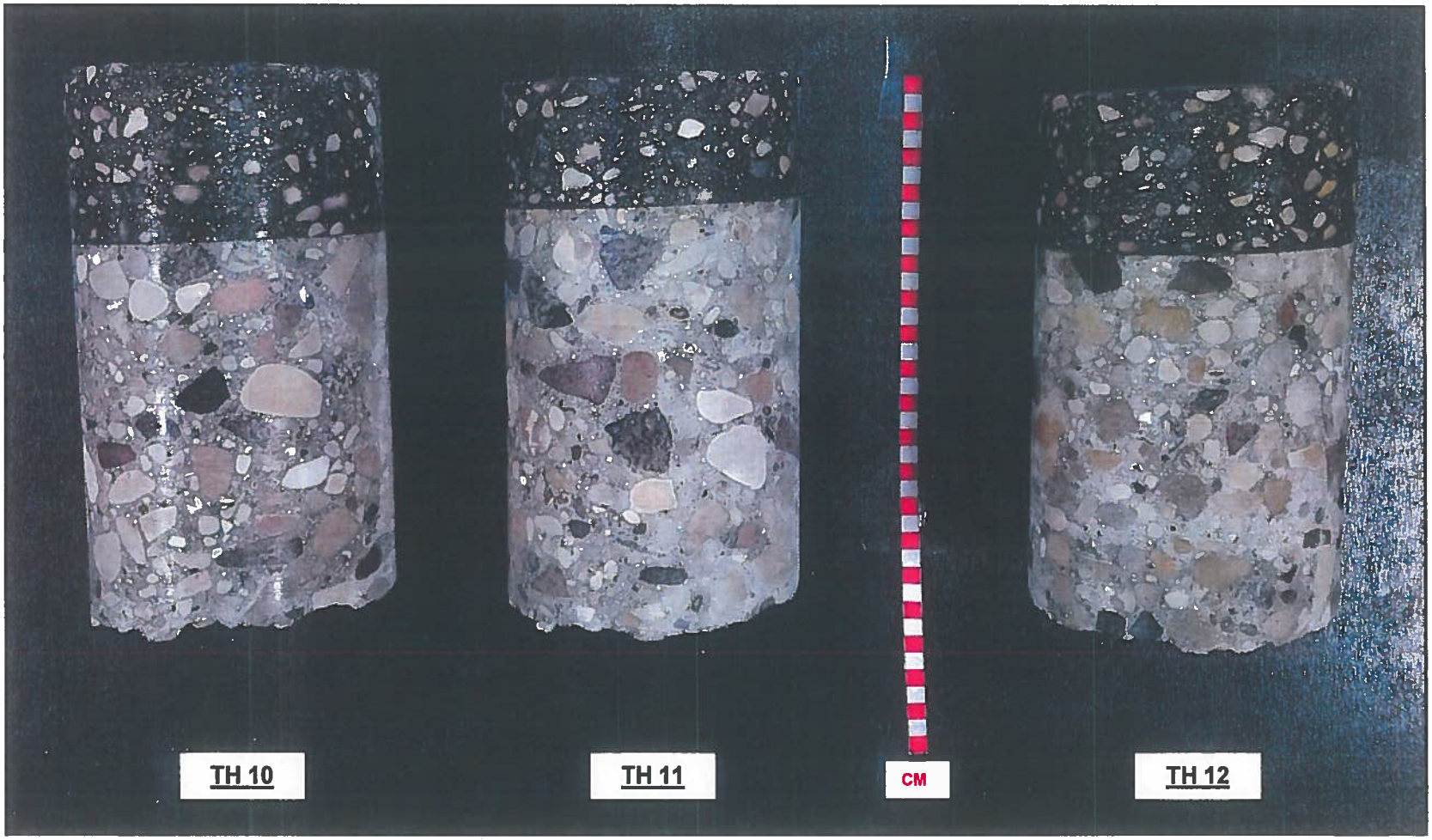

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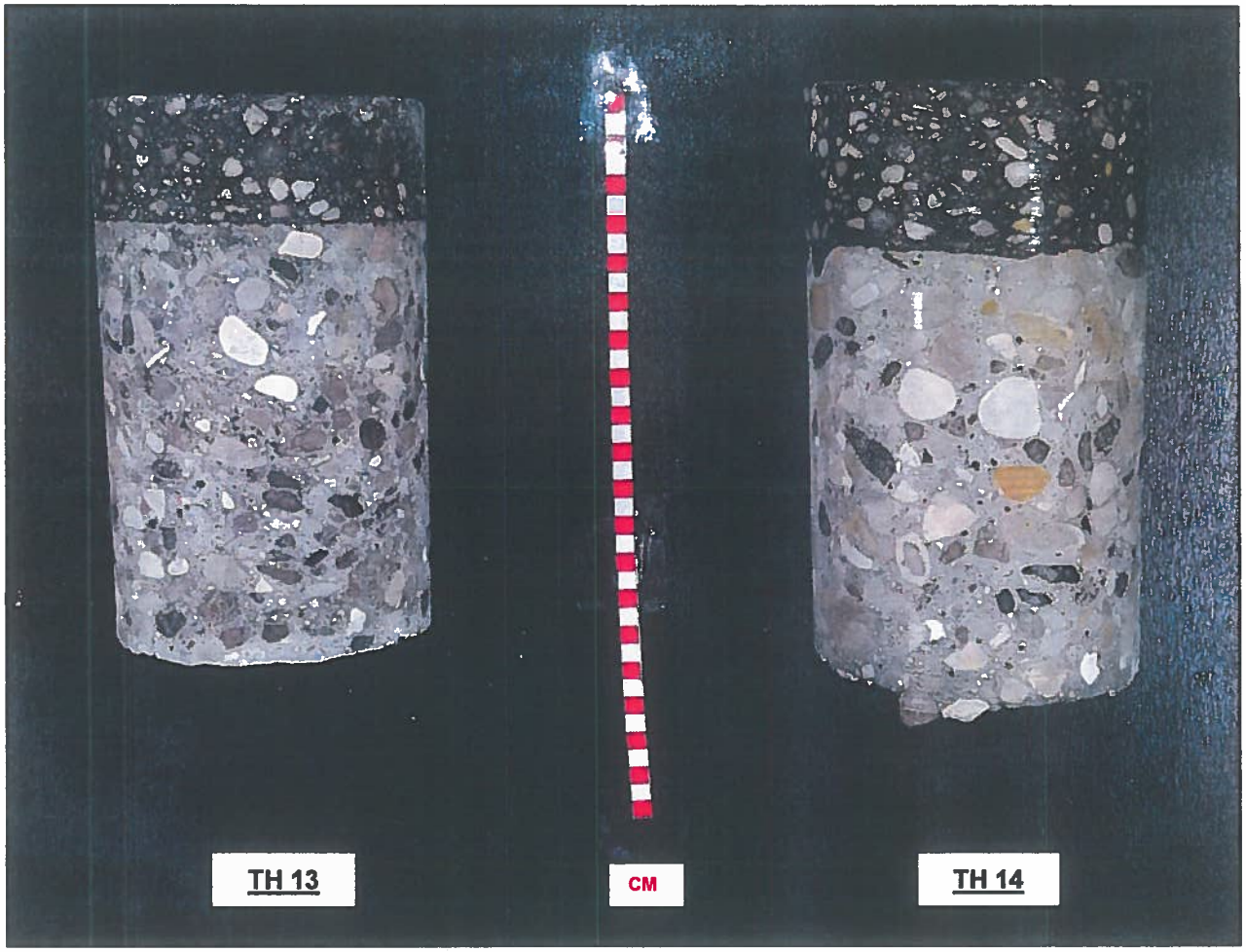

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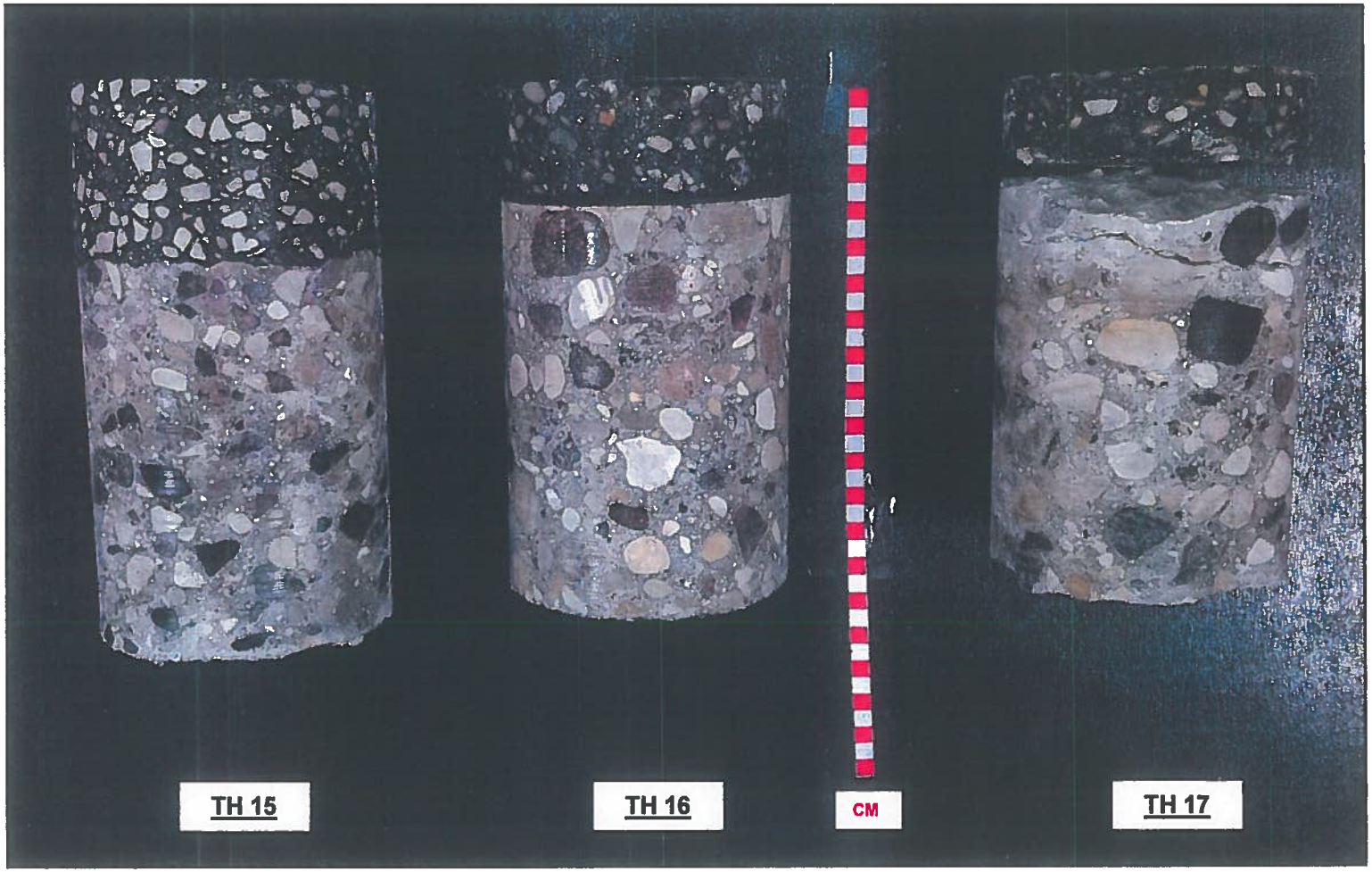

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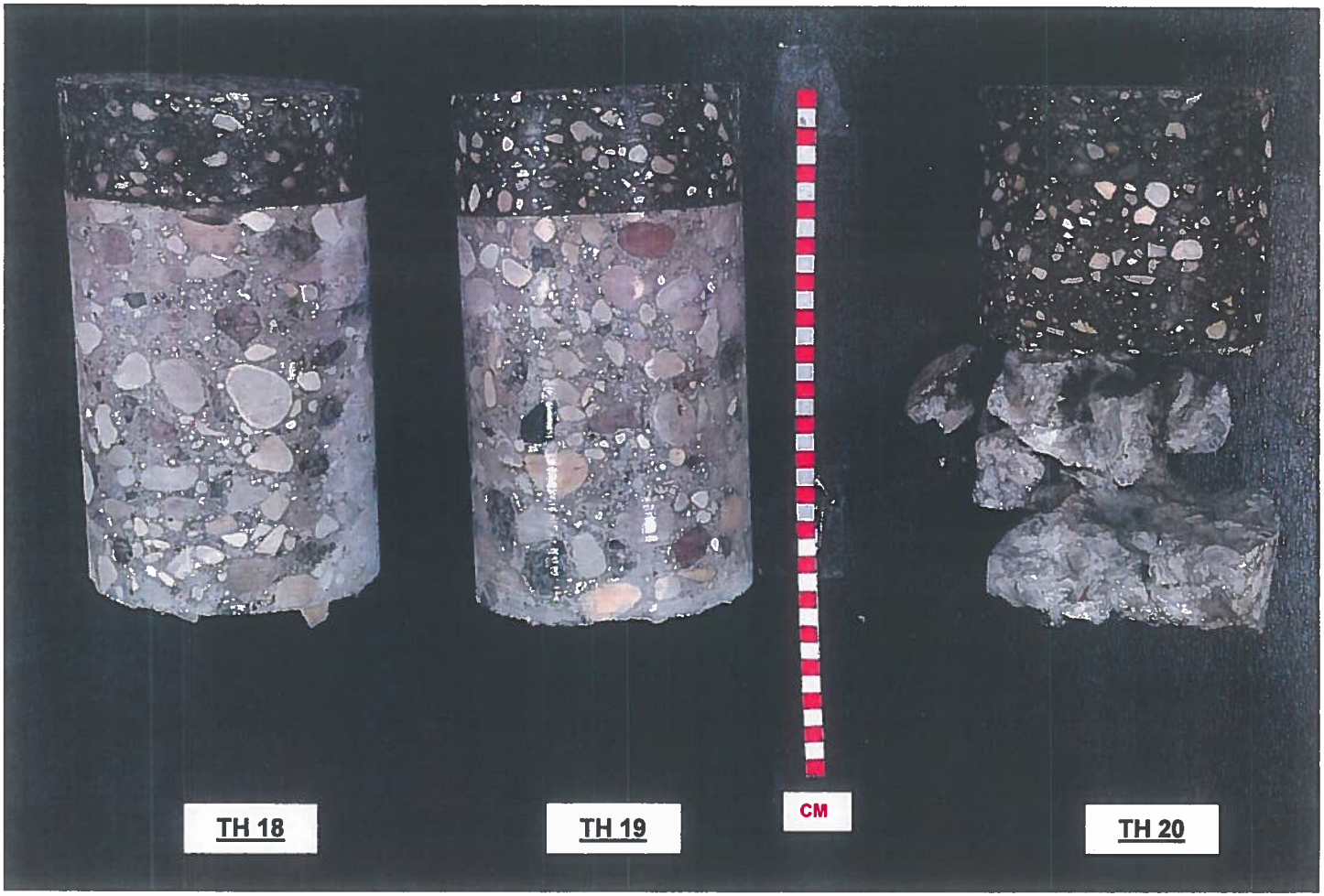

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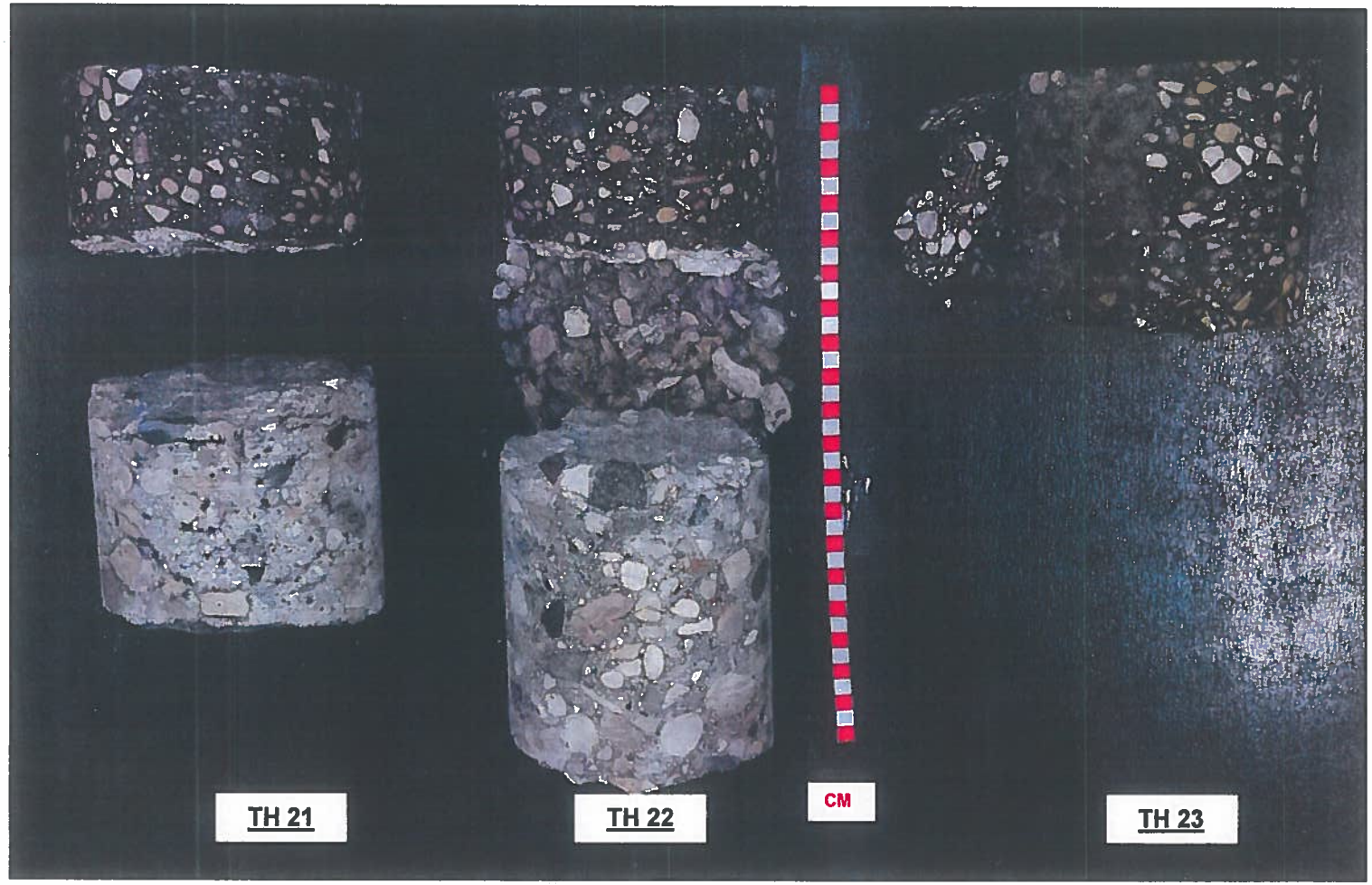

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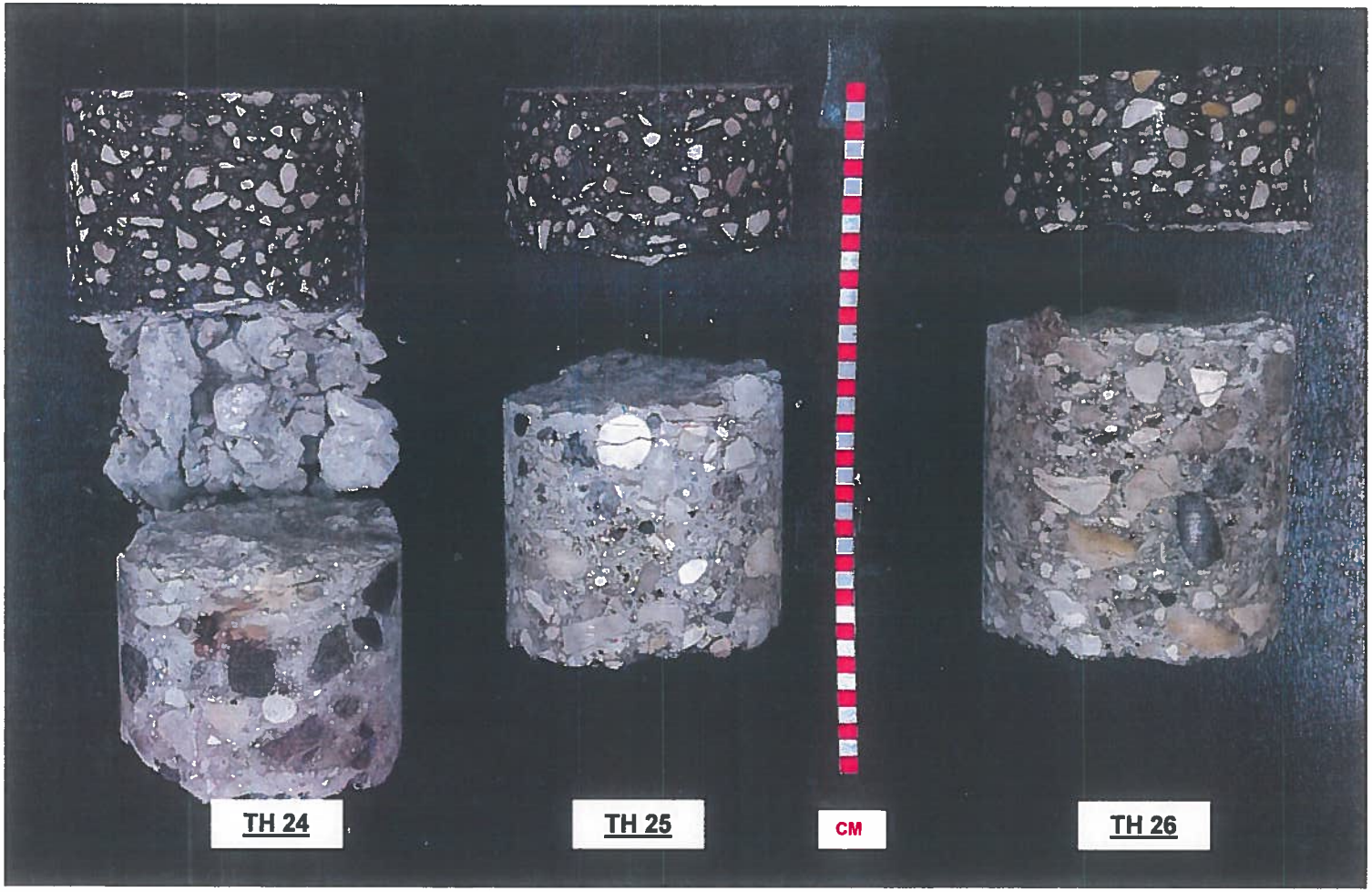

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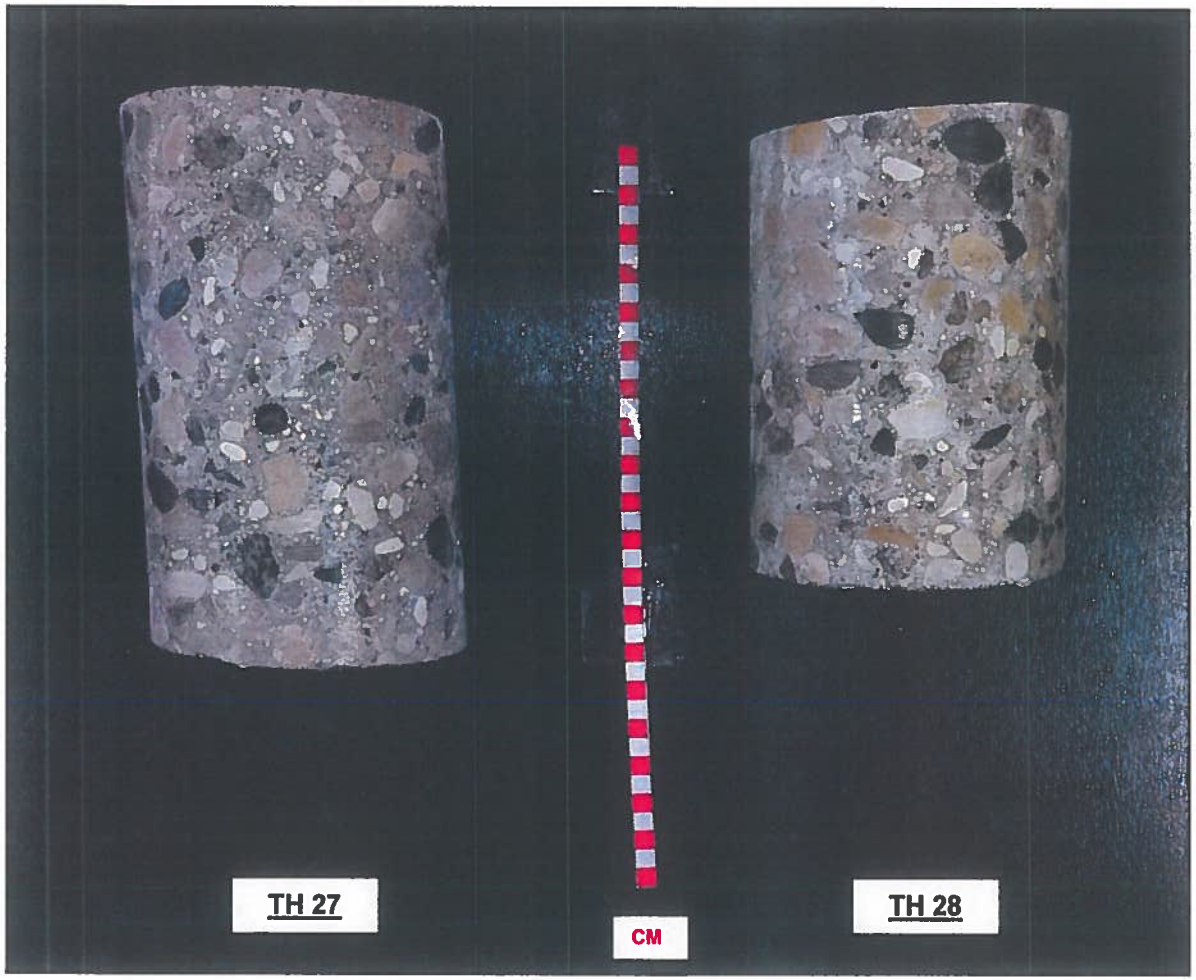

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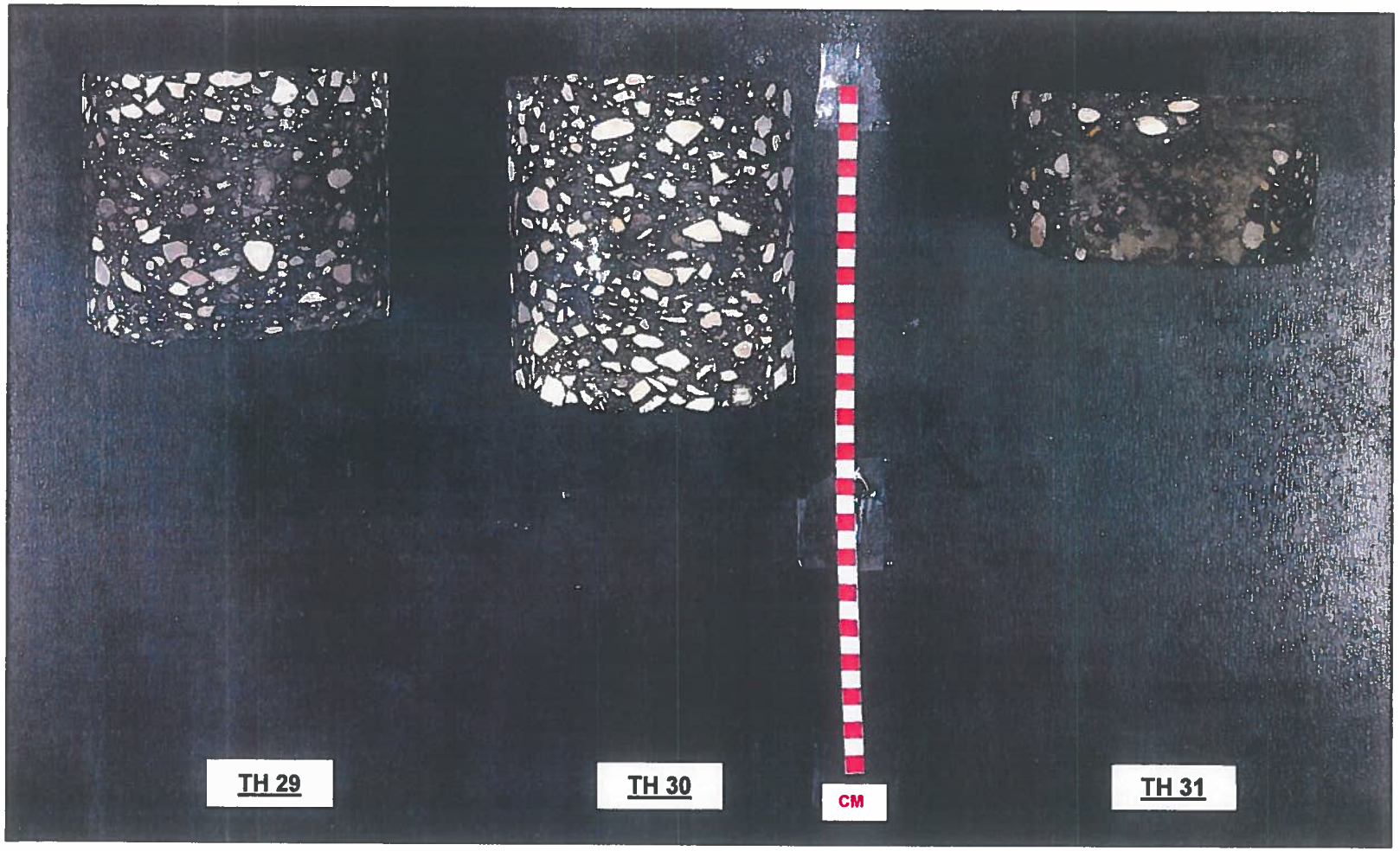
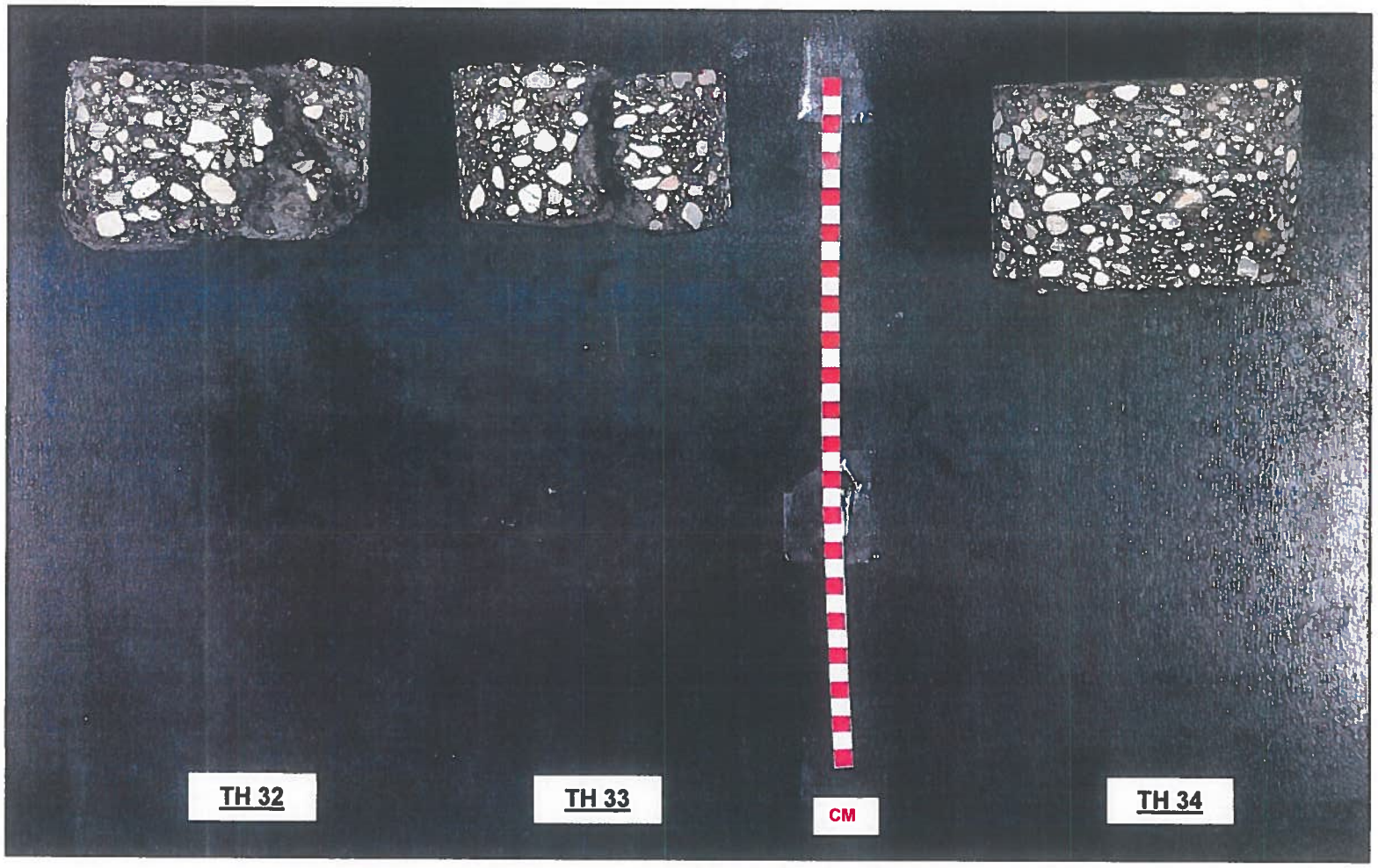


Assiniboine Park Drive to Comissary Road



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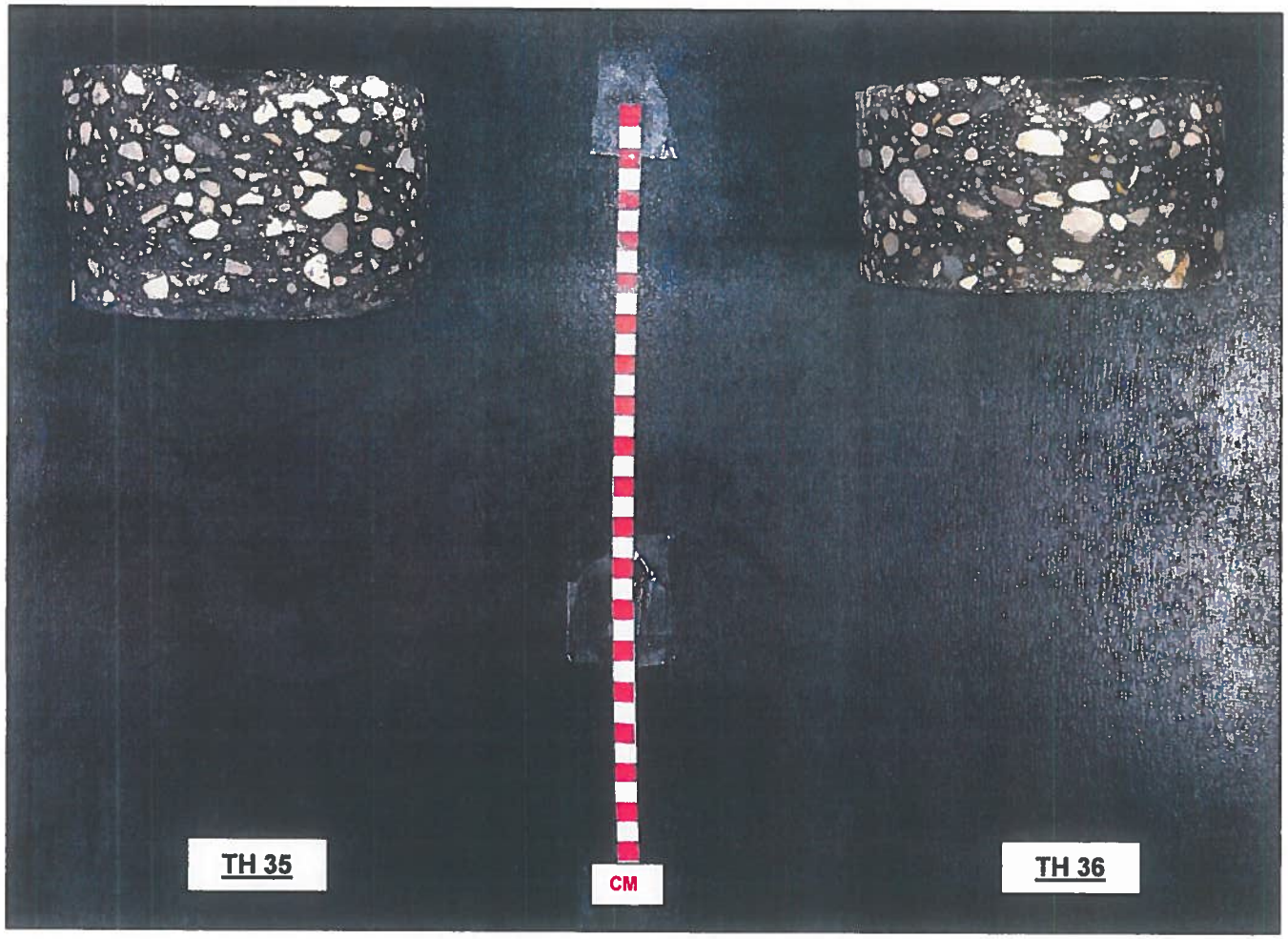

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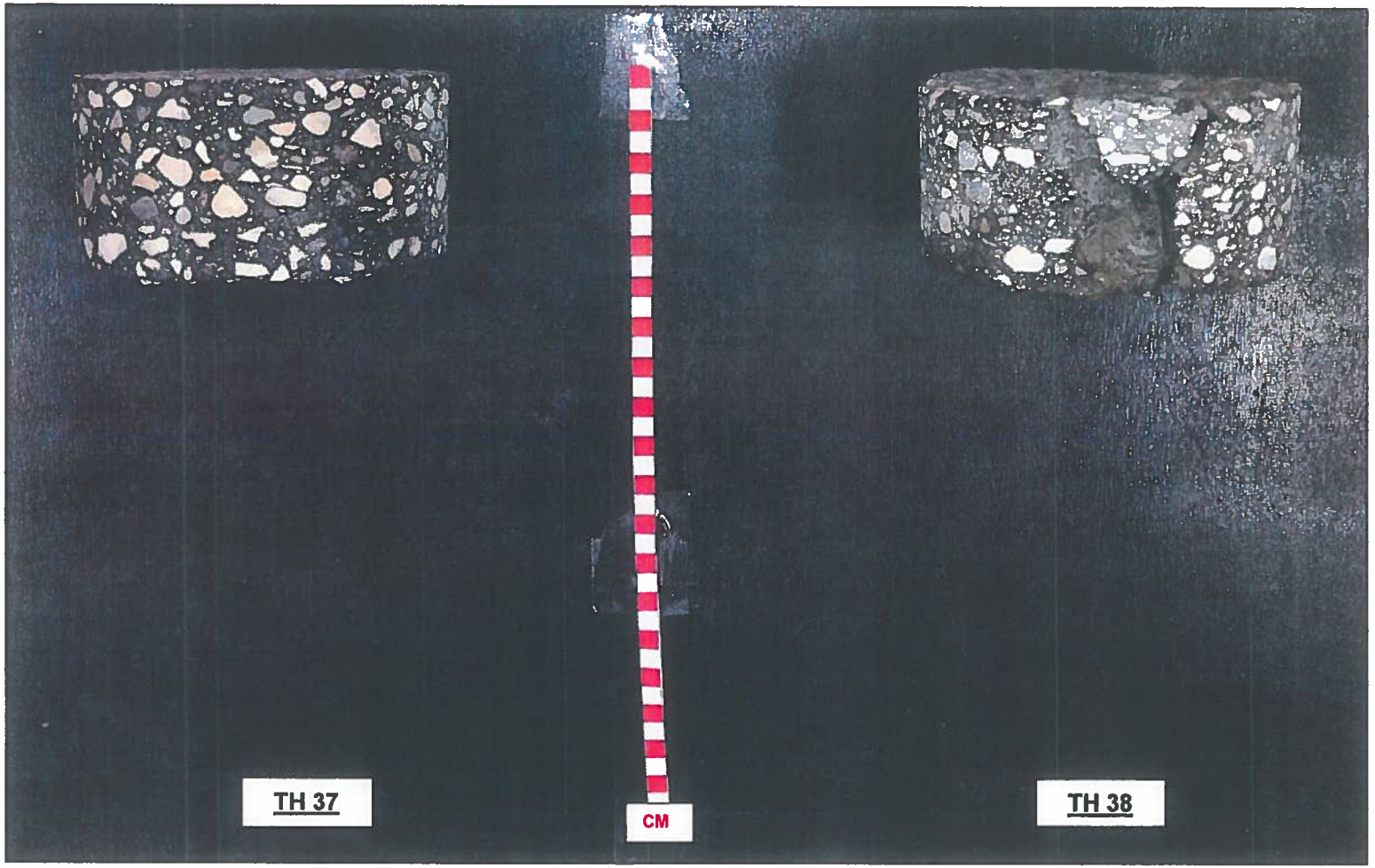

Assiniboine Park Drive to Comissary Road