THE CITY OF WINNIPEG

TENDER

TENDER NO. 568-2020

WELLINGTON CRESCENT RIVERBANK, PATH, AND ROADWAY PROJECT

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PART B - BIDDING PROCEDURES

B1. CONTRACT

B1.1 Wellington Crescent Riverbank, Path, and Roadway Project

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, October 29, 2020.

B2.2 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. SITE INVESTIGATION

B3.1 Further to C3.1, the Bidder may view the Site without making an appointment.

B3.2 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing

B3.3 The Bidder is advised that uneven terrain is present throughout the Site. Caution should be exercised to avoid injury.

B4. ENQUIRIES

B4.1 All enquiries shall be directed to the Contract Administrator identified in D4.1.

B4.2 If the Bidder finds errors, discrepancies or omissions in the Tender, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.

B4.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Tender will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Tender will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B4.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.

B4.6 Any enquiries concerning submitting through MERX should be addressed to:
MERX Customer Support
Phone: 1-800-964-6379
Email: merx@merx.com

B5. CONFIDENTIALITY

B5.1 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.

B5.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Tender to the media or any member of the public without the prior written authorization of the Contract Administrator.

B6. ADDENDA

B6.1 The Contract Administrator may, at any time prior to the Submission deadline, issue addenda correcting errors, discrepancies or omissions in the Tender, or clarifying the meaning or intent of any provision therein.

B6.2 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.

B6.3 Addenda will be available on the MERX website at www.merx.com.

B6.4 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the MERX website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B6.5 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid/Proposal. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B6.6 Notwithstanding B4, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D4.

B7. SUBSTITUTES

B7.1 The Work is based on the Plant, Materials and methods specified in the Tender.

B7.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B7.3 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.

B7.4 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.

B7.5 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.

B7.6 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.

B7.6.1 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.

B7.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

B7.8 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 B18.

B7.9 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.

B8. BID COMPONENTS

B8.1 The Bid shall consist of the following components:

(a) Form A: Bid;

(b) Form B: Prices;

(c) Form G1: Bid Bond and Agreement to Bond.

B8.2 Further to B8.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B7.

B8.3 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.

B8.4 The Bid shall be submitted electronically through MERX at www.merx.com.

B8.4.1 Bids will **only** be accepted electronically through MERX.

B8.5 Bidders are advised that inclusion of terms and conditions inconsistent with the Tender document, including the General Conditions, will be evaluated in accordance with B18.1(a).

B9. BID

B9.1 The Bidder shall complete Form A: Bid/Proposal, making all required entries.

B9.2 Paragraph 2 of Form A: Bid/Proposal 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.

B9.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B9.2.

B9.3 In Paragraph 3 of Form A: Bid/Proposal, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

B9.4 Paragraph 13 of Form A: Bid/Proposal 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;

(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.

B9.4.1 The name and official capacity of all individuals signing Form A: Bid/Proposal should be entered below such signatures.

B9.5 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.

B10. PRICES

B10.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B10.1.1 Prices stated on Form B: Prices shall not include any costs which may be incurred by the Contractor with respect to any applicable funding agreement obligations as outlined in D31. Any such costs shall be determined in accordance with D31.

B10.2 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.

B10.3 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.

B10.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B10.5 The Bidder shall enter the Total Bid Price from Form B: Prices into the Total Bid Price field in MERX.

B10.5.1 Bidders are advised that the calculation indicated in B18.4 will prevail over the Total Bid Price entered in MERX.

B11. DISCLOSURE

B11.1 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.

B11.2 The Persons are:

(a) N/A

B12. CONFLICT OF INTEREST AND GOOD FAITH

B12.1 Further to C3.2, Bidders, by responding to this Tender, declare that no Conflict of Interest currently exists, or is reasonably expected to exist in the future.

B12.2 Conflict of Interest means any situation or circumstance where a Bidder or employee of the Bidder proposed for the Work has:

(a) other commitments;

(b) relationships;

(c) financial interests; or

(d) involvement in ongoing litigation;

that could or would be seen to:

(i) exercise an improper influence over the objective, unbiased and impartial exercise of the independent judgment of the City with respect to the evaluation of Bids or award of the Contract; or

(ii) compromise, impair or be incompatible with the effective performance of a Bidder's obligations under the Contract;

(e) has contractual or other obligations to the City that could or would be seen to have been compromised or impaired as a result of its participation in the Tender process or the Work; or

(f) has knowledge of confidential information (other than confidential information disclosed by the City in the normal course of the Tender process) of strategic and/or material relevance to the Tender process or to the Work that is not available to other bidders and that could or would be seen to give that Bidder an unfair competitive advantage.

B12.3 In connection with its Bid, each entity identified in B12.2 shall:

(a) avoid any perceived, potential or actual Conflict of Interest in relation to the procurement process and the Work;

(b) upon discovering any perceived, potential or actual Conflict of Interest at any time during the Tender process, promptly disclose a detailed description of the Conflict of Interest to the City in a written statement to the Contract Administrator; and

(c) provide the City with the proposed means to avoid or mitigate, to the greatest extent practicable, any perceived, potential or actual Conflict of Interest and shall submit any additional information to the City that the City considers necessary to properly assess the perceived, potential or actual Conflict of Interest.

B12.4 Without limiting B12.3, the City may, in its sole discretion, waive any and all perceived, potential or actual Conflicts of Interest. The City's waiver may be based upon such terms and conditions as the City, in its sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately avoided or mitigated, including requiring the Bidder to put into place such policies, procedures, measures and other safeguards as may be required by and be acceptable to the City, in its sole discretion, to avoid or mitigate the impact of such Conflict of Interest.

B12.5 Without limiting B12.3, and in addition to all contractual or other rights or rights at law or in equity or legislation that may be available to the City, the City may, in its sole discretion:

(a) disqualify a Bidder that fails to disclose a perceived, potential or actual Conflict of Interest of the Bidder or any of its employees proposed for the Work;

(b) require the removal or replacement of any employees proposed for the Work that has a perceived, actual or potential Conflict of Interest that the City, in its sole discretion, determines cannot be avoided or mitigated;

(c) disqualify a Bidder or employees proposed for the Work that fails to comply with any requirements prescribed by the City pursuant to B12.4 to avoid or mitigate a Conflict of Interest; and

(d) disqualify a Bidder if the Bidder, or one of its employees proposed for the Work, has a perceived, potential or actual Conflict of Interest that, in the City's sole discretion, cannot be avoided or mitigated, or otherwise resolved.

B12.6 The final determination of whether a perceived, potential or actual Conflict of Interest exists shall be made by the City, in its sole discretion.

B13. QUALIFICATION

B13.1 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.

B13.2 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 https://www.winnipeg.ca/matmgt/Templates/files/debar.pdf

B13.3 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).

B13.4 Further to B13.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

(a) Written confirmation of a safety and health certification meeting SAFE Work Manitoba's SAFE Work Certified Standard (e.g., COR™ and SECOR™) in the form of:

(i) a copy of their valid Manitoba COR certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Certificate of Recognition (COR) Program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or

(ii) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or

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

B13.5 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.

B13.6 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.

B14. BID SECURITY

B14.1 The Bidder shall include in its Bid Submission bid security in the form of a digital 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 Form G1: Bid Bond and Agreement to Bond, available on The City of Winnipeg, Corporate Finance, Materials Management Division website at https://www.winnipeg.ca/MatMgt/templates/files/eBidsecurity.pdf.

B14.2 Bid security shall be submitted in a digital format meeting the following criteria:

(a) The version submitted by the Bidder must have valid digital signatures and seals;

(b) The version submitted by the Bidder must be verifiable by the City with respect to the totality and wholeness of the bond form, including: the content; all digital signatures and digital seals; with the surety company, or an approved verification service provider of the surety company.

(c) The version submitted must be viewable, printable and storable in standard electronic file formats compatible with the City, and in a single file. Allowable formats include pdf.

(d) The verification may be conducted by the City immediately or at any time during the life of the bond and at the discretion of the City with no requirement for passwords or fees.

(e) The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding B14.2(a).

B14.3 Bonds failing the verification process will not be considered to be valid and the bid shall be determined to be non-responsive in accordance with B18.1(a).

B14.4 Bonds passing the verification process will be treated as original and authentic.

B14.4.1 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.

B14.5 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 formed with the successful Bidder and the contract securities are furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B14.6 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Tender.

B15. OPENING OF BIDS AND RELEASE OF INFORMATION

B15.1 Bids will not be opened publicly.

B15.2 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 MERX website at www.merx.com.

B15.3 After award of Contract, the name(s) of the successful Bidder(s) and their Contract amount(s) will be available on the MERX website at www.merx.com.

B15.4 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).

B15.4.1 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.

B16. IRREVOCABLE BID

B16.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid/Proposal.

B16.2 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 formed and the contract securities have been furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid/Proposal.

B17. WITHDRAWAL OF BIDS

B17.1 A Bidder may withdraw his/her Bid without penalty prior to the Submission Deadline.

B18. EVALUATION OF BIDS

B18.1 Award of the Contract shall be based on the following bid evaluation criteria:

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

(b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B13 (pass/fail);

(c) Total Bid Price;

(d) economic analysis of any approved alternative pursuant to B7.

B18.2 Further to B18.1(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.

B18.3 Further to B18.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his/her Bid or in other information required to be submitted, that he/she is qualified.

B18.4 Further to B18.1(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.

B18.4.1 Further to B18.1(a), in the event that a unit price is not provided on Form B: Prices, the City may determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B18.4.2 Bidders are advised that the calculation indicated in B18.4 will prevail over the Total Bid Price entered in MERX.

B19. AWARD OF CONTRACT

B19.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B19.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be qualified, and the Bids are determined to be responsive.

B19.2.1 Without limiting the generality of B19.2, 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.

B19.3 If funding for the Work is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, Bidders are advised that the terms of D31 shall immediately take effect upon confirmation of such funding, regardless of when funding is confirmed.

B19.4 Where an award of Contract is made by the City, the award shall be made to the qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B18.

B19.4.1 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 2020-01-31) are applicable to the Work of the Contract.

C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm

C0.2 A reference in the Tender to a section, clause or subclause with the prefix "**C**" designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. FORM OF CONTRACT DOCUMENTS

D2.1 Notwithstanding C4.1(c) and C4.4, the Contract Documents will be provided to the Contractor electronically and there will be no requirement for execution and return to the City by the Contractor. Accordingly, the provisions under C4.4(a) and C4.4(b) are no longer applicable.

D3. SCOPE OF WORK

D3.1 The Work to be done under the Contract shall generally, albeit not in its entirety, consist of:

(a) Phase 1 – 2020/21 Winter Works
- (i) Environmental Protection Measures
- (ii) Tree Removal
- (iii) Temporary Construction Access Ramps
- (iv) Riverbank Offloading
- (v) Riprap Blanket
- (vi) West Shear Key
- (vii) East Shear Key
- (viii) Outfall Works (Park Boulevard and Doncaster Street)
- (ix) Force Main Relocation (see D3.1(c))
- (x) Sewer Main Relocation (see D3.1(c))

(b) Phase 2 – 2021 Summer Works
- (i) Pavement Removals and Rehabilitation
- (ii) Intersection and Traffic Calming Improvements
- (iii) Realignment of Wellington Crescent
- (iv) Conversion of Fulham Ave. to a one-way street
- (v) Multi-Use Pathway (MUP) Realignment
- (vi) Manitoba Hydro Lighting Improvements, Removal, and Relocations
- (vii) Tension Crack Sealing and Riverbank Regrading
- (viii) Land Drainage Sewer and Riverbank Swale Improvements
- (ix) Naturalization and Landscape Works
- (x) Wilderness Trail
- (xi) Relocate Assiniboine Park East Gate

(c) All Phase 1 underground works beneath pavement including Force main and Sewer main works to be completed in advance of Phase 2 roadworks start date.

D4. CONTRACT ADMINISTRATOR

D4.1 The Contract Administrator is KGS Group, represented by:

Bruno Pierre Arpin, P.Eng.
Senior Project Manager

Telephone No. 204 896-1209
Email Address barpin@kgsgroup.com

D4.2 At the pre-construction meeting, Bruno Pierre Arpin, P.Eng. will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D5. CONTRACTOR'S SUPERVISOR

D5.1 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.

D5.2 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 D5.1 or an alternate can be contacted twenty-four (24) hours a day to respond to an emergency.

D6. NOTICES

D6.1 Except as provided for in C22.4, 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/Proposal.

D6.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D6.3 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator identified in D4.

D6.3 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

D7. FURNISHING OF DOCUMENTS

D7.1 Upon award of the Contract, the Contractor will be provided with ‘issued for construction’ Contract Documents electronically, including Drawings in PDF formal only.

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 Documents, if applicable.

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.

(d) An all risks property insurance policy to cover all machinery, equipment and tools that may be owned, rented, leased or borrowed to be used in conjunction with the scope of the work.

(e) Contractors pollution liability insurance in the amount of at least one million dollars ($1,000,000) per occurrence and one million dollars ($1,000,000) aggregate insuring against claims for:

(i) Bodily Injury

(ii) Property damage including diminution in value; and Natural Resource Damages

(iii) Clean-Up

(iv) Transported cargo and non-owned disposal sites

(v) Sudden and gradual pollution conditions including further disruption of pre-existing conditions arising from the Contractors operations and completed operations.

D10.2 Deductibles shall be borne by the Contractor.

D10.3 The Contractor shall require any sub-contractors hired to perform riverbank stability Work to maintain, at its own expense and cost, comparable insurance to that set forth under D10.1.

D10.4 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 Documents, as applicable.

D10.5 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D10.6 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.

D11. CONTRACT SECURITY

D11.1 The Contractor shall provide and maintain the performance bond and the labour and material payment bond until the expiration of the warranty period in the form of:

(a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; and

(b) a labour and material payment bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H2: Labour and Material Payment Bond), in an amount equal to fifty percent (50%) of the Contract Price.

D11.2 The Contractor shall provide the City Solicitor with the required performance and labour and material payment bonds within seven (7) Calendar Days of notification of the award of the Contract by way of an award letter and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

D11.3 The Contractor shall, as soon as practicable after entering into a contract with a Subcontractor:

(a) give the Subcontractor written notice of the existence of the labour and material payment bond in D11.1(b); and

(b) post a notice of the bond and/or a copy of that bond in a conspicuous location at the Site of the Work.

D12. SUBCONTRACTOR LIST

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

D13. EQUIPMENT LIST

D13.1 The Contractor shall provide the Contract Administrator with a complete list of the equipment which the Contractor proposes to utilize (Form K: Equipment 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 Documents, if applicable.

D14. DETAILED WORK SCHEDULE

D14.1 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 Documents, as applicable.

D14.2 The detailed work schedule shall consist of the following:

(a) a critical path method (C.P.M.) schedule for the Work;

(b) a Gantt chart for the Work based on the C.P.M. schedule; and

(c) a daily resources schedule for the Work;

all acceptable to the Contract Administrator.

D14.3 Further to D14.2(a), the C.P.M. schedule shall clearly identify, at a minimum, the start and completion dates of all of the activities/tasks making up the in D3 Scope of Work and in D19 Critical Stages as well as showing those activities/tasks on the critical path.

D14.4 Further to D14.2(b), 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 and sub-contractor shall be on the vertical axis.

D14.5 Further to D14.2(c), the daily resources schedule shall list the daily number of individuals on the Site for each trade and sub-contractor.

SCHEDULE OF WORK

D15. COMMENCEMENT

D15.1 The Contractor shall not commence any Work until he/she is in receipt of an award letter from the Award Authority authorizing the commencement of the Work.

D15.2 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 D5.2.

(iv) the Safe Work Plan specified in D9;

(v) evidence of the insurance specified in D10;

(vi) the contract security specified in D11;

(vii) the subcontractor list specified in D12;

(viii) the equipment list specified in D13;

(ix) the detailed work schedule specified in D14; and

(x) the Environmental Protection Plan specified in E15.

(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.

(c) The Contract Administrator has provided the Contractor notice of the following regulatory approvals:

(i) Fisheries Act Authorization (issued by Fisheries and Oceans Canada);

(ii) Approval under the Canadian Navigable Waters Act (issued by Transport Canada); and

(iii) Historic Resources Branch Response Letter (issued by the Province of Manitoba).

D15.3 Commencement of the Phase 1 Work shall be at the discretion of the Contractor provided the commencement date will allow the achievement of the Critical Stages D19.1(a)and D19.1(b).

D15.4 Commencement of Phase 2 surface works will be contingent on frozen ground conditions no longer being present in the work area. The Contractor shall not commence Phase 2 Work until the Contract Administrator has issued a notice authorizing the start of Phase 2 Work.

(a) The Contract Administrator may require the Contractor to perform on-site test pitting to confirm local frost conditions. Test pitting, utility locates, and all things related to test pitting will be considered incidental to the Work and no separate measurement or payment will be made.

D15.5 The City intends to award this Contract by November 30, 2020

D16. WORKING DAYS

D16.1 Further to C1.1(tt);

D16.1.1 Working Days will only apply to Phase 2 Work as defined in D3 Scope of Work.

D16.1.2 The Contract Administrator will determine daily if a Working Day has elapsed and will record his/her assessment. On a weekly basis the Contract Administrator will provide the Contractor with a record of the Working Days assessed for the preceding week. The Contractor shall sign each report signifying that he/she agrees with the Contract Administrator's determination of the Working Days assessed for the reporting period.

D16.1.3 Work done to restore the Site to a condition suitable for Work, shall not be considered "Work" as defined in the definition of a Working Day.

D16.1.4 When the Work includes two or more major types of Work that can be performed under different atmospheric conditions, the Contract Administrator shall consider all major types of Work in determining whether the Contractor was able to work in assessing Working Days.

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 Naturalist Services for Riverbank Naturalization, Rip Rap plantings, and native grass seeding.

(b) External point repair to sewer along Doncaster and Fulham are being undertaken in fall 2020 in preparation for this project. The Work is anticipated to be completed before Work on this project begins.

(c) Manitoba Hydro:

(i) Temporary relocations, permanent removals, and new installations along and within the entire site.

(d) BellMTS and Shaw:

(i) Adjustments as required.

(e) City of Winnipeg Geomatics Branch

(i) Various work on survey monuments.

D17.2 The Contract Administrator will attempt to arrange and coordinate Work to be performed by others so that such Work does not interfere with the Work and Schedule of the Contractor. Where Work by others interferes, as determined by the Contract Administrator, with the Contractor's planned Work, the Contractor shall modify his plans and do other Work. Unless the Contract Administrator determines that there was no opportunity for the Contractor to do a similar amount of Work, no consideration will be made to extending the Contract time.

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 two phases as described in D3 Scope of Work . Each Phase shall be subdivided into stages. Stages are further subdivided into major items of Work.

D18.1.2 The sequence of Work shall adhere to Drawings GE-04 through GE-08.

D19. CRITICAL STAGES

D19.1 The Contractor shall achieve Critical Stages of the Work in accordance with the following requirements:

(a) Shear Key, Riprap, and Outfall Works: March 15, 2021

(b) Tree Removal Works: March 31, 2021

(c) All Phase 1 underground Works beneath pavement including Force main and Sewer main Works to be completed in advance of Phase 2 2021 roadworks.

(d) Naturalization and Planting Works: September 15, 2021

D19.2 When the Contractor considers the Work associated with the Critical Stages 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 Critical Stages Work has been accepted by the Contract Administrator as being completed to the requirements of the Contract is the date on which completion of some said Works has been achieved.

D20. SUBSTANTIAL PERFORMANCE

D20.1 The Contractor shall achieve Substantial Performance within seventy-five (75) consecutive Working Days of the commencement of Phase 2 Work as specified in D15 Commencement.

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 eighty (80) consecutive Working Days of the commencement of Phase 2 Work as specified in D15 Commencement

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 dates and 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 dates and days fixed herein for same during which such failure continues:

(a) D19.1(a) – one-thousand five hundred dollars ($1,500.00);

(b) D19.1(b) - seven hundred fifty dollars ($750.00.00);

(c) Substantial Performance - two thousand five hundred dollars ($2,500.00);

(d) Total Performance - seven hundred fifty dollars ($750.00).

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 dates and 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. COVID-19 SCHEDULE DELAYS

D23.1 The City acknowledges that the schedule for this Contract may be impacted by the COVID-19 pandemic. Commencement and progress of the Work shall be performed by the Contractor with due consideration to the health and safety of workers and the public, directives from health authorities and various levels of government and in close consultation with the Contract Administrator.

D23.2 If the Contractor is delayed in the performance of the Work by reason of the COVID-19 pandemic, the Work schedule may be adjusted by a period of time equal to the time lost due to such delay and costs related to such delay will be determined as identified herein.

D23.3 A minimum of seven (7) Calendar Days prior to the commencement of Work, the Contractor shall declare whether COVID-19 will affect the start date. The Contractor shall provide sufficient evidence that the delay is directly related to COVID-19, including but not limited to evidence related to availability of staff, availability of Material or work by others.

D23.4 For any delay related to COVID-19 and identified after Work has commenced, the Contractor shall within seven (7) Calendar Days of becoming aware of the anticipated delay declare the additional delay and shall provide sufficient evidence as indicated in D23.3. Failure to provide this notice will result in no additional time delays being considered by the City.

D23.5 The Work schedule, including the durations identified in D19 to D21 where applicable, will be adjusted to reflect delays accepted by the Contract Administrator. No additional payment will be made for adjustment of schedules except where seasonal work, not previously identified in the Contract, is carried over to the following construction season.

D23.6 Where Work not previously identified is being carried over solely as a result of delays related to COVID-19, as confirmed by the Contract Administrator, the cost of temporary works to maintain the Work in a safe manner until Work recommences, will be considered by the Contract Administrator. Where the Work is carried over only partially due to COVID-19, a partial consideration of the cost of temporary works will be considered by the Contract Administrator.

D23.7 Any time or cost implications as a result of COVID-19 and in accordance with the above, as confirmed by the Contract Administrator, shall be documented in accordance with C7.

D24. SCHEDULED MAINTENANCE

D24.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

(a) Maintenance of Sod as specified in CW 3510;

(b) Maintenance of Trees as specified in E50.1.4;

(c) Reflective Crack Maintenance during two (2) year maintenance warranty period as specified in CW 3250; and

(d) Crack sealing the interface between all Curb and Gutter and Asphalt Pavements shall be as specified in E28.

D24.2 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

D25. JOB MEETINGS

D25.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City 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.

D25.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

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

D26.1 Further to C6.26, 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).

D27. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D27.1 Further to B13.4, 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 B13.4.

D28. LAYOUT OF THE WORKS

D28.1 Contractor shall be responsible for the following:

(a) All riverbank works including shear key, riprap, and riverbank regrading

D28.2 Further to C6 and CW 1130 Clause 3.15, the Contract Administrator will provide the following:

(a) All other survey layout unless otherwise specified herein.

MEASUREMENT AND PAYMENT

D29. PAYMENT

D29.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D30. WARRANTY

D30.1 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.

D30.2 Notwithstanding C13.2 or D30.1, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Total Performance if:

(a) a portion of the Work cannot be completed because of unseasonable weather or other conditions reasonably beyond the control of the Contractor but that portion does not prevent the balance of the Work from being put to its intended use.

D30.2.1 In such case the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in C13.2 for the warranty period to begin.

D31. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

D31.1 In the event that funding for the Work of the Contract is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, the following terms and conditions shall apply, as required by the applicable funding agreements.

D31.2 Further to D31.1, in the event that the obligations in D31 apply, actual costs legitimately incurred by the Contractor as a direct result of these obligations ("Funding Costs") shall be determined by the actual cost to the Contractor and not by the valuation method(s) outlined in C7.4. In all other respects Funding Costs will be processed in accordance with Changes in Work under C7.

D31.3 For the purposes of D31:

(a) **"Government of Canada"** includes the authorized officials, auditors, and representatives of the Government of Canada; and

(b) **"Government of Manitoba"** includes the authorized officials, auditors, and representatives of the Government of Manitoba.

D31.4 Modified Insurance Requirements

D31.4.1 If not already required under the insurance requirements identified in D10, the Contractor will be required to provide wrap-up liability insurance in an amount of no less than two million dollars ($2,000,000) inclusive per occurrence. Such policy will be written in the joint names of the City, Contractor, Consultants and all sub-contractors and sub-consultants and include twelve (12) months completed operations. The Government of Manitoba and its Ministers, officers, employees, and agents shall be added as additional insureds.

D31.4.2 If not already required under the insurance requirements identified in D10, the Contractor will be required to provide builders' risk insurance (including boiler and machinery insurance, as applicable) providing all risks coverage at full replacement cost, or such lower level of insurance that the City may identify on a case-by-case basis, such as an installation floater.

D31.4.3 The Contractor shall obtain and maintain third party liability insurance with minimum coverage of two million dollars ($2,000,000.00) per occurrence on all licensed vehicles operated at the Site. In the event that this requirement conflicts with another licensed vehicle insurance requirement in this Contract, then the requirement that provides the higher level of insurance shall apply.

D31.4.4 Further to D10.3, insurers shall provide satisfactory Certificates of Insurance to the Government of Manitoba prior to commencement of Work as written evidence of the insurance required. The Certificates of Insurance must provide for a minimum of thirty (30) days' prior written notice to the Government of Manitoba in case of insurance cancellation.

D31.4.5 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.

D31.5 Indemnification by Contractor

D31.5.1 In addition to the indemnity obligations outlined in C17 of the General Conditions for Construction, the Contractor agrees to indemnify and save harmless the Government of Canada and the Government of Manitoba and each of their respective Ministers, officers, servants, employees, and agents from and against all claims and demands, losses, costs, damages, actions, suit or other proceedings brought or pursued in any manner in respect of any matter caused by the Contractor or arising from this Contract or the Work, or from the goods or services provided or required to be provided by the Contractor, except those resulting from the negligence of any of the Government of Canada's or the Government of Manitoba's Ministers, officers, servants, employees, or agents, as the case may be.

D31.6 Records Retention and Audits

D31.6.1 The Contractor shall maintain and preserve accurate and complete records in respect of this Contract and the Work, including all accounting records, financial documents, copies of contracts with other parties and other records relating to this Contract and the Work during the term of the Contract and for at least six (6) years after Total Performance. Those records bearing original signatures or professional seals or stamps must be preserved in paper form; other records may be retained in electronic form.

D31.6.2 In addition to the record keeping and inspection obligations outlined in C6 of the General Conditions for Construction, the Contractor shall keep available for inspection and audit at all reasonable times while this Contract is in effect and until at least six (6) years after Total Performance, all records, documents, and contracts referred to in D31.6.1 for inspection, copying and audit by the City of Winnipeg, the Government of Manitoba and/or the Government of Canada and their respective representatives and auditors, and to produce them on demand; to provide reasonable facilities for such inspections, copying and audits, to provide copies of and extracts from such records, documents, or contracts upon request by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada and their respective representatives and auditors, and to promptly provide such other information and explanations as may be reasonably requested by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada from time-to-time.

D31.7 Other Obligations

D31.7.1 The Contractor consents to the City providing a copy of the Contract Documents to the Government of Manitoba and/or the Government of Canada upon request from either entity.

D31.7.2 If the Lobbyists Registration Act (Manitoba) applies to the Contractor, the Contractor represents and warrants that it has filed a return and is registered and in full compliance with the obligations of that Act, and covenants that it will continue to comply for the duration of this Contract.

D31.7.3 The Contractor shall comply with all applicable legislation and standards, whether federal, provincial, or municipal, including (without limitation) labour, environmental, and human rights laws, in the course of providing the Work.

D31.7.4 The Contractor shall properly account for the Work provided under this Contract and payment received in this respect, prepared in accordance with generally accepted accounting principles in effect in Canada, including those principles and standards approved or recommended from time-to-time by the Chartered Professional Accountants of Canada or the Public Sector Accounting Board, as applicable, applied on a consistent basis.

FORM H1: PERFORMANCE BOND
(See 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

TENDER NO. 568-2020

Wellington Crescent Riverbank, Path, and Roadway Project
which is by reference made part hereof and is hereinafter referred to as the “Contract”.

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

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

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

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

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

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness as to Principal if no seal)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

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

FORM H2: LABOUR AND MATERIAL PAYMENT BOND
(See D11)

KNOW ALL MEN BY THESE PRESENTS THAT

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

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

_____

_____ dollars ($_____.____)

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

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

TENDER NO. 568-2020

Wellington Crescent Riverbank, Path, and Roadway Project

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

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

(a) A claimant is defined as one having a direct contract with the Principal for labour, service and material, or any of them, used or reasonably required for use in the performance of the contract, labour, service and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment (but excluding rent of equipment where the rent pursuant to an agreement is to be applied towards the purchase price thereof) directly applicable to the Contract;

(b) The above-named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant’s work, labour or service was done or performed, or materials were furnished by such claimant, may sue on this bond, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon;

(c) No suit or action shall be commenced hereunder by any claimant

    (i) unless claimant shall have given written notice to the Principal and the Surety above-named, within one hundred and twenty (120) days after such claimant did or performed the last of the work, labour or service, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work, labour or service was done or performed. Such notice shall be served by mailing the same by registered mail to the Principal, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the Province of Manitoba;

(ii) after the expiration of one (1) year following the date on which Principal ceased work on said Contract; including work performed under the guarantees provided in the Contract;

(iii) other than in a court of competent jurisdiction in the Province of Manitoba.

(d) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

(e) The Surety shall not be liable for a greater sum than the specified penalty of this bond.

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

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

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness as to Principal if no seal)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

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

FORM J: SUBCONTRACTOR LIST

(See D12)

Wellington Crescent Riverbank, Path, and Roadway Project

Portion of the Work	Name	Address

FORM K: EQUIPMENT
(See D13)

Wellington Crescent Riverbank, Path, and Roadway Project

1. Category/type:

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

2. Category/type:

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

3. Category/type:

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

FORM K: EQUIPMENT
(See D13)

Wellington Crescent Riverbank, Path, and Roadway Project

4. Category/type:

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

5. Category/type:

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

6. Category/type:

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

E1.1 These Specifications shall apply to the Work.

E1.2 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.

E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/Spec/Default.stm

E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.

E1.2.3 Further to C2.4(d), Specifications included in the Tender shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B7. In every instance where a brand name or design specification is used, the City will also consider approved equals and/or approved alternatives in accordance with B7.

E1.4 The following are applicable to the Work:

City Drawing No.	Drawing Name/Title
GENERAL	
P-3536-01	COVER SHEET
P-3536-02	DRAWING LIST
P-3536-03	GENERAL LAYOUT AND MAJOR WORKS ITEMS
P-3536-04	CONSTRUCTION STAGING - OVERVIEW (SHEET 1 OF 5)
P-3536-05	CONSTRUCTION STAGING - SLOPE STABILIZATION WORKS (SHEET 2 OF 5)
P-3536-06	CONSTRUCTION STAGING - UNDERGROUND WORKS (SHEET 3 OF 5)
P-3536-07	CONSTRUCTION STAGING - PATH AND ROADWAY WORKS (SHEET 4 OF 5)
P-3536-08	CONSTRUCTION STAGING - LANDSCAPE WORKS (SHEET 5 OF 5)
P-3536-09	SIGNAGE AND TRAFFIC CONTROL
SLOPE STABILIZATION	
P-3536-10	EXISTING CONDTIONS AND TEST HOLE LOCATIONS
P-3536-11	TILL SURFACE PLAN, STRATIGRAPHIC PROFILE AND SECTIONS
P-3536-12	RIPRAP PLAN, SECTIONS AND DETAILS (SHEET 1 OF 2)
P-3536-13	RIPRAP PLAN, SECTIONS AND DETAILS (SHEET 2 OF 2)
P-3536-14	WEST SHEAR KEY PLAN, PROFILE AND DETAILS
P-3536-15	EAST SHEAR KEY PLAN, PROFILE AND DETAILS
P-3536-16	SCARP/ TRAILS INTERFACE PLAN AND SECTIONS
P-3536-17	CONSTRUCTION SEQUENCING SCHEMATICS
P-3536-18	EROSION CONTROL MEASURES
UNDERGROUND WORKS	
1-303O-D0005-001	UNDERGROUND & OUTFALL WORKS - INDEX SHEET
1-303O-C0015-001	PARK BOULEVARD OUTFALL - PLAN AND PROFILES - S-MA60004165
1-303O-C0016-001	DONCASTER - OUTFALL PLAN AND PROFILES - S-MA70019277
1-303O-C0017-001	OUTFALLS - MISCELLANEOUS DETAILS - S-MA60004165 AND S-MA70019277
12598	FORCE MAIN - PLAN AND PROFILE - S-MA70018599

City Drawing No.	Drawing Name/Title
12599	FORCE MAIN - DETAILS - S-MA70018599
12600	SEWERMAIN - PLAN AND PROFILE - S-MA60006608, S-MA60006609 & S-MA60006610

STORM DRAINS

P-3536-19	STORM DRAINS LOCATIONS
P-3536-20	STORM DRAINS SD58A AND SD-01 PLAN AND PROFILES
P-3536-21	STORM DRAINS SD-11 AND SD-10 PLAN AND PROFILES
P-3536-22	STORM DRAINS SD-02 AND SD-17 PLAN AND PROFILES
P-3536-23	STORM DRAINS SD-14 AND SD6/19 PLAN AND PROFILES
P-3536-24	STROM DRAINS SD-07 AND SD-15 PLAN AND PROFILES
P-3536-25	STORM DRAINS SD-08 PLN AND PROFILE
P-3536-26	STORM DRAIN DETAILS

PATH AND ROADWAY WORKS

P-3536-27	INDEX PAGE
P-3536-28	KEY PLAN
P-3536-29	ROADWAY - HORIZONTAL GEOMETRY - ROAD
P-3536-30	ROADWAY PLAN AND PROFILE STA. 9+90 TO 11+10
P-3536-31	ROADWAY PLAN AND PROFILE STA. 11+10 TO 12+25
P-3536-32	ROADWAY PLAN AND PROFILE STA. 12+25 TO 13+75
P-3536-33	ROADWAY PLAN AND PROFILE STA. 13+75 TO 15+10
P-3536-34	ROADWAY PLAN AND PROFILE STA. 15+10 TO FRANK ST
P-3536-35	PATHWAY - HORIZONTAL GEOMETRY (SHEET 1 OF 2)
P-3536-36	PATHWAY - HORIZONTAL GEOMETRY (SHEET 2 OF 2)
P-3536-37	MULTI-USE PATHWAY STA. 1+00 TO 2+25
P-3536-38	MULTI-USE PATHWAY STA. 2+25 TO 3+50
P-3536-39	MULTI-USE PATHWAY STA. 3+50 TO 4+75
P-3536-40	MULTI-USE PATHWAY STA. 4+75 TO 6+00
P-3536-41	MULTI-USE PATHWAY STA. 6+00 TO 7+25
P-3536-42	MULTI-USE PATHWAY STA. 7+25 TO 8+50
P-3536-43	MULTI-USE PATHWAY STA. 8+50 TO 9+75
P-3536-44	MULTI-USE PATHWAY STA. 9+75 TO 11+00
P-3536-45	DETAILS
P-3536-46	INTERSECTION DETAILS (SHEET 1 OF 2)
P-3536-47	INTERSECTION DETAILS (SHEET 2 OF 2)

LANDSCAPE WORKS

P-3536-48	LANDSCAPE / NATURALIZATION PLAN (WEST)
P-3536-49	LANDSCAPE / NATURALIZATION PLAN (EAST)
P-3536-50	LANDSCAPE ENLARGEMENT PLAN (SHEET 1 OF 6)
P-3536-51	LANDSCAPE ENLARGEMENT PLAN (SHEET 2 OF 6)
P-3536-52	LANDSCAPE ENLARGEMENT PLAN (SHEET 3 OF 6)
P-3536-53	LANDSCAPE ENLARGEMENT PLAN (SHEET 4 OF 6)
P-3536-54	LANDSCAPE ENLARGEMENT PLAN (SHEET 5 OF 6)
P-3536-55	LANDSCAPE ENLARGEMENT PLAN (SHEET 6 OF 6)
P-3536-56	LANDSCAPE DETAILS (SHEET 1 OF 4)
P-3536-57	LANDSCAPE DETAILS (SHEET 2 OF 4)
P-3536-58	LANDSCAPE DETAILS (SHEET 3 OF 4)
P-3536-59	LANDSCAPE DETAILS (SHEET 4 OF 4)
P-3536-60	TREATMENT INVENTORY OF EXISTING TREES
P-3536-61	PARK GATE PLAN, DETAILS & SPECIFICATIONS (SHEET 1 OF 2)
P-3536-62	PARK GATE PLAN, DETAILS & SPECIFICATIONS (SHEET 2 OF 2)

E2. GEOTECHNICAL REPORT

E2.1 Further to C3.1, geotechnical test holes have been drilled in the vicinity of the proposed Works to determine the character of the subsurface soil to facilitate the design of the Work. The information is considered accurate at the locations indicated and at the time of investigation. However, considerable variations in the soil conditions may exist between test holes and fluctuations in ground water levels can be expected seasonally. The test hole logs are included in Appendix 'A'.

E2.2 The Contractor is responsible for any interpretation they place on the supplied information and are expected to make such additional investigation of the soil as they feel necessary to satisfy themselves.

E2.3 Any test borings or test excavations made by the Contractor shall be done in accordance with the requirements of the appropriate authority of the City of Winnipeg. The Contractor shall notify the Contract Administrator prior to starting any soil boring or test excavation.

E3. RIVER LEVEL INFORMATION

E3.1 The Rivers and Creeks in Winnipeg are regulated in the summer at the approximate RSRL listed on the drawings and efforts are made to lower the river to the UWRL in the winter months. However, annual flooding occurs in the Red River Valley and Assiniboine River and water levels can fluctuate greatly from year to year and month to month and no guarantees are made that the water level will be at the levels indicated on the Drawings. For more information on past river levels within the City of Winnipeg, visit https://winnipeg.ca/waterandwaste/flood/riverLevels.stm. River level profiles that were considered in the design of the works are included in Appendix 'B'. Note that actual river levels encountered at the site during construction will vary depending on several factors that may influence the river level at any given point in time.

E4. PAVEMENT CORE REPORT

E4.1 Further to C3.1, the pavement core report is provided to aid the Contractor's evaluation of the existing pavement structures. The Pavement Core Report is included as part of Appendix 'A'.

E5. SHOP DRAWINGS

E5.1 Description

(a) This Specification shall revise, amend and supplement the requirements of CW 1110.

(i) The term 'shop drawings' means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, including Site erection drawings which are to be provided by the Contractor to illustrate details of a portion of the Work.

(ii) The Contractor shall submit specified shop drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be show on all submissions for Contract Administrator review.

(iii) Provision of Shop Drawings will be considered incidental to the price for supply and delivery of equipment and materials.

(b) Shop Drawings

(i) Original drawings are to be prepared by Contractor, Subcontractor, Supplier, Distributor, or Manufacturer, which illustrate appropriate portion of Work; showing fabrication, layout, setting or erection details as specified in appropriate sections

(ii) Shop drawings for the following structural components shall bear the seal of a registered Engineer in the Province of Manitoba.

- Reinforcing steel.

- Metal Fabrications.

(c) Contractor's Responsibilities

(i) Review shop drawings, product data and samples prior to submission and stamp and sign drawings indicating conformance to the Contract requirements.

(ii) Verify:

- Field Measurements
- Field Construction Criteria
- Catalogue numbers and similar data

(iii) Coordinate each submission with requirements of Work and Contract Documents. Individual shop drawings will not be reviewed until all related drawings are available.

(iv) Notify Contract Administrator, in writing at time of submission, of deviations from requirements of Contract Documents.

(v) Responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator's review of submission, unless Contract Administrator gives written acceptance of specified deviations.

(vi) Responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.

(vii) The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the required number of corrected copies of Shop Drawings. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on previous submission.

(viii) After Contract Administrator's review and return of copies, distribute copies to subtrades as appropriate.

(ix) Maintain one (1) complete set of reviewed shop drawings, filed by Specification Section Number, at the Site of the Work for use and reference of the Contract Administrator and Subcontractors.

(d) Submission Requirements

(i) Schedule submissions at least 14 Calendar Days before dates reviewed submissions will be needed, and allow for a 10 Calendar Day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.

(ii) Submit one original print and one digital PDF copy of shop drawings. The Contractor is advised that the Contract Administrator will retain the original copy and return one digital PDF copy to the Contractor

(iii) Accompany submissions with transmittal letter, containing:

- Date
- Project title and Tender number
- Contractor's name and address
- Number of each shop drawing, product data and sample submitted
- Specification Section, Title, Number and Clause
- Drawing Number and Detail/Section Number
- Other pertinent data

(e) Submission shall include

(i) Date and revision dates

(ii) Project title and Tender number

(iii) Name of:

- Contractor
- Subcontractor
- Supplier

- Manufacturer
- Separate detailer when pertinent

(iv) Identification of product material

(v) Relation to adjacent structure or materials

(i) Field dimensions clearly identified as such.

(ii) Specification section name, number and clause number or drawing number and detail/section number

(iii) Applicable standards, such as CSA or CGSB numbers.

(iv) Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.

(f) Other Considerations

(i) Fabrication, erection, installation or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent shop drawings and resubmit.

(ii) Material and equipment delivered to the Site of the Works will not be paid for at least until pertinent shop drawings have been submitted and reviewed.

(iii) Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.

(iv) No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of shop drawings.

E6. REFUSE AND RECYCLING COLLECTION

E6.1 While access to refuse and/or recycling collection vehicles is restricted, on collection day(s) the Contractor shall move all of the affected property owners refuse and/or recycling materials to a nearby common area, prior to an established time, in accordance with E6.2 to permit the normal collection vehicles to collect the materials. Immediately following recycling collection, the Contractor shall return recycling receptacles to the addresses marked on the receptacles.

E6.2 Collection Schedule:

Wellington Crescent from Park Boulevard to Academy Road.

Collection Day(s):	**Monday A**
Collection Time:	**7:00 to 18:00**
Common Collection Area:	**Recycling and garbage collection is alley pickup. Contractor to relocate bins on collection day as required**

Fullham Avenue from Doncaster Street to Frank Street.

Collection Day(s):	**Monday A**
Collection Time:	**7:00 to 18:00**
Common Collection Area:	**Recycling and garbage collection is alley pickup**

E6.3 No measurement or payment will be made for the work associated with this specification.

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. VERIFICATION OF WEIGHTS

E8.1 All Material which is paid for on a weight basis shall be weighed on a scale certified by Consumer & Corporate Affairs, Canada.

(a) All weight tickets shall have the gross weight and the time and date of weighing printed by an approved electro/mechanical printer coupled to the scale.

(b) The tare weight and net weight may either be hand written or machine printed. All weights, scales and procedures shall be subject to inspection and verification by the Contract Administrator. Such inspection and verification may include, but shall not be limited to:

(a) checking Contractor's scales for Consumer & Corporate Affairs certification seals;

(b) observing weighing procedures;

(c) random checking of either gross or tare weights by having such trucks or truck/trailer(s) combinations as the Contract Administrator shall select weighed at the nearest available certified scale; and

(d) checking tare weights shown on delivery tickets against a current tare.

E8.2 The Contractor shall ensure that each truck or truck/trailer(s) combination delivering Material which is paid for on a weight basis displays a tare weight not more than one (1) month old.

(a) The tare shall be obtained by weighing the truck or truck/trailer(s) combination on a certified scale and shall show:

(a) upon which scale the truck or truck/trailer(s) combination was weighed;

(b) the mechanically printed tare weight;

(c) the license number(s) of the truck and trailer(s); and

(d) the time and date of weighing.

E9. TRUCK WEIGHT LIMITS

E9.1 The City shall not pay for any portion of Material which results in the vehicle exceeding the maximum gross vehicle weight allowed under *The City of Winnipeg Traffic By-Law,* unless such vehicle is operating under special permit.

GENERAL REQUIREMENTS

E10. OFFICE FACILITIES

E10.1 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, two windows for cross ventilation and a door entrance with a suitable lock.

(d) The building shall be suitable for all weather use. It shall be equipped with an electric heater and air conditioner so that the room temperature can be maintained between either 16-18ºC or 24-25ºC.

(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 two desks, two drafting tables, table 3m X 1.2m, one stool, one four drawer legal size filing cabinet, and a minimum of 12 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.

E10.2 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.

E10.3 The office facilities will be provided from the date of the commencement of the Work until the end of the Phase 1 Works.

E11. TRAFFIC CONTROL

E11.1 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 planning 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.

(c) Further to E11.1, should the Contract Administrator require that Work on Regional Streets be carried out at night, on Sundays, on public holidays or that Work be restricted or suspended during peak traffic hours, the Contractor shall comply without additional compensation being considered to meet these requirements.

E11.2 Notwithstanding E11.1, 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.

E11.2.1 An exception to E11.2 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.

E11.2.2 Further to E11.2, 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.

E12. TRAFFIC MANAGEMENT

E12.1 Further to clause 3.7 of CW 1130:

E12.1.1 The Contractor shall be responsible for Traffic Management of the Work in its entirety.

E12.1.2 General Requirements

(a) Pedestrian and ambulance/emergency vehicle access through the site must be maintained at all times;

(b) The Contractor shall coordinate with the Assiniboine Park Conservancy to ensure that access to Assiniboine Park via the east entrance is maintained at all times;

(c) The Contractor shall maintain access to private approaches along Wellington Crescent at all times;

(d) Should the Contractor be unable to maintain the existing approach access to any property, he/she shall review the planned disruption with the affected property owner(s) and the Contract Administrator and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours notification to the affected property owner(s) and the Contract Administrator prior to disruption of any approach access.

(e) All Traffic Management methods must be in accordance with the Manual of Temporary Traffic Control and are subject review and approval by the Contract Administrator; and

(f) The Contractor must provide ten (10) days advanced notice prior to implementing any changes to traffic flow patterns through and near to the work area.

E12.1.3 Contractor shall schedule construction activities to meet the following:

(a) Phase 1: Riverbank Works
  (i) Wellington Crescent will be closed to all traffic; and
  (ii) The Contractor shall sign the street “Road Closed – No Exit” in accordance with the Manual of Temporary Traffic Control

(b) Wellington Crescent will be reopened to traffic between the Phase 1 Riverbank Works and the Phase 2 Road and Path Relocation works

(c) Phase 2a: Wellington Crescent Asphalt Reconstruction between Grenfell Boulevard and Doncaster Street
  (i) Wellington Crescent will be closed to all traffic; and
  (ii) The Contractor shall sign the street “Road Closed – No Exit” in accordance with the Manual of Temporary Traffic Control.

(d) Phase 2b: Doncaster Street and Wellington Crescent East of Doncaster Street
  (i) Maintain a minimum of one lane of traffic in one direction within the Site at all times during construction; and
  (ii) Intersecting street and private approach access shall be maintained at all times.

(e) Phase 2c: Fulham Avenue between Doncaster Street and Frank Street
  (i) Road renewal will be closed to through traffic;
  (ii) Local access in one lane will be maintained at all times; and
  (iii) The Contractor shall sign the street “Road Closed – No Exit” in accordance with the Manual of Temporary Traffic Control

E13. PEDESTRIAN SAFETY

E13.1 The Contractor shall be responsible for the development and maintenance of alternate temporary Multi-Use Pathways (MUP) during the project as directed by and to the satisfaction of the Contract Administrator.

E13.2 The Contractor shall stage the Phase 1 Riverbank Works according to the Construction Drawings.

E13.3 Phase 1 Pedestrian Traffic Staging

(a) During the initial stage, pedestrians shall be allowed to utilize the existing MUP east of Grenfell Boulevard while the Contractor is completing tree clearing along the Wellington Crescent realignment and permanent MUP realignment corridors. Clearing along these corridors shall allow the contractor to divert pedestrians to a temporary MUP along those corridors and away from the edge of bank. At this time, the Contractor shall also provide a temporary MUP west of Grenfell Boulevard that is contained within the City Right-of-Way on the south side of Wellington Crescent. This section of the temporary MUP shall meander around existing mature trees. Pathway alignment shall be subject to approval by the Contract Administrator. In no circumstance shall mature trees be cut to establish the temporary MUP west of Grenfell Boulevard.

(b) Once tree clearing is complete along the Wellington Crescent realignment and permanent MUP realignment corridors between Grenfell Boulevard and Doncaster Street, the Contractor shall convert a section of the cleared corridors into a temporary MUP that ties into the newly established temporary MUP west of Grenfell Boulevard. This pedestrian diversion strategy shall be maintained for the remainder of the Phase 1 Works. At this time, the contractor may utilize clear areas between the temporary MUP and the riverbank for construction staging and/or to facilitate transfer of riprap down to the lower bank subject to the stockpiling restrictions in E17.

E13.4 Phase 2 Pedestrian Traffic Staging

(a) During construction of the Phase 2, the Contractor shall provide pedestrian thoroughfare along the Wellington Crescent right-of-way including connections to adjacent roadways.

(b) Temporary diversions shall be constructed to meet City of Winnipeg accessibility standards with ramps installed at grade changes such as curbs.

(c) Rerouting will prioritize the use of the existing pathway and any temporary pathway constructed in Phase 1.

E13.5 General Requirements

(a) The Contractor shall provide signage, temporary curb ramps, and traffic control at all pedestrian crossings that are consistent with the requirements of the City of Winnipeg *Manual of Temporary Traffic Control on City Streets*.

(b) Minimum MUP construction shall include:

(i) 50 mm Compacted Class A Base Course on Separation Geotextile

(ii) 2 m clear width

(iii) Accessible ramps at curb faces and other vertical obstacles

(iv) Signage installed every 50 m along and leading up to any temporary MUP to ensure that appropriate wayfinding exists. Erect signage at all potential temporary MUP access points that explain the temporary detours.

(c) The contractor shall be responsible to maintain the temporary pedestrian diversion corridor daily. This shall include but not be limited to providing snow clearing and laying down traction gravel. The Contractor shall prioritize inspecting the temporary pedestrian corridor in the morning and implementing any necessary maintenance works daily. If at the discretion of the Contract Administrator, any element of the temporary pedestrian corridor requires maintenance, the Contractor shall immediately implement the necessary maintenance works to the satisfaction of the Contract Administrator.

(d) The removal of temporary pathways is considered incidental to the Work.

E13.6 Measurement and Payment

(a) The supply, placement, and removal of temporary MUP shall be measured on an area basis and paid for at the Contract Unit Price per square metre for "Temporary MUP". The area to be paid for shall be the total number of square metres supplied and placed in accordance with this Specification, accepted and measured by the Contract Administrator.

E14. WATERWAY BY-LAW AND PERMITS

E14.1 The Contractor shall note that all Works fall within 107 metres (350 feet) of the normal summer water level of the Assiniboine River and are therefore within the jurisdiction of the Waterway By-law. The City of Winnipeg shall be responsible to apply and pay for a Waterway Permit for all permanent and temporary works depicted in the Drawings. The Contract Administrator will provide a copy of the permit(s) to the Contractor.

E14.2 The Contractor may propose alternative designs or configurations for the temporary works (for example, access ramps). The Contract Administrator may require any such proposals to include a geotechnical analysis completed by a Professional Engineer registered in the Province of Manitoba. The Contractor will apply and pay for any additional Waterway Permit(s) or modification to the Waterway Permit for the work described in D3 Scope of Work as a result of electing to utilize alternative temporary works to facilitate access. The Contractor shall adhere to conditions imposed by all applicable Waterway Permit(s). Additionally,

(a) The cost of any additional engineering analysis for proposed alternate temporary works shall be borne by the Contractor.

(b) The Contractor shall allow 14 days for review by the Contract Administrator for any proposed alternative temporary works.

E14.3 Under no circumstances will stockpiling of any material be permitted within 107 metres of the regulated summer water level of the Assiniboine River without written approval by the Contract Administrator.

(a) Stockpiling of material anywhere within the project limits shall be subject to review and approval by the Contract Administrator in consideration of Waterway Permit requirements, geotechnical stability, and other considerations, as appropriate.

E15. ENVIRONMENTAL PROTECTION PLAN

E15.1 The Contractor shall plan and implement the Work of this Contract strictly in accordance with the requirements of the Environmental Protection Plan, as herein specified, and the Fisheries Act Authorization. The Contractor shall be responsible for all costs associated with the Environmental Protection Plan is incidental to the Work and no separate measurement or payment will be made.

E15.2 The Contractor is advised that at least the following Acts, Regulations, and By-laws apply to the Work and are available for viewing at the office of the Contract Administrator.

(a) Federal
  (i) Canadian Environmental Assessment Act (CEAA) c.37
  (ii) Transportation of Dangerous Goods Act and Regulations c.34
  (ii) The Fisheries Act
  (iii) Canadian Navigable Waters Act

(b) Provincial
  (i) The Dangerous Goods Handling and Transportation Act D12
  (ii) The Endangered Species and Ecosystems Act E111
  (iii) The Environment Act c.E125
  (iv) The Fire Prevention Act F80
  (v) The Manitoba Heritage Resources Act H39.1
  (vi) The Manitoba Noxious Weeds Act N110

(vii) The Manitoba Nuisance Act N120

(viii) The Public Health Act c.P210

(ix) The Workplace Safety and Health Act W210

(x) And current applicable associated regulations.

(c) Municipal

(i) The City of Winnipeg By-law No. 2480/79 and all amendments up to and including 7969/2000

(ii) The City of Winnipeg By-law No. 1573/77 and all amendments up to and including 7670/2000

(iii) The City of Winnipeg By-law No. 1/2008

(iv) And any other applicable Acts, Regulations, and By-Laws.

E15.3 The Contractor is advised that the following environmental protection measures apply to the Work.

(a) Materials Handling and Storage

(i) Construction materials shall not be deposited or stored on riverbanks or river shorelines unless written acceptance from the Contract Administrator is received in advance.

(ii) Construction materials and debris shall be prevented from entering any nearby watercourse. If materials and/or debris inadvertently enter the watercourse, the Contract shall be required to remove the material and restore the watercourse to its original condition.

(b) Fuel Handling and Storage

(i) The Contractor shall obtain all necessary permits from Manitoba Conservation and Climate for the handling and storage of fuel products and shall provide copies to the Contract Administrator.

(ii) All fuel handling and storage facilities shall comply with The Dangerous Goods and Transportation Act Storage and Handling of Petroleum Products Regulation and any local land use permits.

(iii) Fuels, lubricants, and other potentially hazardous materials as defined in The Dangerous Goods and Transportation Act shall be stored and handled within the approved storage areas.

(iv) In accordance with Section 2.5 (Construction: General Guidelines) of the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat, (DFO and DNR, 1996), the Contractor shall ensure that any temporary fuel storage areas established for construction of the project are contained by an impermeable dike and are located a minimum distance of 100 metres away from the high water line of the Red River. Dikes shall be designed, constructed, and maintained to retain not less than 100% of the capacity of the total number of containers or 110% of the largest container, whichever is greatest. The dikes shall be constructed of clay or similar impervious material. If this type of material is not available, the dike shall be constructed of locally available material and lined with high density polyethylene (HDPE). Furthermore, the fuel storage area(s) shall be secured by a barrier such as a high fence and gate to prevent vandalism.

(v) The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage.

(vi) Products transferred from the fuel storage area(s) to specific Work Sites shall not exceed the daily usage requirement.

(vii) When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheet of suitable material (such as HDPE) and size shall be spread on the ground to catch the fluid in the event of a leak or spill.

(viii) Refuelling of mobile equipment and vehicles shall take place at least 100 metres from a watercourse.

(ix) The area around storage Sites and fuel lines shall be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.

(x) A sufficient supply of materials, such as absorbent material and plastic oil booms, to clean up minor spills shall be stored nearby on-site. The Contractor shall ensure that additional material can be made available on short notice.

(c) Waste Handling and Disposal

(i) The construction area shall be kept clean and orderly at all times during and at completion of construction.

(ii) At no time during construction shall personal or construction waste be permitted to accumulate for more than one day at any location on the construction Site, other than at a dedicated storage area as may be approved by the Contract Administrator.

(iii) All resulting debris shall be deposited at a Waste Disposal Ground operating under the authority of Manitoba Regulation #150/91.

(iv) Indiscriminate dumping, littering, or abandonment shall not take place.

(v) No on-site burning of waste is permitted.

(vi) Waste storage areas shall not be located so as to block natural drainage.

(vii) Run-off from a waste storage area shall not be allowed to cause siltation of a watercourse.

(viii) Waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.

(ix) Equipment shall not be cleaned near watercourses; contaminated water from onshore cleaning operations shall not be permitted to enter watercourses.

(d) Dangerous Goods/Hazardous Waste Handling and Disposal

(i) Dangerous goods/hazardous wastes are identified by, and shall be handled according to, The Dangerous Goods Handling and Transportation Act and Regulations.

(ii) The Contractor shall be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.

(iii) The Contractor shall have on-site staff that is trained and certified in the handling of the dangerous/hazardous goods, when said dangerous/hazardous goods are being utilized on-site for the performance of the Work.

(iv) Different waste streams shall not be mixed.

(v) Disposal of dangerous goods/hazardous wastes shall be at approved hazardous waste facilities.

(vi) Liquid hydrocarbons shall not be stored or disposed of in earthen pits on-site.

(vii) Used oils shall be stored in appropriate drums, or tankage until shipment to waste oil recycling centres, incinerators, or secure disposal facilities approved for such wastes.

(viii) Used oil filters shall be drained, placed in suitable storage containers, and buried or incinerated at approved hazardous waste treatment and disposal facilities.

(ix) Dangerous goods/hazardous waste storage areas shall be located at least 100 metres away from the high-water line and be diked.

(x) Dangerous goods/hazardous waste storage areas shall not be located so as to block natural drainage.

(xi) Run-off from a dangerous goods/hazardous waste storage area shall not be allowed to cause siltation of a watercourse.

(xii) Dangerous goods/hazardous waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.

(e) Emergency Response

(i) The Contractor shall ensure that due care and caution is taken to prevent spills.

(ii) The Contractor shall report all major spills of petroleum products or other hazardous substances with significant impact on the environment and threat to human health and safety (as defined in Table 1 below) to Manitoba Conservation and Climate, immediately after occurrence of the environmental accident, by calling the 24-hour emergency phone number (204) 945-4888. The Contract Administrator shall also be notified.

(iii) The Contractor shall designate a qualified supervisor as the on-site emergency response co-ordinator for the project. The emergency response co-ordinator shall have the authority to redirect resources in order to respond in the event of a spill.

(iv) The following actions shall be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on-site emergency response co-ordinator:

- Notify emergency-response co-ordinator of the accident:
  - identify exact location and time of accident
  - indicate injuries, if any
  - request assistance as required by magnitude of accident (Manitoba Conservation and Climate 24-hour Spill Response Line (204) 945-4888, Police, Fire Department, Ambulance, company backup)
- Attend to public safety:
  - stop traffic, roadblock/cordon off the immediate danger area
  - eliminate ignition sources
  - initiate evacuation procedures if necessary
- Assess situation and gather information on the status of the situation, noting:
  - personnel on-site
  - cause and effect of spill
  - estimated extent of damage
  - amount and type of material involved
  - proximity to waterways, sewers, and manholes
- If safe to do so, try to stop the dispersion or flow of spill material:
  - approach from upwind
  - stop or reduce leak if safe to do so
  - dike spill material with dry, inert sorbet material or dry clay soil or sand
  - prevent spill material from entering waterways and utilities by diking
  - prevent spill material from entering manholes and other openings by covering with rubber spill mats or diking
- Resume any effective action to contain, clean up, or stop the flow of the spilled product.

(v) The emergency response co-ordinator shall ensure that all environmental accidents involving contaminants shall be documented and reported to Manitoba Conservation and Climate according to The Dangerous Goods Handling and Transportation Act Environmental Accident Report Regulation 439/87.

(vi) When dangerous goods are used on-site, materials for containment and clean-up of spill material (e.g. absorbent materials, plastic oil booms, and oversized recovery drums) shall be available on-site.

(vii) Minor spills of such substances that may be contained on land with no significant impact on the environment may be responded to with in-house resources without formal notification to Manitoba Conservation and Climate.

(viii) City emergency response, 9-1-1, shall be used if other means are not available.

(ix) The on-site emergency response coordinator shall contact The Canadian Coast Guard, Selkirk (204) 785-6030, if the spill material reaches and is on or in the Red or Assiniboine Rivers.

Table 1 Spills that must be reported to the Manitoba Conservation and Climate as Environmental Accidents

Classification	Hazard	Reportable Quantity/Level

1		Explosives	All
2.1		Compressed Gas (flammable)	100 L*
2.2		Compressed Gas	100 L*
2.3		Compressed Gas (toxic)	All
2.4		Compressed Gas (corrosive)	All
3		Flammable Liquids	100 L
4		Flammable Solids	1 kg
5.1	PG** I & II	Oxidizer	1 kg or 1 L
	PG III	Oxidizer	50 kg or 50 L
5.2		Organic Peroxide	1 kg or 1 L
6.1	PG I	Acute Toxic	1 kg or 1 L
	PG II & III	Acute Toxic	5 kg or 5 L
6.2		Infectious	All
7		Radioactive	Any discharge or radiation level exceeding 10 mSv/h at the package surface and 200 uSv/h at 1 m from the package surface
8		Corrosive	5 kg or 5 L
9.1		Miscellaneous	50 kg (except PCB mixtures)
9.1		PCB Mixtures	500 g
9.2		Aquatic Toxic	1 kg or 1 L
9.3		Wastes (Chronic Toxic)	5 kg or 5 L

* Container capacity (refers to container water capacity)
** PG = Packing Group(s)

(f) Vegetation

(i) Vegetation shall not be disturbed without written permission of the Contract Administrator. The Contractor shall protect plants or trees which may be at risk of accidental damage. Such measures may include protective fencing or signage and shall be approved in advance by the Contract Administrator.

(ii) The Contractor shall submit a Tree Preservation and Protection Plan to the Contract Administrator for approval prior to commencement of construction activities. The Tree Preservation and Protection Report shall be prepared by an arborist with International Society of Arboriculture (ISA) Certified Arborist designation, and the Report shall include the information listed below:

- Details of any associated significant vegetation worthy of protection in accordance with the Ecologically Significant Land Strategy, including tree species, their location, size, and condition;
- Recommendations for tree protection in accordance with tree protection specifications outlined herein;
- Details of tree preservation and protection measures (before, during and after construction) for all trees that are to be preserved under the scope of this project;
- Details of all trees proposed for removal;
- Details of tree pruning (crown and roots), as applicable;
- Schedule for site inspection and status reporting to the Contract Administrator via an ISA Certified Arborist throughout construction.

(iii) Trees damaged as a result of this project shall be assessed by the City of Winnipeg Urban Forestry Branch to identify remedial pruning, if applicable. Remedial pruning shall be performed at the cost of the Contractor by an ISA Certified Arborist in accordance with the most current edition of the American National Standards Institute (ANSI) A300 and the most current edition of the companion publication “Best Management Practices – Tree Pruning”.

(iv) No pruning work is permitted on elm trees for the period April 1st to July 31st in accordance with the Manitoba Forest Health Protection Act and Regulations unless deemed a safety hazard by the Contract Administrator.

(v) The Contractor shall provide compensation for damaged trees determined to be non-viable viable by the Urban Forestry Branch in accordance with the City of Winnipeg Tree Removal Guidelines.

(vi) Trees identified to be at risk by the Contract Administrator are to be strapped with 25 x 100 x 2400 millimetre wood planks, or suitably protected as directed by the Contract Administrator.

(vii) A Tree Protection Zone (TPZ) shall be established for all trees to be preserved and protected and whose TPZ intersects with the Construction Area.

- No activity is permitted inside the TPZ, including any traffic, construction excavation, change of grade, or disposal/storage of materials, chemicals.:
- No accumulation of water or other substances as a result of activities associated with construction is permitted within the TPZ.
- No parking of vehicles or equipment
- TPZ Setback Distance:

Trunk Diameter (DBH)	Minimum Protection Distances Required
<10.1 cm	2.0m
10.1 – 40.0 cm	2.4m
40.1 – 50.0 cm	3.0m
50.1 – 60.0 cm	3.6m
60.1 – 70.0 cm	4.2m
70.1 – 80.0 cm	4.8m
80.1 – 90.0 cm	5.4m
90.1 – 100.0 cm	6.0m
>100.0 cm	6.0 cm for each 1.0 cm of trunk diameter

(viii) A physical TPZ barrier shall be constructed prior to the commencement of any disturbance on the Site by erecting a barrier as described below:

- The Contractor shall obtain approval from the Contract Administrator for placement and installation of barriers prior to commencing any construction activities.
- Barriers are to remain in place and be fully functional throughout the duration of the project until all work is completed to the satisfaction of the Contract Administrator.
- Where the TPZ is interrupted by an impervious surface, the TPZ barrier will be installed at the edge of the hard surface area.
- Materials for the TPZ Barrier shall meet the following specifications:
  - Frame to consist of 50X100mm (2X4") wood posts set 450mm deep at each of the 4 corners of the TPZ. Max spacing of 2m apart. 50X100mm rails (2X4") wood rails on top and bottom. Where surface is impervious, wood posts and frame shall be anchored or held in place by other means to prevent the barrier from being moved and to the satisfaction of the Contract Administrator.
  - Orange plastic web snow fence securely fastened to the outside of the frame to act as a barrier.
  - Where fill or excavation material must be stored within 1m of the outside of the TPZ, a barrier of ¾" thick plywood must be securely installed along the outside of the orange plastic web snow fencing and must be long enough to accommodate the full extent or fill or excavated material to ensure that no material enters the TPZ.
  - The fence must be with a minimum of 1.2m to a maximum height of 1.8m. Adjustments may be made where height interferes with the normal branching habit of the tree and as accepted by the Contract Administrator.

- A “Tree Protection Zone” sign must be mounted on any side facing foot and vehicular traffic, including construction traffic. The sign shall be produced in colour and be 45X60cm in size and made of white coroplast.

(ix) Pruning of Tree Branches

- Branch pruning shall be performed to avoid anticipated conflicts between tree branches with construction activities or structures and is to be performed by an ISA Certified Arborist with the written consent of the Contract Administrator.
- The Contractor shall be responsible for the cost of any precautionary branch pruning.
- Branch pruning shall be done in accordance with the American National Standards Institute (ANSI) A300 current edition and the companion publication “Best Management Practices – Tree Pruning” current edition.
- No Pruning work is permitted on elm trees for the period April 1st to July 31st as directed in the Manitoba Forest Health Protection Act and Regulations unless deemed a safety hazard by the Contract Administrator.
  - All elm debris, including branches and logs, shall be chipped on site or transported directly to Brady Road Resource Management Facility for disposal in accordance with The Forest Health Protection Act and Regulations.
  - The City of Winnipeg is an Emerald Ash Borer Regulated Area under the authority of the Canadian Food Inspection Agency. The movement of any ash materials, including logs, branches, woodchips, ash nursery stock/trees, and all species of wood out of Winnipeg is prohibited. Ash debris, including branches and logs, shall be chipped on site or transported directly to Brady Road Resource Management Facility for disposal.

(x) Pruning of Tree Roots

- Root pruning shall be performed to avoid anticipated conflicts between tree roots and construction activities or structures and is to be performed by an ISA Certified Arborist and with the written consent of the Contract Administrator.
- The Contractor shall be responsible for the cost of any precautionary root pruning.
- All exposed or surface roots greater than 40mm diameter at risk of being damaged or damaged at the edge of the TPZ shall be cut cleanly with a pruning saw or chain saw. Severing or crushing roots by excavator or other mechanical device is not acceptable.

(xi) Exceptions to the TPZ Barrier shall only be made as approved by the Contract Administrator and may include:

- TPZ Barrier may be temporarily modified upon approval of the Contract Administrator to allow for necessary access where no other access route is available or where the work extends inside the TPZ.
- Where work must be performed inside the TPZ Barrier use best practices to minimize harm to existing trees and tree roots and shall be consistent with the American National Standards Institute (ANSI) A300 Standard for Management of Trees and Shrubs During Site Planning, Site Development, and Construction current edition and the companion publication “Best Management Practices – Managing Trees During Construction” current edition.
- If excavation is the only means of completing the work, the Contractor shall use best practice to minimize harm to existing trees and tree roots. If deemed necessary by the Contract Administrator, the Contractor shall engage an ISA Certified Arborist to be on site to minimize risk to the public, workers, and tree(s).

(xii) Herbicides and pesticides shall not be used adjacent to any surface watercourses.

(xiii) All landowners adjacent to the area of application of herbicides or pesticides shall be notified at least 2 days prior to the Work.

(xiv) Trees or shrubs shall not be felled into watercourses.

(xv) Areas where vegetation is removed during clearing, construction, and decommissioning activities, shall be revegetated as soon as possible in accordance with the landscaping plans forming part of the contract, or as directed by the Contract Administrator.

(g) Landscape Works

(i) All disturbed areas are to be restored as indicated on the construction drawings.

(h) Red and Assiniboine Rivers Navigation Protection

(i) The Red and Assiniboine Rivers are open to navigation from approximately mid-April to mid-November, annually. During this period, it will be the responsibility of the Contractor to fully ensure the safety of river users.

(ii) The Contractor shall provide, install, and maintain adequate warning signs and lighting on any structure beyond the water's edge to notify boats and other craft navigating on the Assiniboine River that construction is underway. These warnings shall meet the requirements of Transport Canada.

(iii) Prior to commencing any applicable operations over the Assiniboine River, the Contractor shall provide to the Contract Administrator a copy of all necessary approvals received by the Contractor.

(i) Channel Protection

(i) The ice surface and riverbank channel shall be cleared of construction materials prior to ice break up. The Contractor shall cleanup and remove all items and materials that will have an adverse impact on the channel, including but not limited to: soil, excess rockfill, snow fence, construction debris, etc. Channel protection shall be considered incidental to the Work and no measurement or payment will be made for this item.

(j) Erosion and Sediment Control

(i) Implementation of erosion and sediment control measures shall be in compliance with contract documents and regulatory approvals in order to prevent the entry of sediment in waterbodies. Suitable temporary erosion control measures (e.g. silt fences, straw waddles) shall be installed where required to ensure disturbed areas are not subject to erosion prior to the establishment of vegetation. These measures are to be inspected regularly to ensure that they are functioning properly until vegetation is re-established and necessary repairs or adjustments will be made if damage is discovered or if these measures are not effective in controlling erosion and sedimentation.

(ii) Prior to mobilization to the site, the contractor shall submit a detailed Erosion and Sediment Control Plan outlining the types and locations of all temporary erosion and sediment control measures during construction. The Erosion and Sediment Control Plan shall include any proposed alternatives to the erosion control measures illustrated on the Construction Drawings. Any Alternatives shall be subject to the approval of the Contract Administrator.

(k) Heritage Resource Protection Plan

(i) A Heritage Resources Protection Plan will be developed prior to construction as an outcome of the Heritage Resource Impact Assessment being conducted, and it will specifically deal with potential effects to heritage resources. It will outline measures to mitigate effects to cultural and heritage resource. If heritage resources, or objects thought to be heritage resources, are discovered during site preparation and construction the Historic Resources Branch (of the Manitoba Sport, Culture and Heritage Department) will be informed immediately. The Contractor will cease construction activities in the immediate vicinity of the heritage resources, protective barriers will be placed around heritage resource sites and heritage resources discovered will be left in their original position until an Archaeologist is contacted and prescribes instruction.

E15.3.1 No separate measurement or payment will be made for the protection of trees and shall be considered incidental to the Work.

E16. SURFACE RESTORATIONS

E16.1 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.

E17. SITE DEVELOPMENT AND RESTORATION

E17.1 Description

(a) This Specification shall cover all aspects of the Site Development and Restoration Work, including but not limited to mobilization and demobilization, erection, maintenance and removal of safety fencing, swamp mats as required for access, traffic control and signage, sediment control Works, snow clearing, flow control, temporary cofferdams, temporary pedestrian corridors, removal of existing railing as shown in the Landscaping Works Drawings, protection and pruning as required of existing trees, removal of fallen trees and debris, office facilities, general access development (including ramp excavation and original grade restoration using clay backfill, to be compacted to minimum 95% SPMDD), access maintenance and removal, and Site Restoration.

(b) The work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, and all things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.

(c) The Tender quantities listed on Form B: Prices include estimated quantities for all items required to revegetate the footprint of the works according to the Landscape Drawings (e.g. quantities for topsoil, seeding, sodding, natural grasses, plantings, etc.). All revegetation quantities required to restore areas adjacent to the footprint of the works as a function of the Contractor's chosen means and methods are beyond the quantities listed on Form B: Prices and revegetation of those additional areas will be considered incidental to Site Development and Restoration. Areas adjacent to the footprint of the works that are disturbed by the Contractor must be restored in a manner consistent with the Landscape Drawings for revegetating the footprint of the works. No additional payment will be made for additional revegetation of areas that are adjacent to the works and have been disturbed by the Contractor as a function of the Contractor's chosen means and methods.

(d) Access and subsequent construction works shall include the protection of all existing infrastructure and services at the Site throughout the period of construction.

(e) The inclusion of a payment item for the Work under this Specification shall not release or reduce the responsibilities of the Contractor under any other specification in this Contract.

E17.2 Materials

(a) Equipment

(i) All equipment, implements, tools and facilities used shall be of a size and type as required to complete the work in a reasonable time, approved by the Contract Administrator. The Contractor shall keep all equipment in good working order, and have sufficient standby equipment available at all times, as required,

E17.3 Construction Methods

(a) Mobilization shall include, but not be limited to:

(i) All activities and associated costs for transportation of the Contractor's personnel, equipment, and operating supplies to the site, and/or sites, and/or between sites;

(ii) Establishment of offices, buildings, other necessary general facilities and equipment parking/staging areas for the Contractor's operations at the site or sites;

(iii) Premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable;

(iv) General cleanup and housekeeping needed maintain a neat and orderly project site and/or sites;

(v) Other job-related items.

(vi) Access to the site, equipment parking, and staging areas are limited to that shown on the drawings or as approved by the Contract Administrator.

(b) Demobilization shall include, but not be limited to:

(i) All activities and costs for transportation of personnel, equipment, and supplies not used in the project from the site, and/or sites, and/or between sites;

(ii) Disassembly, removal, and site cleanup and restoration of offices, buildings, and other facilities assembled on the site and/or sites;

(iii) Repair of access roads, temporary haul roads, and equipment parking areas leaving the project site in the same or better condition than at the start of the project;

(iv) General cleanup and housekeeping needed to restore a neat and orderly project site.

(v) Access to the site, equipment parking

(vi) Access to the site, equipment parking, and staging areas are limited to that shown on the drawings or as approved by the Contract Administrator.

(c) Site and Construction Access

(i) The Contractor shall be responsible to plan and develop suitable site access that is limited to the footprints illustrated on construction drawings for temporary access ramps, shear key working corridors, and the final riprap geometry. The development of site access includes but is not limited to, tree removal, temporary bridging over structures, temporary removal and reinstallation of safety fencing, and temporary removal and reinstallation of erosion control. Prior to commencing construction, the Contractor shall submit their site access plan to the Contract Administrator for approval.

(ii) Any alternative access points to those illustrated on the Construction Drawings will be subject to the approval of the Contract Administrator and must be proposed by the Contractor in their site access plan.

(iii) All construction access ramps shall be excavated from the upper bank area and working down to the edge of the river. The ramps shall be constructed by excavating to the necessary ramp grade and disposing of the material off Site. Under no circumstances will the excavated material or any additional materials be placed as fill in the ramp area, unless required in specific areas as illustrated on the construction drawings or approved in writing by the Contract Administrator. Detailed construction access ramp drawings are to be submitted to the Contract Administrator for approval a minimum seven (7) days prior to any construction activity on Site.

E17.4 See E13.3 Phase 1 Pedestrian Traffic Staging

(a) During the initial stage, pedestrians shall be allowed to utilize the existing MUP east of Grenfell Boulevard while the Contractor is completing tree clearing along the Wellington Crescent realignment and permanent MUP realignment corridors. Clearing along these corridors shall allow the contractor to divert pedestrians to a temporary MUP along those corridors and away from the edge of bank. At this time, the Contractor shall also provide a temporary MUP west of Grenfell Boulevard that is contained within the City Right-of-Way on the south side of Wellington Crescent. This section of the temporary MUP shall meander around existing mature trees. Pathway alignment shall be subject to approval by the Contract Administrator. In no circumstance shall mature trees be cut to establish the temporary MUP west of Grenfell Boulevard.

(b) Once tree clearing is complete along the Wellington Crescent realignment and permanent MUP realignment corridors between Grenfell Boulevard and Doncaster Street, the Contractor shall convert a section of the cleared corridors into a temporary MUP that ties into the newly established temporary MUP west of Grenfell Boulevard. This pedestrian

diversion strategy shall be maintained for the remainder of the Phase 1 Works. At this time, the contractor may utilize clear areas between the temporary MUP and the riverbank for construction staging and/or to facilitate transfer of riprap down to the lower bank subject to the stockpiling restrictions in E17.

E17.5 Phase 2 Pedestrian Traffic Staging

(a) During construction of the Phase 2, the Contractor shall provide pedestrian thoroughfare along the Wellington Crescent right-of-way including connections to adjacent roadways.

(b) Temporary diversions shall be constructed to meet City of Winnipeg accessibility standards with ramps installed at grade changes such as curbs.

(c) Rerouting will prioritize the use of the existing pathway and any temporary pathway constructed in Phase 1.

E17.6 General Requirements

(a) The Contractor shall provide signage, temporary curb ramps, and traffic control at all pedestrian crossings that are consistent with the requirements of the City of Winnipeg *Manual of Temporary Traffic Control on City Streets*.

(b) Minimum MUP construction shall include:

(i) 50 mm Compacted Class A Base Course on Separation Geotextile

(ii) 2 m clear width

(iii) Accessible ramps at curb faces and other vertical obstacles

(iv) Signage installed every 50 m along and leading up to any temporary MUP to ensure that appropriate wayfinding exists. Erect signage at all potential temporary MUP access points that explain the temporary detours.

(c) The contractor shall be responsible to maintain the temporary pedestrian diversion corridor daily. This shall include but not be limited to providing snow clearing and laying down traction gravel. The Contractor shall prioritize inspecting the temporary pedestrian corridor in the morning and implementing any necessary maintenance works daily. If at the discretion of the Contract Administrator, any element of the temporary pedestrian corridor requires maintenance, the Contractor shall immediately implement the necessary maintenance works to the satisfaction of the Contract Administrator.

(d) The removal of temporary pathways is considered incidental to the Work.

E17.7 Measurement and Payment

(a) The supply, placement, and removal of temporary MUP shall be measured on an area basis and paid for at the Contract Unit Price per square metre for “Temporary MUP”. The area to be paid for shall be the total number of square metres supplied and placed in accordance with this Specification, accepted and measured by the Contract Administrator.

(i) Waterway By-Law and Permits for responsibilities of the Contractor when proposing alternative construction access ramps and their implications on the Waterway Permit that will already be secured for this project.

(ii) All access ramps shall be restored to the same condition or better than the conditions were prior to the initiation of any Work.

(iii) Any riprap placement that is required to facilitate access along the lower bank area must be contained to the working footprint illustrated in the Construction Drawings. It should be anticipated that the construction equipment necessary to place riprap along the shoreline between the approximate limits delineated by Grenfell Boulevard and Doncaster Street may need to be limited in size.

(iv) The following shall apply for riverbank works between the approximate limits defined by Grenfell Boulevard and Doncaster Street:

(i) The contractor may elect to transfer riprap from the upper bank to the lower bank at the approved riprap transfer locations illustrated on the Construction Drawings.

(ii) Alternate riprap transfer locations that are proposed by the Contractor must minimize disruption to mature trees along the mid bank area and must also be approved in advance by the Contract Administrator.

(iii) Riprap or other construction materials will not be stockpiled within 30 m (100 ft) of the edge of bank unless otherwise approved by the Contract Administrator. The edge of bank will be defined by an apparent sudden grade change as interpreted in the field by the Contract Administrator.

(b) Frozen Waterways Permit

(i) The Contractor is responsible for obtaining a Frozen Waterways Permit for permission to Work on the river ice. Contact the local authority.

(c) Diversion of Flows

(i) Flows such as snowmelt, rainfall, a water main break, or any other flow traveling through the outfalls or storm drains shall be diverted during construction as specified in E41 Flow Control. The cost of the flow diversion is considered incidental to Site Development and Restoration.

(d) Temporary Pedestrian Corridors

(i) The Contractor shall provide and maintain temporary multi-use pathways during construction to provide safe passage of pedestrians throughout the project area consistent with the requirements of E13 Pedestrian Safety.

(e) Snow and Ice Removal

(i) Snow cover shall be cleared from the riverbank prior to the placement of the rockfill riprap and from along excavation areas for outfall works. The methodology to clear the snow shall be subject to the approval of the Contract Administrator. The Contractor will also be responsible for all snow clearing on the upper bank area for equipment access or to maintain temporary pedestrian corridors around the work areas.

(ii) Ice at the shoreline of the River shall be broken and cleared before the placement of riprap below ice level. Care shall be taken to ensure that the ice is removed, and does not become trapped below rock fill riprap placement.

(iii) The contractor shall clear snow from the temporary pedestrian corridors around the work areas at the frequency necessary to maintain adequate access conditions as determined by the Contract Administrator.

(iv) If the Contractor obstructs snow clearing activities for open roadways and pathways, then the Contractor must provide the necessary snow clearing.

(f) Safety Fence

(i) The Contractor shall erect and maintain for the duration of the project, safety fencing to restrict access to any open and unsupervised excavation and open-water hazard.

(ii) Appropriate signs shall be erected to warn all recreational users of the river that an open water hazard may exist. Sufficient signage will be present to effectively provide warning from any potential angle of approach to an open water hazard.

(iii) Fence construction shall consist of Dupont Number L70 orange plastic safety fence or approved equal with a mesh spacing of 45 mm and a minimum height of 1.2 metres supported by steel posts driven into the ground. The steel posts shall be sized and capable of maintaining the snow fence material upright, regardless of conditions. Steel posts only in the ground, but wood posts required on ice. Upon completion of the work, all fence materials shall be removed and disposed off-site.

(g) Environmental Regulations

(i) The Contractor shall plan to Work in accordance with the current environmental regulations of "Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat", Fisheries and Oceans, and Manitoba Natural Resources.

(ii) The Contractor shall supply, in writing, prior to commencement of Work on-site, a detailed plan for sediment control on this project.

(iii) The Contractor shall ensure that sufficient supplies of suitable spill kits are on-site to cleanup minor spills, should they occur. The Contractor shall supply the name, address and phone number of a local supplier, where additional kits are available on short notice

(h) General Site Clean Up and Restoration

(i) The Site shall be restored to a condition at least equivalent to its original condition prior to initiation of the work as approved by the Contract Administrator. This may include, but is not necessarily limited to, landscape and grading repairs of any areas disturbed by the Contractor both within and outside of the approved work area. Site Restoration shall also include the removal of the Contract Administrator's trailer.

(i) Removal of Debris Deposited by River

(i) Elevated water levels may result in debris being deposited on the riverbank. Debris that does not conflict with the Contractors operations may be left in place. Debris that conflicts with the Contractor's operations shall either be either relocated on site, or removed from site and disposed. Relocation of deposited debris shall be subject to approval by the Contract Administrator.

(j) Revegetation of Temporary Work Areas

(i) Further to E17.1(c), laydown areas or similar temporary work areas shall be revegetated in a manner that is equal to or better than the original conditions prior to construction, as determined by the Contract Administrator. Revegetation of temporary work areas shall be considered incidental to Site Development and Restoration. No separate payment shall be made to revegetate these temporary work areas.

(ii) Due to their current status as park/recreational land or private residential property, the means of restoration for existing grassy areas will be sod.

(k) Removal and Relocation of Miscellaneous Site Features

(i) The Contractor shall completely remove from site the following miscellaneous site features, including any buried components, to the satisfaction of the Contract Administrator:

- Two (2) Steel Bollards at the east entrance of Assiniboine Park.
- Approximately 150 m of wooden/metal fencing along the edge of bank between the intersection of Wellington Crescent / Chataway Boulevard and Wellington Crescent / Doncaster Street.

(ii) The Contractor shall relocate the following miscellaneous site features to locations approved by the Contract Administrator and to the satisfaction of the Contract Administrator:

- Two (2) Wooden Bollards demarcating the TransCanada Trail at the east entrance of Assiniboine Park.
- Two (2) recycling/refuse bins at the east entrance of Assiniboine Park.
- One (1) dog waste bag dispenser at the east entrance of Assiniboine Park.
- One (1) recycling/refuse bin at the Wellington Crescent / Girton Boulevard intersection
- One (1) recycling/refuse bin at the Wellington Crescent / Doncaster Street Boulevard intersection
- Two (2) benches along the upper bank east of the Doncaster Street Outfall

(iii) All relocations of miscellaneous site features are anticipated to be within 100 m of their current locations.

(iv) The Contractor shall replace any miscellaneous site features that are determined by the Contract Administrator to have become significantly damaged as a result of the Contractor's method of relocation. Should the existing TransCanada Trail bollards become too damaged to salvage, they shall be replaced according to City of Winnipeg Trail Bollard Detail SCD-105D.

(l) Method of Measurement

(i) Site Development and Restoration will be paid for on a lump sum basis. The Work to be paid for shall be the total Work constructed in accordance with this Specification and accepted by the Contract Administrator. No measurement will be made for this Work.

(m) Basis of Payment

(i) Site Development and Restoration will be paid for at the Contract Lump Sum Price for "Site Development and Restoration", which 20% of the Site Development and Restoration unit price will be paid on the first progress payment following commencement of the Work and to the satisfaction of the Contract Administrator.

(ii) Site Development and Restoration will be paid for at the Contract Lump Sum Price for "Site Development and Restoration", which 20% of the Site Development and Restoration unit price will be paid subsequent to the completion of the Work and restoration and clean-up of the Site including supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification to the satisfaction of the Contract Administrator.

(iii) The remaining 60% of the Site Development and Restoration unit price will be paid for interim progress payments, prorated to the value of work completed and approved by the Contract Administrator.

E18. TREE REMOVAL

E18.1 Description

E18.1.1 This specification shall cover the removal of existing trees, stumps, roots, logs, brush, rubbish, and all other surface litter within the full limits of the works, and disposal of the same in a manner hereinafter specified.

E18.1.2 The Work to be done by the Contractor under this specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E18.2 Materials

E18.2.1 Existing Trees to be Removed

E18.2.2 The existing trees to be removed include, but not limited to ash, elm, cottonwood, basswood, oak, pine, maple, spruce, etc., all of which may be cut with standard chain saw equipment. The existing trees range from 50 mm to 1,000 mm diameter.

(a) all elm debris, including branches and logs, shall be chipped on site or transported directly to Brady Road Resource Management Facility for disposal in accordance with The Forest Health Protection Act and Regulations.

(b) The City of Winnipeg is an Emerald Ash Borer Regulated Area under the authority of the Canadian Food Inspection Agency. The movement of any ash materials, including logs, branches, woodchips, ash nursery stock/trees, and all species of wood out of Winnipeg is prohibited. Ash debris, including branches and logs, shall be chipped on site or transported directly to Brady Road Resource Management Facility for disposal.

E18.3 Construction Methods

E18.3.1 Prior to commencement of the Work the Contract Administrator shall identify on site all trees for removal as identified in the contract documents or as required in order to facilitate construction, for the review and approval by the Contract Administrator. Trees are to be marked with flagging tape, of varying colours per the following:

(a) 125 mm (5") to 249 mm (<10") diameter

(b) 250 mm (10") diameter and greater

(c) The removal of trees and brush less than 50 mm (2") diameter does not need to be marked on site

(d) Flagging material must not damage or permanently mark the tree. Flagging material is to be removed promptly by the contractor should the tree be rejected for removal by the Contract Administrator.

E18.3.2 The Contractor shall remove only trees designated to be removed, and grub out all stumps and roots greater than 100 mm diameter. Trees are to be felled so as to land within the limits of the Works. The Contractor shall load and haul all trees, stumps, roots, logs, brush, rubbish and all other surface litter from the Site and dispose of these materials at an approved disposal Site, acceptable to the Contract Administrator.

E18.3.3 The Contractor shall take all precautions to prevent damage to structures, adjacent property and to trees and shrubs. In the event of damage, the Contractor will be held liable, and shall be required to provide appropriate restoration at his cost, to the satisfaction of the Contract Administrator.

E18.3.4 Any trees damaged during construction activities shall be examined by a bonded tree care professional and pruned as required. Damaged trees which are not viable shall be replaced by the Contractor at the Contractor's own cost.

E18.4 Measurement and Payment

E18.4.1 The removal of existing trees shrubs and brush to access or install riverbank and outfall repair works shall be considered incidental to those works. No separate measurement or payment shall be made for tree removal that is deemed to be incidental to those works as determined by the Contract Administrator. This shall include trees within the footprint of the:

(a) temporary construction access ramps;

(b) riprap blanket;

(c) shear key construction corridors;

(d) temporary outfall repair excavations;

(e) riverbank offloading and tension crack sealing/regrading areas; and

(f) HDPE-lined riverbank drainage swales.

E18.4.2 The removal of existing trees shrubs and brush within the excavation footprint for the Wellington Crescent road realignment, the Multi-Use Pathway realignment, and associated connections and modifications to existing intersecting roadways shall be measured on a per tree basis and paid for at the Contract Unit Price per unit for the "Items of Work" listed below. The amount to be paid shall be the total number of trees removed in accordance with this specification, accepted and measured by the Contract Administrator.

Items of Work: Tree Removal

(a) 125 mm to 249 mm Diameter

(b) Greater than 250 mm Diameter

(c) The removal of trees and brush less than 125 mm diameter is considered incidental to the Work and no separate measurement or payment will be made.

E18.4.3 In the event of uncertainty, the decision to apply measurement and payment according to either E18.4.1 or E18.4.2 for any particular tree shall be at the sole discretion of the Contract Administrator.

E19. PROTECTION OF EXISTING TREES

E19.1 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) A number or specific trees have been identified as being of specific importance to the project. These trees will require any/all construction activity taking place under the drip line of the tree's canopy (the extent of the branching) to be undertaken with a Professional Arborist (provided by the City of Winnipeg) on site to ensure that the construction activities impact on the tree is minimized.

(b) The Contractor shall not stockpile materials and soil or park vehicles and equipment on boulevards within 2 metres of trees.

(c) All trees will have a protective zone with radius calculated consistent with E15 Environmental Protection Plan. The area protected will remain free of digging, trenching, grade changes, stock piling of materials and soil compaction, unless otherwise agreed to by the City and Contract Administrator throughout the duration of the Contract. Protective fencing should be placed around these areas as required, as approved by the Contract Administrator.

(d) Trees within and immediately adjacent to proposed construction and those 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. Do not use nails or other fasteners that penetrate the tree trunk. The width and length of strapping may be reduced to suit the tree being protected, as approved by the Contract Administrator.

(e) 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) where 25 mm diameter equals 0.3 m the measured from outside edge of the trunk of the tree at 150 mm above grade. . Where roots must be cut to facilitate excavation, they shall be pruned neatly at the face of excavation. They must be properly trimmed with sharp tools to prevent crushing or being pulled by construction equipment. No tree pruning paint sealer is required. All exposed roots must be mulched until the excavated area is filled to avoid exposure to sunlight and desiccation.

(f) 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.

(g) 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.

(h) Repair, replace and maintain tree protection materials during construction until the project completion.

(i) Carefully remove safety fencing and strapping material without harming the tree as soon as the construction and restoration Work is complete

E19.2 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.

E19.3 Elm trees shall not be pruned at any time between April 1 and July 31.

E19.4 No separate measurement or payment will be made for the protection of trees and shall be considered incidental to Site Development and Restoration.

E20. SILT FENCE

E20.1 Description

(a) This specification covers the erection of temporary silt fencing, which shall be installed and maintained at the locations shown on the drawings or as directed by the Contract Administrator, to control runoff and minimize the release of detrimental silt loading to watercourses.

(b) The scope of Work included in this specification is as follows:

(a) Supply and Install temporary silt fencing at the locations as indicated on the Drawings or as directed by the Contract Administrator, immediately upon completion of the riprap placement and prior to undertaking any other activities on the Site where silt fencing is required.

(b) Maintain the silt fencing in serviceable condition throughout the entire duration of activities at the Site where silt fencing is required, including final restoration and cleanup of the construction Site.

(c) Remove the silt fencing and restore the area where the fencing was installed, without further disturbing the area and without releasing any deleterious substances to the adjacent watercourse.

E20.2 Materials

(a) Fence Posts

(a) Fence posts shall be 100 mm diameter untreated wood posts or 50 mm diameter steel.

(b) Filter Fabric

(a) Filter Fabric Shall be a woven geotextile material specifically designed for a silt fence application, meeting the following minimum requirements:

Property	**Test Method**	**Value**
Grab Tensile Strength	ASTM D 4632	0.55 kN
Grab Tensile Elongation	ASTM D 4632	15%
Mullen Burst	ASTM D 4786	2060 kPa
Puncture	ASTM D 4833	0.285 kN
Trapezoid Tear	ASTM D 4533	0.285 kN
UV Resistance	ASTM D 435	5 80 % @ 500 hrs
Apparent Opening Size (AOS)	ASTM D 4751	0.60 mm
Flow Rate	ASTM D 4491	405 l/min/m2

Acceptable Product: “Amoco 2130 Silt Fence Fabric” or approved equal in accordance with B7.

(c) Wire Mesh

(a) Wire mesh shall be galvanized or plain metal with wire gauge = 3.0 mm, wire spacing @ 150 mm o/c.

(d) Fencing Material Fasteners

(a) Staples or wire ties of sufficient strength and spacing to withstand 500 N (100 lbf) pull test at any point on the wire mesh.

E20.3 Construction Methods

(a) Ensure that no deleterious substances are discharged into the adjacent watercourse at any time during construction activities.

(b) Silt Fence Installation

(a) Excavate 150 x 150 anchor trench along alignment of silt fence as indicated.

(b) Install fence posts as indicated. Ensure that fence posts are firmly driven into undisturbed soil, or are completely and firmly backfilled if installed via auger methods. Attach wire mesh as support backing for silt fence filter fabric with. Attach silt fence filter fabric on top of wire mesh in similar fashion. Overlap any fence seams (wire mesh or filter fabric) by 450 mm minimum. Ensure that wire mesh and filter fabric are installed on the upslope side of the post and are fully laid in anchor trench as shown.

(c) Install and compact impermeable excavated materials into anchor trench and slope as indicated. Compact to 95% of maximum dry density (ASTM D-698).

(c) Silt Fence Maintenance

(a) Inspect silt fence daily, prior to starting any other construction activities. If fence posts are found loose or not upright, repair in accordance with the installation procedure. If silt fence is found to be loose or torn, repair or replace as necessary to comply with the installation procedure

(b) If silt deposition at the fence is 300 mm or more in depth, carefully remove and dispose of silt offsite without disturbing silt fence.

(d) Silt Fence Removal

(a) The silt fence shall remain in place until new vegetation growth has established on the bank, as determined by the Contract Administrator.

(b) Upon authorization of the Contract Administrator, remove all fence posts, wire mesh, fabric, and fasteners from Site.

(c) Restore areas disturbed in accordance with E17 Site Development and Restoration without releasing any deleterious substances to the adjacent watercourse.

E20.4 Measurement and Payment

(a) The supply, placement, and removal of silt fence shall be measured on a length basis and paid for at the Contract Unit Price per lineal metre for “Silt Fence”. The length to be paid for shall be the total number of metres supplied and placed in accordance with this Specification, accepted and measured by the Contract Administrator. Payment of silt fence shall be in accordance with the following payment schedule:

(a) Sixty percent (60%) of the Contract Unit Price per lineal metre for “Silt Fence” shall be paid following supply and installation.

(b) Forty percent (40%) of the Contract Unit Price per lineal metre for “Silt Fence” shall be paid following final removal.

(b) Scheduled maintenance and removal of accumulated sediment from the silt fence is considered incidental to the Work and no separate measurement or payment will be made

E21. STRAW WATTLES

E21.1 Description

E21.1.1 This Specification covers the erection of temporary straw wattles, which shall be installed and maintained at the locations shown on the Drawings to control runoff and minimize the release of detrimental silt loading to the watercourse.

E21.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E21.2 Materials

E21.2.1 The Contractor shall be responsible for the supply, safe storage and handling of all materials as shown on the Drawings.

E21.2.2 Straw Wattles shall be 300 mm (12") biodegradable Straw Wattles.

E21.3 Equipment

E21.3.1 All equipment, implements, tools and facilities used shall be of a size and type as required to complete the Work in a reasonable time, approved by the Contract Administrator. The Contractor shall keep all equipment in good working order, and have sufficient standby equipment available at all times, as required.

E21.4 Construction Methods

E21.4.1 Installation

(a) Install the straw wattles at the locations illustrated on the Construction Drawings or as directed by the Contract Administrator.

(b) Straw wattles are to be installed in accordance with the details on the Construction Drawings and manufacturer's installation instructions.

E21.4.2 Maintenance

(a) The Contractor shall ensure that the integrity of the straw wattle is maintained until natural vegetation is re-established at the site. Any section of straw wattle that is found to be damaged or otherwise no longer be providing effective erosion and sediment control, as determined by the Contract Administrator, shall be immediately be restored to the satisfaction of the Contract Administrator at no additional cost to the City.

(b) If sediment deposition at the base of the log is 150 mm or more in depth, the Contractor shall carefully remove and dispose of the sediment build up off-site without disturbing the straw wattle system.

E21.4.3 Removal

(a) The straw wattle erosion control shall remain in place until new vegetation growth has established on the riverbank, as determined by the Contract Administrator.

(b) Upon authorization of the Contract Administrator, the Contractor shall remove all straw wattles, posts and netting from the site.

(c) The contractor shall take care not to release sediment or deleterious substances into the adjacent watercourse as part of straw wattle removal, as determined by the Contract Administrator.

E21.5 Measurement and Payment

E21.5.1 The supply, placement, and removal of straw wattles shall be measured on a length basis and paid for at the Contract Unit Price per lineal metre for "Straw Wattle". The length to be paid for shall be the total number of metres supplied and placed in accordance with this Specification, accepted and measured by the Contract Administrator. Payment of Straw Wattle shall be in accordance with the following payment schedule:

(a) Sixty percent (60%) of the Contract Unit Price per lineal metre for "Straw Wattle" shall be paid following supply and installation.

(b) Forty percent (40%) of the Contract Unit Price per lineal metre for "Straw Wattle" shall be paid following final removal.

E21.5.2 Removal of accumulated sediment from the straw wattle is considered incidental to the Work and no separate measurement or payment will be made for removal of accumulated sediment.

GEOTECHNICAL

E22. RIPRAP

E22.1 Description

(a) This Specification shall cover the Supply and Placement of shoreline riprap.

(b) The work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for an incidental to the satisfactory performance and completion of all work as hereinafter specified.

E22.2 Materials

(a) The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification.

(b) The material for use as riprap shall consist of a clean free draining, sound dense, durable crushed rock material, free from organics, roots, silts, sand, clay, or any other material that would detract from the strength and drainage characteristics of clean rockfill.

(c) Individual riprap particles shall be shaped such that no dimension is greater than two times the smallest dimension. Flat, elongated or platy particles will not be accepted.

(d) The riprap shall be durable, comprised of either limestone, granite, or other quality dense rock. Should the Contractor choose to use limestone, it shall be durable white crystalline limestone. Softer buff to yellow dolomite or dolostone will not be accepted.

(e) Rockfill riprap shall meet the following requirements:

Parameter	Test Method	Specified Limit
Bulk Specific Gravity	ASTM C127	2.6 minimum
Absorption	ASTM C127	2.5% maximum
LA Abrasion Loss	ASTM C535 ASTM C131	32% maximum
Soundness	ASTM C88	13% maximum
Gradation	ASTM D5519	See below

(f) The rockfill riprap shall be well graded having a full range and even distribution of sizes and shall conform to the following gradation:

Canadian Metric Sieve Size (millimetres)	Percent of Total Dry Weight Passing Each Sieve
450	100%
300	35-80%
100	20-60%
50	10-30%
5	0-5%

(g) Clean gravel shall be used to cap the interstitial spaces of the riprap below the winter water level. The caping gravel will consist of a clean free draining processed limestone material, with a uniform 20 mm diameter particle size. The clean gravel shall contain no more than 3% particles smaller than 5 mm diameter.

E22.3 Submittals

(a) The Contractor shall submit the proposed supplier(s) and location of quarry Sites for supply of the shear key rockfill.

(b) Rock samples shall be submitted to the Contract Administrator for approval a minimum of five (5) days prior to their use. No rockfill will be permitted without providing the source and supplier. Inspection of the source will be performed by the Contract Administrator prior to written acceptance.

E22.4 Quarry Sites

(a) Contractors supplying riprap rockfill shall be responsible for demonstrating that the material is of adequate quality and volume to meet the material specifications contained herein.

E22.5 Testing and Approval

(a) All materials set forth in this Specification shall be subject to inspection and testing by the Contract Administrator or by the testing laboratory designated by the Contract Administrator. There shall be no charge for any materials taken by the Contract Administrator for testing purposes.

(b) The Contract Administrator will visit proposed quarry Sites for inspection of the proposed rockfill material and quarry faces a minimum of fourteen (14) days prior to supply and placement of shear key rockfill.

(c) No supply and placement of riprap rockfill will be permitted prior to the Contract Administrator reviewing the source.

(d) The procedures for preparation of all rockfill samples for use in material inspection and testing shall be subject to review and acceptance by the Contract Administrator for individual tests. The samples may be obtained from crushed and processed material at the sizing necessary for specific tests if the material is deemed to be representative of the rockfill backfill that will be used, subject to the acceptance of the Contract Administrator.

(e) The testing frequency necessary to confirm the material quality will be specified at the discretion of the Contract Administrator.

E22.6 Construction Methods

(a) Placement

(i) Sub-cut the bank over which riprap is to be placed to the dimensions shown on the Drawings.

(ii) Push or roll riprap into place in such a manner that the larger rocks are uniformly distributed and the smaller rocks serve to fill the places between the larger stones, and that excessive segregation of the various particle sizes does not occur.

(iii) Sufficient levelling shall be done to procure a neat and uniform surface, conforming to the shape and dimensions shown on the Drawings, and accepted by the Contract Administrator.

(iv) The allowable fill tolerances shall be within 50 mm of the grades and thicknesses as shown on the Drawings. Care shall be taken when placing the outside edges of the riprap to provide a smooth flow transition from the existing river bottom to the riprap areas, as identified on the Drawings, and subject to the approval of the Contract Administrator.

(v) Any additional riprap introduced temporarily to facilitate site access must by fully contained within the riprap footprint illustrated on the Construction Drawings.

(vi) Clean gravel shall be placed overtop of riprap that is placed below the winter water level. The volume of clean gravel shall be consistent with a 150 m thick layer of gravel that is distributed evenly over the footprint of riprap below the winter water level.

(vii) Provide a smooth uniform surface from the existing grade and new riprap when placing outside edges or transitions, as accepted by the Contract Administrator.

(viii) Temporary stockpiling of riprap along the riverbank shall not be permitted. Material shall be placed to the required lines and grade shown the Drawing immediately upon delivery to the Site.

E22.7 Quality Control

(a) Inspection

(i) All workmanship and all materials furnished and supplied under this Special Provision are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through the final acceptance of the specified work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given.

E22.8 Access

(a) The Contract Administrator shall be afforded full access for the inspection and control testing of materials at the Site to determine whether the material is being selected and placed in accordance with this Specification.

E22.9 Method of Measurement

(a) The supply and placement of Riprap will be measured on a weight basis. The weight to be paid for shall be the total number of metric tonnes of riprap supplied and placed in accordance with this Specification, as measured by a certified weigh scale and accepted by the Contract Administrator. The Contractor shall provide the weigh tickets to the Contract Administrator for the material supplied to the Site at the time of delivery. No payment will be made for any weigh tickets which are not supplied at the time of delivery, or which are lost.

(b) The supply and placement of Clean Gravel will be measured on a weight basis. The weight to be paid for shall be the total number of metric tonnes of Clean Gravel supplied and placed in accordance with this Specification, as measured by a certified weigh scale and accepted by the Contract Administrator. The Contractor shall provide the weigh tickets to the Contract Administrator for the material supplied to the Site at the time of delivery. No payment will be made for any weigh tickets which are not supplied at the time of delivery, or which are lost.

E22.10 Basis of Payment

(a) Sub-cutting or excavation for riprap placement will be paid under “Riverbank Excavation” of E24 Riverbank Regrading

(b) The supply and placement of Riprap will be paid for at the Contract Unit Price per tonne for "Riprap", measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

(c) The supply and placement of 20 mm Clean Gravel will be paid for at the Contract Unit Price per tonne for "Clean Gravel", measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

E23. ROCKFILL TRENCH SHEAR KEY

E23.1 Description

(a) This Specification shall cover the installation of the rockfill trench shear key, including the excavation and disposal of waste material, the supply, placement and vibratory compaction of rockfill, the supply, placement and compaction of clay cap, and provisions for handling groundwater infiltration.

(b) The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for an incidental to the satisfactory performance and completion of all Work as hereinafter specified.

(c) Referenced Standard Construction Specifications

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

E23.2 Materials

(a) The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification.

(b) Excavated Material

(i) Excavated material is anticipated to consist of in-situ overburden soils and may include, but not necessarily be limited to: organic topsoil, clay, silt, sand, gravel, fill, rubble, roots, riprap, concrete blocks, etc., all of which may be excavated with standard hydraulic excavation equipment.

(c) Rockfill

(i) The rockfill material used to backfill the shear key trench shall consist of a clean free draining, sound, dense, durable, crushed rock. The material shall be free from organics, roots, silts, sand, clay, snow, ice or any other material that would detract from the strength and drainage characteristics of clean rockfill.

(ii) Individual particles shall be shaped such that no dimension is greater than two times the smallest dimension. Flat, elongated, or platy particle shapes will not be accepted.

(iii) Should the Contractor choose to use limestone, it shall be durable white crystalline limestone. Softer buff to yellow dolomite or dolostone will not be accepted.

(iv) The rockfill material shall meet the following requirements:

Parameter	Test Method	Specified Limit
Bulk Specific Gravity	ASTM C127	2.6 minimum
Absorption	ASTM C127	2.5 % maximum
LA Abrasion Loss	ASTM C131	32% maximum
Soundness	ASTM C88	13% maximum
Gradation	ASTM D5519	See below

(v) The rockfill shall be well graded having a full range and even distribution of sizes and shall conform to the following gradation:

Canadian Metric Sieve Size (millimeters)	Percent of Total Dry Weight Passing Each Sieve
150	100%
75	40-70%
25	0-5%

(b) Clay Cap

(i) The impervious clay cap at the top of the rockfill shear key shall consist of a high plasticity clay material, with a liquid limit in excess of 50%.

(ii) The clay shall be free of deleterious material such as roots, organic material, ice, snow or other unsuitable materials, and may be salvaged from the on-site excavation, as approved by the Contract Administrator. Frozen material will not be accepted.

(c) Shear Key Geotextile

(i) Shear Key Geotextile shall be “Separation/Filtration Geotextile Fabric” as specified in Table CW 3130.2 of City of Winnipeg Specification CW 3130 – (R5).

(d) Re-use of temporary surfacing material

(i) The contractor may use rockfill material for temporary surfacing of access ramps or working platforms.

(ii) Salvage of this material will be permitted for use as Rockfill, subject to the salvaged material meeting the requirements of this specification at the time of installation into the shear key excavation.

(iii) Any salvaged temporary surfacing material that is not used as shear key rockfill will not be measured or paid, and shall be incidental to E17 Site Development and Restoration. The Contract Administrator may reduce the quantity of salvaged rockfill to account for material waste during the salvaging process

E23.3 Equipment

(a) All equipment, implements, tools and facilities used shall be of a size and type as required to complete the work in a reasonable time, approved by the Contract Administrator. The Contractor shall keep all equipment in good working order, and have sufficient standby equipment available at all times, as required.

(b) The Contractor shall use vibratory equipment that can be densify the rockfill backfill throughout the entire depth of the rockfill shear key.

E23.4 Submittals

(a) The Contractor shall submit the proposed supplier(s) and location of quarry Sites for supply of the shear key rockfill.

E23.5 Quarry Sites

(a) Contractors supplying shear key rockfill shall be responsible for demonstrating that the material is of adequate quality and volume to meet the material specifications contained herein.

(b) Rock samples shall be submitted to the Contract Administrator for approval a minimum of five (5) days prior to their use. No rockfill will be permitted without providing the source and supplier. Inspection of the source will be performed by the Contract Administrator prior to written acceptance.

E23.6 Testing and Approval

(a) All materials set forth in this Specification shall be subject to inspection and testing by the Contract Administrator or by the testing laboratory designated by the Contract Administrator. There shall be no charge for any materials taken by the Contract Administrator for testing purposes.

(b) The Contract Administrator will visit proposed quarry Sites for inspection of the proposed rockfill material and quarry faces a minimum of fourteen (14) days prior to supply and placement of shear key rockfill.

(c) No supply and placement of shear key rockfill will be permitted prior to the Contract Administrator reviewing the source.

(d) The procedures for preparation of all rockfill samples for use in material inspection and testing shall be subject to review and acceptance by the Contract Administrator for individual tests. The samples may be obtained from crushed and processed material at the sizing necessary for specific tests if the material is deemed to be representative of the rockfill backfill that will be used, subject to the acceptance of the Contract Administrator.

(e) The testing frequency necessary to confirm the material quality will be specified at the discretion of the Contract Administrator.

E23.7 Construction Methods

(a) The excavation shall be supervised at all times, and open excavations shall be adequately guarded or covered for safety, and shall be the sole responsibility of the Contractor.

(b) Excavate the access ramp and working bench such that excavation proceeds in a top-down fashion, initiating from the top of bank and progressing to the lower bank.

(c) The contractor shall confine the shear key works to the 6 m wide corridor illustrated on the construction drawings.

(d) The contractor's working bench shall be at least 1 m below original ground surface along the shear key centerline profile to facilitate placement of a 1 m thick (minimum) clay cap up to the original grades present prior to shear key construction.

(e) The rockfill shear key trench shall then be excavated and backfilled to achieve the embedment depth into till as illustrated on the Drawings. Note that the till elevation may vary and therefore the total depth of excavation may differ than that illustrated on the Construction Drawings.

(f) Excavation below the working bench shall not commence until sufficient rockfill is on Site to backfill the excavation.

(g) Any deleterious or sloughed material shall be removed from the excavation prior to backfilling.

(h) Discharge of water contained within the excavation from displacement of the rockfill during backfill will be acceptable. The Contractor shall be responsible to contain and direct any displaced water such that it will not affect other construction work or cause excessive erosion of the existing riverbank soils. The control of the water shall be considered incidental to the work.

(i) The construction of the rockfill shear key shall be a continuous operation with backfilling immediately following excavation.

(j) The Contractor shall not excavate more than 2 metres ahead of the backfill placement as measured at the bottom of the excavation.

(k) Excavated material shall be removed from the riverbank area immediately upon excavation and disposed of offsite. Stockpiling of excavated material on the riverbank area will not be permitted.

(l) The Contractor shall take all precautions necessary to maintain the excavation geometry to the neat lines shown on the Drawings. If necessary, the excavation shall be completed in stages and allowed to freeze, to prevent sloughing of the side slopes and shear key sidewalls. Such precautions will be considered incidental to the excavation and will not be paid for separately.

(m) Compacting of rockfill shall be by the vibro-compaction through the full depth of the rockfill and into the underlying glacial till and capable of increasing the rockfill density a minimum of 10% versus the uncompacted material. Vibro-compaction shall be completed over the entire length of the shear key as shown on the Drawings. Rockfill compaction will be considered incidental to the Supply and Placement of Shear Key Rockfill and no separate payment for compaction will be made.

(n) The Contractor shall monitor the supply rate of the rockfill material to ensure that the backfilling operations are not delayed.

(o) Stockpiling of rockfill material will not be permitted on the riverbank except at locations where existing shear key rockfill is in place, subject to the approval of the Contract Administrator.

(p) Where crushed limestone has become contaminated with silt, clay, snow, ice or other deleterious material due to the Contractor's method of operation, negligence, failure to backfill in a timely manner, etc. the material shall be classified as rejected backfill and shall be weighed prior to disposal for deduction from the total weight of crushed limestone measured for payment.

(q) Non-woven geotextile shall be placed as a separator between rockfill and clay cap, as shown on the drawings.

(r) Handle, store and install non-woven geotextile in accordance with the manufacturer's recommended procedures and this specification.

(s) Commence installation of geotextile after material has been approved and the preparation of the sub-grade has been inspected by the Contract Administrator.

(t) Unroll geotextile fabric as smooth as possible on the prepared sub-grade and install in the longest continuous practical length, free from tension, stress, wrinkles and creases.

(u) Cut or fold geotextile fabric to conform to curves

(v) Overlap joints a minimum of 600 millimetres. Install pins as required to hold geotextile fabric in place.

(w) Construction equipment shall not drive on the geotextile fabric.

(x) Remove and replace geotextile fabric that is improperly installed or damaged as directed by the Contract Administrator.

(y) After placement of the rockfill and geotextile to the dimensions shown on the Drawings, the impervious clay cap shall be placed in layers not exceeding 150 millimetres, and compacted to a minimum of 95% of the Standard Proctor Maximum Dry Density. The clay cap shall be located within undisturbed soil surrounding the excavation. Care shall be taken to ensure that an effective seal results between the wall of the excavation and the clay material placed, to protect against water infiltration into the excavation, as approved by the Contract Administrator.

E23.8 Method of Measurement

(a) Shear Key Excavation

(i) The excavation for the rockfill shear key will be measured on a volume basis. The volume to be paid for shall be the total number of cubic metres of excavation completed, measured from the original ground surface prior to rockfill shear key construction as carried out in accordance with this Specification, acceptable to the Contract Administrator, and as computed from measurements made by the Contract Administrator.

(b) Shear Key Geotextile

(i) Supply and installation of the non-woven geotextile will be measured on an area basis. The area to be paid for shall be the total number of square metres of geotextile supplied and installed in accordance with this Specification, acceptable to the Contract Administrator, and as computed from measurements made by the Contract Administrator. Only material placed within the designated sub-grade limits will be included in the payment for "Shear Key Geotextile". No measurement or payment will be made for geotextile fabric removed and replaced due to improper installation or damaged materials.

(c) Rockfill

(i) The supply, placement and compaction of the Rockfill will be measured on a weight basis. The weight to be paid for shall be the total number of metric tonnes of Rockfill supplied and placed in accordance with this Specification, acceptable to the Contract Administrator, as measured on a certified weigh scale. The Contractor shall provide the weigh tickets to the Contract Administratorfor the material supplied to the Site at the time of delivery. No payment will be made for any weigh tickets that are not supplied at the time of delivery.

(d) Clay Cap

(i) The Clay Cap will be measured on a volume basis using before and after placement neat-line geometries. The volume to be paid for shall be the total number of cubic metres of clay cap placed in accordance with this

Specification, acceptable to the Contract Administrator, as computed from measurements made by the Contract Administrator.

E23.9 Basis of Payment

(a) Shear Key Excavation

(i) Excavation of the Rockfill Trench Shear Key will be paid for at the Contract Unit Price for "Shear Key Excavation" measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described, and all other items incidental to the Work included in this Specification.

(b) Shear Key Geotextile

(i) The non-woven geotextile will be paid for at the Contract Unit Price for "Shear Key Geotextile" measured as specified herein, which price shall be payment in full for supplying materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

(c) Rockfill

(i) The supply, placement and compaction of the Rockfill will be paid for at the Contract Unit Price for "Rockfill", measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described, and all other items incidental to the Work included in this Specification.

(d) Clay Cap

(i) The supply, placement and compaction of the Clay Cap will be paid for at the Contract Unit Price for "Clay Cap", measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described, and all other items incidental to the Work included in this Specification.

E24. RIVERBANK REGRADING

E24.1 Description

(a) This Specification shall cover riverbank regrading works including common excavations for sub-cutting the riverbank prior to riprap placement, tension crack sealing, and offloading as well as the placement and compaction of suitable fill materials for tension crack sealing and promoting positive surface drainage towards the river.

(b) The work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.

(c) Referenced Standard Construction Specifications

(i) CW 3170 – Earthwork and Grading.

E24.2 Materials

(a) Native Material to be Excavated

(i) The materials covered in this specification consist of the in-situ overburden soils, and may include but not necessarily be limited to organic topsoil, clay, silt, sand, gravel, fill, rubble, roots, riprap, concrete blocks, etc., all of which may be excavated with standard hydraulic excavation equipment.

(b) Clay Fill

(i) Clay fill used to seal tension cracks or otherwise build back excavations to promote positive drainage shall be as specified in CW3170. High plasticity clay salvaged from shear key construction shall also be acceptable.

(ii) The clay shall be free of deleterious material such as roots, organic material, ice, snow or other unsuitable materials, and may be salvaged from the on-site excavation, as approved by the Contract Administrator. Frozen material will not be accepted.

E24.3 Construction Methods

(a) Riverbank Excavation

(i) Complete excavation in accordance with CW3170.

(ii) The extents of excavations shall be as indicated on the drawings and directed in the field by the Contract Administrator.

(iii) Excavated material shall be removed from the riverbank area immediately upon excavation and disposed of offsite or stockpiled as directed by the Contract Administrator. No stockpiling of excavated material on the riverbank will be allowed.

(b) Clay Fill

(i) Complete placement and compaction of clay fill in accordance with CW3170.

(ii) The extents of clay fill shall be as indicated on the drawings and directed in the field by the Contract Administrator.

(iii) The clay backfill material shall be pushed and kneaded into place to ensure that the entire excavated volume is entirely filled with clay, and that no void spaces remain. The clay backfill shall be compacted to a minimum of 95% of the SPMDD.

(iv) No stockpiling of clay fill material on the riverbank will be allowed unless the stockpile location is approved by the Contract Administrator.

E24.4 Measurement and Payment

(a) Riverbank Excavation

(i) Excavation will be measured and paid for on a volume basis. The volume to be paid for shall be the total number of cubic metres of "Riverbank Excavation", completed in accordance with this Specification, as measured in the field and accepted by the Contract Administrator.

(b) Clay Fill

(i) Clay Fill will be measured and paid for on a volume basis. The volume to be paid for shall be the total number of cubic metres of "Clay Fill", placed and compacted in accordance with this Specification, as measured in the field and accepted by the Contract Administrator.

E25. HDPE-LINED DRAINAGE SWALES

E25.1 Description

(a) This Specification shall cover the supply and placement of the rock-filled, HDPE-Lined Drainage Swales that will convey runoff emerging from storm drain outlets down to the riprap blanket.

(b) The Work to be done by the Contractor under this specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

(b) Referenced Standard Construction Specifications

(i) CW 2030 – Excavation Bedding and Backfill.

E25.2 Materials

(a) HDPE Swale Liner

(i) Acceptable Product:

Thermoformed high-density polyethylene (HDPE) 12" depth trapezoidal channel.
Trade name: **SmartDitch**
Manufacturer: PendaForm/Nilex (Contact: Brent Kennedy)

(ii) Fittings and appurtenances as recommended by the manufacturer.

(iii) 914 mm wide edge protection option is required.

(iv) Material properties to meet or exceed the following values:

PROPERTY	TEST METHOD	*NOMINAL VALUES (SI)	*NOMINAL VALUES (ENGLISH)
Density	ASTM D1505	0.949 g/cm^3	0.949 g/cm^3
Melt Mass Flow Rate	ASTM D1238	10 g/10 min	10 g/10 min
Environmental Stress Crack Resistance (ESCR) Condition A (100% Igepal), F50 Condition B (10% Igepal), F50	 ASTM D1693A ASTM D1693B	 600 hr 600 hr	 600 hr 600 hr
Tensile Yield Strength 2" / min, 51 mm / min	ASTM D638, Type IV	24.8 MPa	3600 psi
Tensile Elongation 2" / min	ASTM D638, Type IV	600%	600%
Flexural Modulus (compression molded)	ASTM D790	1170 MPa	170,000
Brittleness Temperature	ASTM D746	-90°C	<-130°F
Tensile Impact Strength	ASTM D1822	84.1 KJ/m^2	40.2 ft-lb/in^2
Coefficient of Linear Thermal Expansion	ASTM D696	N/A	7 x 10^{-5} in / in / °F
Cell Classification	ASTM D3350	445540	N/A

(v) The Contractor may elect to use an alternative product upon review and approval by the Contract Administrator, in accordance with B7. The Contractor shall request the Manufacturer to directly submit written information on the preparation, materials, design, performance, references, and use of proposed products.

(b) Bedding Material

(i) Bedding material shall be as indicated on the drawings and as per CW 2030, modified to have 0.6 m of compacted excavated site-select material as opposed to the detailed 0.3 m of compacted excavated material. Any site-select bedding materials shall be free of rocks, sharp object, soil clumps, debris, and frozen or organic material.

(c) Geotextile

(i) Geotextile shall be the same as specified in E23 Rockfill Trench Shear Key.

(d) Rockfill

(i) Rockfill shall be the same as specified in E23 Rockfill Trench Shear Key.

E25.3 Construction Methods

(a) In addition, the procedures specified herein, all HDPE-lined swale installers shall familiarize themselves with and adhere to all requirements of "SmartDitch Guidelines Product, Technical & Installation" available online at:

http://www.smartditch.com/pdf/smart-ditch-technical-manual.pdf

(b) Storage and Handling Requirements

(i) Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

(ii) Store and protect HDPE liner and geosynthetics from direct sunlight and UV rays.

(iii) Vehicular traffic is not permitted near HDPE-liners.

(iv) All sections of the HDPE liner shall be inspected prior to installation. Any sections found to be unsuitable for installation, as determined by the Contract Administrator, shall be replaced.

(c) Surface Preparation

(i) Excavate to the grades illustrated on the Construction Drawings. All equipment used to install the HDPE-lined swale shall be limited in size and contained within the footprint of the detail illustrated on the Construction Drawings.

(ii) Grade swale cross section to match HDPE liner shape using tilting bucket, modified excavator bucket, or alternative means as approved by the Contract Administrator.

(iii) Prepare the surface, in advance of placing the HDPE-lined swale, achieving a smooth, even surface, clear of any aggregates or debris.

(iv) Sub-grade shall be clean and smooth and free of sharp edges, fines, loose or foreign materials, oil, grease, and other materials that may damage the HDPE channel or geotextile.

(v) All roughened surfaces that can damage the HDPE channel or geotextile shall be repaired to offer a smooth sub-grade.

(vi) Commence installation of geotextile after material has been approved and the preparation of the sub-grade has been inspected by the Contract Administrator.

(vii) Unroll geotextile fabric as smooth as possible on the prepared sub-grade and install in the longest continuous practical length, free from tension, stress, wrinkles and creases.

(viii) Cut or fold geotextile fabric to conform to curves

(ix) Overlap joints a minimum of 600 millimetres ensuring that overlapping occurs in a downslope fashion in the direction of flow. Install pins as required to hold geotextile fabric in place.

(x) Remove and replace geotextile fabric that is improperly installed or damaged as directed by the Contract Administrator.

(xi) Place bedding material as illustrated on the Construction Drawings. Supplement granular bedding as necessary to ensure uniform and continuous support beneath the HDPE-lined swale.

(xii) HDPE-liner shall be laid down by hand end-to-end. No more than 3 sections of HDPE liner shall be connected prior to placement onto the prepared surface.

(xiii) Should any voids become apparent between prepared foundation and the HDPE-liner, they shall be backfilled with the approved granular bedding material and compacted by hand

(d) Joining and Anchoring Sections

(i) Joining and anchoring sections shall be completed according to procedures in Appendix 5.4 of “SmartDitch Guidelines Product, Technical & Installation” available online at the link provided in E25.3(a).

(ii) Anchoring shall also be completed in accordance with Section 3.1.9 of the same “SmartDitch Guideline Project, Technical & Installation” in E25.3(a).

(e) Installing Edge Protection

(i) Edge protection shall be installed according to the details illustrated on the Construction Drawings and procedures outlined in Appendix 5.5 of “SmartDitch Guidelines Product, Technical & Installation” available online at the link provided in E25.3(a).

(f) Rockfill Supply and Placement

(i) Swale rockfill shall be placed over the HDPE-lined swale to thickness, lines and grades shown on the Drawings.

(ii) Rockfill placement shall begin at the toe of the HDPE-lined swale and shall proceed up the slope. Care shall be taken when placing rockfill in and around

the HDPE channel. Rockfill shall not be dropped into the HDPE-lined swale. Vehicular traffic is not be permitted near the HDPE-lined swales.

(iii) The allowable fill tolerances shall be within ± 50 mm of the grades and thickness shown on the Construction Drawings.

(iv) Temporary stockpiling of swale rockfill along the riverbank shall not be permitted, unless at a location approved by the Contract Administrator.

E25.4 Measurement and Payment

(a) HDPE-Lined Drainage Swale

(i) The supply and installation of the HDPE-lined Drainage Swale will be measured on a linear metre basis and paid at the Contract unit price for "HDPE 12" Depth Trapezoidal Channel ". The price shall include all work completed in accordance with this Specification and as shown on the Drawings, as measured in the field and accepted by the Contract Administrator.

(ii) No separate measurement or payment will be made for any required testing, repairs, overlapping, anchoring, seams, or manufacturers field services on any component of the HDPE-Lined Drainage Swale detail.

E26. PROTECTION OF INSTRUMENTATION

E26.1 The Contractor shall ensure that existing instrumentation located in the test holes shown on the Drawings or in the Chataway lift station and adjacent sewers are protected from damage due to construction activities. The Contractor will be responsible to replace destroyed instrumentation or repair any damages at his own cost, to the satisfaction of the Contract Administrator.

TRANSPORTATION

E27. SUPPLY AND INSTALLATION OF PAVEMENT REPAIR FABRIC

E27.1 Description

(a) General

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

(b) Referenced Standard Construction

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

E27.2 Materials

(a) Storage and Handling

(i) Store and handle material in accordance with Section 2 of CW 3130.

(b) Pavement Repair Fabric

(i) Pavement repair fabric will be Glass Grid Road Reinforcement Mesh - Style 8501.

E27.3 Construction Methods

(a) General

(i) Install pavement repair fabric at random locations as directed by the Contract Administrator.

(ii) 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.

(iii) Proceed with installation upon completion and acceptance of the asphalt levelling course.

(iv) Install fabric in accordance with the manufacturer's specifications and recommendations.

(v) Only construction equipment required to place the final asphalt surface course will be allowed to travel on the exposed fabric.

(vi) Replace damaged or improperly placed fabric.

(vii) Ensure temperature of the asphalt material does not exceed the melting point of the fabric.

E27.4 Measurement and Payment

(a) Pavement Repair Fabric

(i) 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.

E28. SEALING INTERFACE BETWEEN CONCRETE AND ASPHALT SURFACES

E28.1 Description

(a) The Contractor shall seal the interface of the asphalt roadways to concrete curb and gutters.

E28.2 Materials

(a) Joint sealant shall be supplied as per CW 3250.

E28.3 Construction Methods

(a) Sealing of the interface shall be completed using joint sealant in accordance with Clause 3.2 and 3.3 of CW 3250.

(b) The Contractor shall maintain the joint sealant for a two (2) year maintenance warranty period.

E28.4 Measurement and Payment

(a) Sealing the interface of the concrete and asphalt surfaces will be measured on a length basis and paid for at the Contract Unit Price for "Crack Sealing" regardless of the width of the crack. The length to be paid for will be the total number of metres of cracks routed and/or cleaned and sealed in accordance with this specification, accepted and measured by the Contract Administrator.

E29. INSTALLATION OF SIGN SLEEVES IN CONCRETE

E29.1 Description

(a) This Specification shall cover placement of steel sign sleeves in concrete, at locations indicated on the Drawings or as directed by the Contract Administrator.

E29.2 Materials

(a) Sign sleeves will be made available to the Contractor by the City of Winnipeg's Traffic Services.

(b) The Contractor shall arrange to retrieve sign sleeves from the City of Winnipeg's Streets Maintenance Division, located at 1220 Pacific Avenue.

E29.3 Construction Methods

(a) The Contractor shall cast sleeves directly into the concrete as it is being placed.

(b) Sleeves shall be installed such that signposts inserted into them are vertical.

(i) Sleeves that deviate from vertical by more than 5 degrees shall be removed and replaced at the Contractor's expense.

(c) The Contractor shall ensure that sleeves are clean and free from debris when installed and shall promptly remove any concrete within the sleeve during construction.

E29.4 Measurement and Payment

E29.5 Installing sign sleeves will be measured for payment on a unit basis. Number of units to paid for will be the total number of sign sleeves installed in accordance with this specification, accepted and measured by the Contract Administrator.

UTILITIES

E30. OUTFALL SEWER REPAIRS AND STORM DRAIN INSTALLATION

E30.1 Description

E30.1.1 This Specification shall amend and supplement Standard Specifications CW 2130, CW 2160, and CW 3610.

E30.1.2 The Work to be done by the Contract under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Work hereinafter specified.

E30.2 Materials

E30.2.1 Handling and Storage of Materials

(a) All materials shall be handled and stored in a careful and professional manner, to the satisfaction of the Contract Administrator.

E30.2.2 Testing and Approval

(a) All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials supplied for testing purposes.

E30.2.3 Galvanized Primer

(a) Galvanized primer for repair of damaged coating shall be zinc rich, ready mix to CGSB-1- GP-181M.

E30.2.4 Pipe Foundation Material

(a) Where required, pipe foundation material shall be well graded 50 mm max crushed sub-base material having the following grading requirements

Canadian Metric Sieve Size (millimeters)	Percent of Total Dry Weight Passing Each Sieve
50	100%
5	25-80%
0.8	5-18%

E30.2.5 Bedding and Backfill Material

(a) Sand bedding and Modified Class 2 backfill material as indicated on the drawings and per CW 2030, modified to have 0.6 m of compacted excavated Site select material as opposed to the detailed 0.3 m of compacted excavated material.

E30.2.6 SPCSP Outfall Pipe wall thickness

(a) The SPCSP outfall thickness shall be as specified on the drawings.

E30.2.7 Debris Grating

(a) Shop drawings shall be submitted for the debris gratings and shall be installed as shown on the drawings. Galvanizing shall be hot-dip conforming to requirements of

CSA G164- N1981 to a minimum net retention of 600g/m2. All bolts and nuts shall be galvanized steel, conforming to ASTM A-320 Grade B8M. All welding shall be fully approved by the Canadian Welding Bureau in conformance with CSA Standard W47.1. Welding shall be done by currently licensed welders only. Welding splatter and other fabricator burrs, where exposed, shall be ground off and/or filed smooth, and left ready for subsequent operations. All miscellaneous metal, after fabrication, shall be hot dip galvanized. No separate measurement will be made for hot-dip galvanizing.

E30.2.8 Clay Plug

(a) The impervious clay plug near the end of the outfall pipe shall consist of a high plasticity clay material, with a liquid limit in excess of 50%. The clay shall be free of deleterious material such as roots, organic material, ice, snow or other unsuitable materials, and may be salvaged from the on-site excavation, as approved by the Contract Administrator. Frozen material will not be accepted.

E30.2.9 Polymer Coated SPCSP Pipe

(a) Pipe

Drainage pipe shall be Armtec/Canada Culvert Polymer Coated CorPlate Structural Plate Corrugated Steel Pipe (SPCSP) or approved equivalent in accordance with B7, of diameter, corrugation and wall thickness as shown on the drawings.

(i) Further to the above, the Park Boulevard Outfall SPCSP shall match all manufacturing components of the existing outfall SPCSP, including plate pattern, material, gauge, and bolts. If steel type cannot be verified, isolation bolts and isolation liner shall be installed between existing structural plates and new structural plates.

E30.2.10 Slip Joint

(a) Shop Drawings shall be submitted for all slip joints. Slip joints are to be 3 mm thick and 2 m in length. The slip joint shall be installed as shown on the drawings.

(b) Galvanizing shall be hot-dip conforming to the requirements of CSA G164-N1981, to a minimum retention of 600g/m2. All bolts and nuts shall be galvanized steel conforming to ASTM A-325. All welding shall be fully approved by the Canadian Welding Bureau in conformance with CSA Standard W.47.1. Welding splatter and other fabricator burrs, where exposed, shall be ground off and/or field smooth, and left ready for subsequent operations. All miscellaneous metal, after fabrication, shall be hot dip galvanized.

E30.2.11 HDPE

(a) HDPE pipe size and dimension ratio shall be as specified on the drawings.

E30.2.12 CSP

(a) CSP thickness shall be 2.0 mm or as specified on the drawings. CSP size shall be as specified on the drawings.

E30.2.13 Flexible Expansion Joint

(a) Flexible Expansion Joints shall be EBAA Iron Inc. Flex-Tend Flexible Expansion Joint or approved equivalent in accordance with B7, of appropriate diameter to suit pipe size and material as indicated on the drawings.

(b) Flexible expansion joints shall be installed in the locations indicated on the drawings or as directed by the Contract Administrator and shall be manufactured of ductile iron conforming to the material requirements of ASTM A536 and ANSI/AWWA C153/A21.53. Foundry certification of material shall be readily available upon request.

(c) Each flexible expansion joint shall be pressure tested prior to shipment against its own restraint to a minimum of 350 psi (250 psi for flexible expansion joints 2 inch and 30 inches diameter and larger.) A minimum 2:1 safety factor, determined from the

published pressure rating, shall apply. Factory Mutual Approval for the 3 inch through 12-inch sizes is required.

(d) Each flexible expansion joint shall consist of an expansion joint designed and cast as an integral part of a ball and socket type flexible joint, having a minimum per ball deflection of: 20º, 2" - 12"; 15º, 14" - 36"; 12º, 42"-48" and 4-inches minimum expansion. Additional expansion sleeves shall be available and easily added or removed at the factory or in the field. Both standardized mechanical joint and flange end connections shall be available.

(e) Expansion shall take place in the centre sleeve of the flexible joint. Flexible joint shall provide unobstructed, uniform flow at full deflection of the ball joint.

(f) All internal surfaces (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C213. Sealing gaskets shall be constructed of EPDM. The coating shall meet ANSI/NSF-61.

(g) Exterior surfaces shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116/A21.16.

(h) Appropriately sized polyethylene sleeves, meeting ANSI/AWWA C105/A21.5, shall be included for direct buried applications.

(i) Manufacturer's certification of compliance to the above standards and requirements shall be readily available upon request. The Contract Administrator shall reserve the right to inspect the manufacturer's facility for compliance.

E30.2.14 HDPE Flange Adapters

(a) The Contractor shall ensure that suitable HDPE Fused Flange Adapters of appropriate size and diameter for the pipe specified are installed as per manufacturer's recommendations.

E30.2.15 HDPE Pipe to Manhole Connection

(a) HDPE to Manhole connections shall be a flexible booted connection. Shop Drawings for HDPE to Manhole Connections shall be submitted to the Contract Administrator prior to construction.

E30.2.16 CSP Pipe to Manhole Connection

(a) CSP to Manhole connections shall be a 6" reinforced concrete collar in conjunction with a water stop grout ring. **The Contractor shall ensure that CSP pipe is manufactured to allow for installation of water stop grout ring on end of pipe (i.e. flat end section to allow for installation of water stop grout ring).** Shop drawings for CMP to Manhole Connections shall be submitted to the Contract Administrator prior to construction.

E30.2.17 Equipment

(a) All equipment, implements, tools and facilities used shall be of a size and type as required to complete the Work in a reasonable time, approved by the Contract Administrator. The Contractor shall keep all equipment in good Working order, and have sufficient standby equipment available at all times, as required.

E30.3 Construction Methods

E30.3.1 Trench Shoring and Excavation

(a) Where required, trench excavations shall be dug and maintained using a wood or steel shoring, designed and sealed by a Structural Professional Engineer who is a practicing member of Engineers Geoscientists Manitoba (EGM). The Contractor shall provide AutoCAD shop drawings to the Contract Administrator, for review, prior to the start of excavation. Work must be completed in accordance with CW 2030, unless otherwise indicated by the Contract Administrator.

(b) The Contractor shall take precautionary steps to prevent damage from construction activities to adjacent private property. All damage to adjacent private property caused

by the Contractor's activities shall be repaired to, equal or better condition than prior to construction, as approved by the Contract Administrator. No separate measurement or payment will be made for the protection of adjacent private property.

E30.3.2 Pipe Foundation

(a) In-situ soils shall be excavated to the trench width and subgrade elevations specified on the Drawings.

(b) The subgrade shall be proof rolled to inspect for soft spots.

(c) Where soft spots are observed, the subgrade shall be further sub-excavated and filled with additional compacted granular material to the depths specified by the Contract Administrator.

(d) Separation geotextile shall be installed between granular material and the in-situ soils.

(e) 50 mm crushed granular material shall be placed in lifts not thicker than 150mm, and compacted to 100% Standard Proctor density.

E30.3.3 Bedding

(a) Ensure bedding is thoroughly tamped and that the pipe is uniformly supported throughout and completed in accordance with CW 2030, unless otherwise indicated by the Contract Administrator

E30.3.4 Backfill

(a) Backfill around the pipe in lifts not thicker than 300-mm, alternating from side to side. At no time should the difference in backfill elevation on either side of the pipe be greater than 450 mm. Work must be completed in accordance with CW 2030, unless otherwise indicated by the Contract Administrator.

(b) Backfilling above the pipe shall be in accordance with CW 2030 for Modified Class 2 backfill. The top 600-mm of backfill is to be Site select excavated material, as approved on Site by the Contract Administrator, not the standard 300 mm excavated material. The Contractor shall ensure the compaction equipment utilized, is consistent with degree of compactive effort required to achieve the specified densities, and adequately protects against overloading the pipe.

E30.3.5 Clay Plug

(a) Construct the impervious clay plug in lifts not exceeding 150 mm, alternating from side to side. The Contractor shall achieve 100% STDD for each lift, and shall arrange for the Contract Administrator to inspect each lift of the clay plug prior to beginning the next lift.

E30.3.6 Installation of SPCSP

(a) CSP field cuts shall be straight circumferential cuts. Clean all ends free of burrs etc., and touch up all areas affected by Work with galvanized primer.

(b) The Contractor shall excavate and dispose of the existing outfall piping and debris grate in accordance with the Standard Construction Specifications.

(c) All outfall pipes shall be installed as shown on the drawings and in accordance with CW 3610.

(d) All pipes shall be laid to the established line and grade.

(e) The existing outfall pipes shall be temporarily removed or otherwise protected as approved by the Contract Administrator.

(f) Work required for Supply and Installation of Outfall Pipe, as specified on the drawings, shall include removal and disposal of the existing outfall pipe, including removal of existing debris grates, concrete collars and headwalls, slip joints, and any debris found within.

E30.3.7 Connections

(a) Provide lean mix concrete pipe bedding and backfill to the lines and grades as detailed in the contract drawings.

(b) Slip joints are to be internal unless noted otherwise on the drawings. The receiving pipes are to be cleaned of all surface debris, including but not limited to frozen backfill, ice, and internal sediment.

(c) The slip joints are to be installed in locations as shown on the drawings and as directed by the Contract Administrator. Angle brackets are to be located at the 9:00 and 3:00 o'clock position unless approved otherwise by the Contract Administrator. Bolts are to be tightened evenly throughout the coupler.

E30.3.8 Installation of Debris Grate

(a) Debris Grates shall be installed as detailed and in the location shown on the Drawings.

E30.3.9 Polymer Coated Pipe

(a) Polymer Coated pipe shall be installed in accordance with the manufacturer's instructions.

(b) All pipe and couplers shall conform to CSA G401-01 "Corrugated Steel Pipe Products".

(c) Field cutting and welding of pipe will require repairs to the polymer coating. All field welds and cuts on polymer coated pipe shall be repaired using Ranbar Tri-spec-515-7 black synthetic coating or approved equivalent in accordance with B7. Surfaces are to be clean and dry and free from grease, oil, dirt and rust. Following the repair process, the field coating must be fully cured prior to exposure to water, soil or debris.

(d) All repairs to be in accordance with CSA G401-01, Section 5.3.

E30.3.10 Shop Drawings

(a) Submit prepared shop drawings for the: polymer coated SPCSP, the installation procedure for SPCSP including temporary bracing (as required), temporary trench shoring, and debris grate in accordance with Clause 1.5 of CW 1110 and E8.

E30.4 Method of Measurement and Payment

E30.4.1 Removals

(a) No separate payment is to be made for removal of existing outfall pipe, connections, or headwalls.

(b) The removal of existing debris grates, slip joints and existing concrete collars, headwalls, excavation, pipe removal, and, where applicable, backfill, shall be incidental and included in the unit price per metre for installation of new SPCSP outfall pipe.

E30.4.2 Supply and Installation of Outfall Pipe

(a) The supply and installation of new outfall pipe shall be measured on a linear basis. The length to be paid for shall be the total number of linear meters of pipe, measured from the tie-in point to the tip of the manufactured bevelled end section, horizontally above the center of the pipe installed in accordance with this Specification and acceptable to the Contract Administrator.

(b) Beveling the end section of pipe, where applicable, shall be considered incidental to the installation of the outfall pipe and no separate payment will be made.

(c) Separate measurement will be made for each size and class of outfall pipe.

(d) Supply and installation of new CSP will be paid for at the Contract Unit Price for "Items of Work" listed below, measured specified herein, which price shall be payment in full for supplying all materials and performing all operations described and all other items incidental to the Work included in this Specification.

Items of Work:

Supply and Installation of Outfall Pipe

(i) 2400 mm diameter SPCSP c/w polymer coating (actual pipe material to match all manufacturing components of existing Park Boulevard Outfall SPCSP, including plate pattern, material, gauge, and bolts)

(ii) 2120 mm diameter SPCSP (3.5 mm) c/w polymer coating

E30.4.3 Supply and Installation of Reinforced Concrete Collar CMP to Manhole Connection and HDPE to Manhole Booted Connection

(a) Installation of Reinforced Concrete Collar CSP to Manhole Connection and HDPE to Manhole Booted Connection shall be included and paid for at the Contract Unit Price for "Items of Work" listed below, measured specified herein, which price shall be payment in full for supplying all materials and performing all operations described and all other items incidental to the Work included in this Specification.

(i) Connect 450mm Diameter CSP to Manhole (c/w Waterstop Grout Ring)

(ii) Connect 600mm Diameter CSP to Manhole (c/w Waterstop Grout Ring)

(iii) Connect 350 mm OD HDPE DR17 to Manhole (Flexible Boot Connection)

E30.4.4 Clay Plug

(a) Construction of the clay plug is considered incidental to installation of pipe. No separate payment will be made for installation of the clay plug.

E30.4.5 Supply and Installation of Debris Grate

(a) The supply and installation of the Debris Grate shall be measured on a unit basis. The units to be paid for shall be the total number of Debris Grate installed in accordance with this Specification and acceptable to the Contract Administrator as computed from measurements made by the Contract Administrator.

(b) Separate measurement will be made for each size of Debris Grate.

(c) Supply and installation of Debris Grate will be paid for at the Contract Unit Price for "Supply and Installation of Debris Grate", measured specified herein, which price shall be payment in full for performing all operations described and all other items incidental to the Work included in this Specification.

Items of Work:

Supply and Installation of Debris Grate:

(i) 2400 mm diameter

(ii) 2120 mm diameter

E30.4.6 Supply and Installation of Pipe Fittings

(a) Pipe Fitting shall be understood to include external slip joints, internal slip joints, and flexible expansion joints.

(b) Measurement and Payment will be on a per Unit basis for each diameter, material type and fitting type indicated on the Drawings. The units to be paid for shall be the total number of fittings installed in accordance with this Specification and acceptable to the Contract Administrator as computed from measurements made by the Contract Administrator.

(c) The Unit Price shall include all work and materials, including modifications to the pipe on either side of the fittings, as required, to install the fittings.

Items of Work:

Supply and Installation of Pipe Fittings

(i) 1800 mm diameter polymer coating Internal Slip Joint

(ii) 350 mm OD HDPE Flexible Expansion Joint

(iii) 350 mm OD HDPE Flanged End Connection (Fused Flange Adapter)

E31. SEWER INSPECTION

E31.1 Description

E31.1.1 This Specification shall amend and supplement Standard Specifications CW 2145.

E31.1.2 This Specification covers inspection of sewers and manholes using internal video equipment for the purposes of assessing thoroughness of cleaning, observing and recording structural and service defects and construction features and to verify new sewer construction prior to acceptance.

E31.2 Construction Methods

E31.2.1 Sewer Condition Coding

(a) Sewer pipes shall be coded according to the Standard Specifications CW 2145.

E31.2.2 Cross Sectional Measurements

(a) The Contractor shall record cross section measurements every 5 m taken horizontally at 3:00, vertically at 12:00 and at 45 degrees at 1:00 and 4:00. Stationing should be from the upstream face of the gate chamber or manhole. The Contractor will record the cross-sectional measurements on an Inspection Form provided by the Contract Administrator.

E31.2.3 Maximum Vertical Deflection

(a) The maximum observed vertical deflection "pinch point" in the outfall shall be recorded with its appropriate stationing.

E31.3 Measurement and Payment

E31.3.1 Amend Section 4.4 of specification 2145 to read

(a) Sewer inspection will be measured on a length basis and paid for at the Contract Unit Price for "Sewer Inspection". Length to be paid for will be the total length of sewer inspected in accordance with this specification, accepted and measured by the Contract Administrator.

(b) Cross sectional measurements and maximum vertical deflection measurements will be considered incidental to the sewer inspection

(c) Payment will not be made until the required report submissions are accepted by the Contract Administrator.

E31.3.2 Delete Section 4.6 of Specification 2145.

E32. CAST-IN-PLACE CONCRETE CONSTRUCTION

E32.1 Description

E32.2 This specification shall cover construction of cast-in-place concrete (with the exception of road and sidewalk works) and shall supplement, revise and amend CW 2160.

E32.3 Materials

E32.3.1 Concrete Design

(a) Proportioning of fine aggregate, coarse aggregate, cement, and water for cast-in-place concrete shall be as follows:

Cement Type: HS

Minimum Compressive Strength @ 28 days: 30 MPa

Maximum coarse aggregate size: 19 mm

Maximum Water/Cement ratio: 0.45

Slump (Before Plasticizing): 80 mm +/- 30 mm

Slump (After Plasticizing): 150 mm +/- 30 mm

(b) All admixtures must be compatible and meet the following standards:

Air entraining agents to ASTM C260

Chemical admixtures (water reducing) to ASTM C494

Type F high-range water reducing (super-plasticizing) admixture shall be used when a slump of more than 110 mm is desired.

E32.3.2 Lean-Mix Concrete Design

(a) Proportioning of fine aggregate, coarse aggregate, cement, and water for lean mix concrete shall be as follows:

Cement Type: HS

Minimum Compressive Strength @ 28 days: 15 MPa

Slump: 80 mm

Air Content: nil

Minimum Cement Content = 240 kg/m3

Maximum Water/Cement Ratio = 0.49

E32.3.3 Grout

(a) Grout shall be Sika Grout 212 or approved equal in accordance with B7.

E32.3.4 Reinforcing Steel

(a) Reinforcement is new deformed billet steel bar conforming to CSA G30.18 (Latest). Grade 400.

(b) Unless noted otherwise, reinforcement clear concrete cover distances shall be a minimum of:

75 mm for concrete cast against earth.

50mm for all other concrete.

(c) Reinforcing steel shall be clean, free of rust, dirt, loose scale, oil, grease or any material that could reduce bond with the concrete.

E32.3.5 Waterstop shall be SikaSwell S-2 (Hydrophilic Polyurethane Sealant) extrudable swelling waterstop or approved equivalent in accordance with B7.

E32.4 Measurement and Payment

E32.4.1 Cast-in-place concrete will be considered incidental to the Work listed in individual Part E Specifications and shall be included in the associated price for each applicable item. No direct measurement for payment will be made for this item.

E33. COLD WEATHER REQUIREMENTS

E33.1 Description

E33.1.1 This specification address concrete Work associated with E32 where the Work is required to be carried out when the mean daily temperature is below 5°C or anticipated to be below 5°C within the next 24 hours, cold weather requirements will be specified herein.

E33.1.2 All freshly placed concrete shall be protected from the elements and from defacements due to construction operations.

E33.2 Construction Methods

E33.2.1 The following are minimum requirements for protecting concrete during and after placement during freezing weather, but mere adherence to these requirements will not relieve the Contractor of the necessity for producing concrete which has not been weakened or injured by frost of freezing, or replacing such damaged Work at no additional expense to the City;

(a) Before any concrete is placed, all ice, snow, and frost shall be completely removed from all formwork, and other surfaces against which concrete temperatures of such surfaces raised above 7°C for twenty-four (24) hours minimum prior to concreting. Where concrete Work is to come in contact with the earth, the surface of the earth shall be completely free of frost when concrete is placed thereon.

(b) Concrete aggregates and water shall be heated to not over 80°C. Concrete shall be not less than 20°C or more than 30°C in temperature when deposited. Concrete when placed during freezing weather, or if freezing is anticipated during curing period, shall be fully enclosed and the temperature of same maintained at not less than 20°C for five (5) days nor less than 5°C for an additional five (5) days.

(c) Heating enclosures shall be strong and wind-proof, well ventilated with heating units so located as to prevent local overheating or drying of the concrete or damage from combustion gases. Only indirect fired heaters will be accepted. Units must be vented outside the enclosure. No direct fired units will be accepted.

E33.2.2 The Contractor shall inform the Contract Administrator well in advance as to the methods of enclosure and frost protection he proposes to employ.

E33.3 Measurement and Payment

E33.3.1 Cold weather requirements shall be considered incidental to the construction of cast-in-place concrete and no measurement or payment will be made for this item.

E34. EROSION CONTROL BLANKETS

E34.1 Description

(a) This Specification shall cover the supply and placement of erosion control blankets to provide temporary erosion control in localized areas (as directed by the Contract Administrator)

E34.2 Materials

(a) The blanket material shall consist of wheat or barley straw, coconut fibres, or other plants approved by the Contract Administrator. Acceptable products will be S32 BD Double Net Straw Blankets with biodegradable netting or approved alternative in accordance with B7. The blanket material shall be air dried, reasonably light in colour, and shall not be musty, mouldy, caked or otherwise of low quality. The blanket material shall be free of coarse (chaff) material and free of noxious weeds and/or seeds to prevent the introduction of weeds into previously seeded and planted areas.

E34.3 Construction Methods

E34.3.1 General

(a) The Contractor shall supply and place erosion control blankets immediately after final grading is completed and prior to March 31.

(b) Erosion control blankets shall be placed as directed, measured and accepted by the Contract Administrator.

(c) Covered areas shall be inspected periodically and after runoff producing storm events. Damaged areas shall be repaired immediately as determined by the Contract Administrator. Areas requiring recovering as directed by the Contract Administrator will be re-measured and additionally paid for at the Contract Unit Price for the Work item.

E34.3.2 Installation

(a) The erosion control blankets shall be installed as per the manufacturer's recommended procedures. Blankets shall be rolled out on smoothed out soils starting from the top of the slope. The Contractor is to start by stapling the blanket at the top of the slope in a 150 mm deep by 150mm wide trench. The trench will be backfilled and compacted so that water will flow evenly onto the blanket.

(b) The Contractor shall roll the blankets down the slope insuring soil blanket contact. Edges are to be overlapped a minimum 50 mm with parallel blankets.

(c) If more than one blanket is need for the run down the slope, then adjoining ends must be overlapped a minimum 100 mm shingle style. Overlapped areas are to be stapled with a staggered pattern of staples.

E34.3.3 Removal

(a) Immediately prior to placement of topsoil and sod and/or topsoil and seed all erosion control blankets shall be removed and disposed of off-Site.

E34.4 Measurement and Payment

E34.4.1 Supply, placement and removal of erosion control blankets will be measured on an area basis and paid for at the Contract Unit Price for "Erosion Control Blanket". The area to be paid for shall be the total number of square metres of ground covered by blankets, supplied and placed in accordance with this Specification, accepted and measured by the Contract Administrator.

E35. SUPPLY AND INSTALLATION OF TEMPORARY SHORING

E35.1 Description

(a) This Specification shall cover shoring requirements for the Works where required under Manitoba Acts, Regulations, and Guidelines, or as indicated on the Drawings.

E35.2 Construction Methods

E35.2.1 Excavation

(a) Remove excavated material from the Site immediately. Excavated material shall not be stockpiled on-Site or along river bank.

(b) All Working areas below grade shall be kept adequately and securely supported during and after excavation until the shoring and bracing is in place to prevent loss of ground or injury to any person from falling material.

E35.2.2 Excavation Safety Fence

(a) Further to Clause 3.1 of CW 1130, completely cover the excavation and provide a security fence to completely surround the excavation when unattended generally in accordance with the following.

(b) Safety fence installed shall be as per E.11.3.7, or as otherwise required by Workplace Safety and Health regulations.

E35.2.3 Shoring

(a) The type, strength, and amount of shoring and bracing shall be such as the nature of the ground and attendance conditions may require, taking into account property lines, existing slopes, utilities and roadways.

(b) Shoring and bracing shall be so spaced and dimensioned as to prevent caving, loss of ground, surface settlement, or squeezing of the soil beyond the neat lines of excavation. It shall be free from defects that might impair its strength or suitability for the Work. Sheeting/shoring and bracing shall conform to the latest revisions of the "Construction Safety Act" of the Department of Labour of the Government of Manitoba and in accordance with Province of Manitoba "W210 The Workplace Safety and Health Act" and "Guidelines for Excavation Work".

(c) Supporting design calculations as required to facilitate review of the submission for conformance with the Contract Documents.

(d) Submit AutoCAD Shop Drawings and design calculations for the shoring/excavation system designed and sealed by a Professional Engineer registered or licensed to practice in the Province of Manitoba and experienced in the structural design of

shoring systems. The designer of the shoring system shall inspect the system during construction and certify, in writing to the Contract Administrator, that construction is in conformance with the approved design.

(e) Shoring and bracing shall be installed such that the structure size and wall thickness shown on the shop drawings can be obtained subsequent to installation of the shoring system.

(f) Shoring and bracing shall be designed and installed to prevent settlement and damage to existing structures. In the event of damage, the Contractor will be held liable, and shall be required to provide appropriate restoration at his cost, to the satisfaction of the Contract Administrator.

(g) Shoring and bracing shall remain in place until concrete has attained 75% of the design strength.

E35.2.4 Monitoring Movement of Shoring

(a) The Contractor shall submit to the Contract Administrator a plan for monitoring the movement of trench shoring during construction a minimum of two (2) Working Days prior to the installation of trench shoring. The monitoring plan shall be performed by approved survey methods for vertical or horizontal movement of the shoring, acceptable to the Contract Administrator. Costs for monitoring shall be incidental to the installation of the temporary shoring.

E35.3 Measurement and Payment

E35.3.1 All costs associated with supply and installation of temporary shoring shall be paid for at the lump sum price for "Supply and Installation of Temporary Shoring", which lump sum price shall be payment in full for supplying all materials and performing all operations described and all other items incidental to the Work included in this Specification.

E36. SEWER CLEANING

E36.1 Description

E36.1.1 This Specification shall amend and supplement Standard Specifications CW 2140.

E36.2 Construction Methods

E36.2.1 Advise the Contract Administrator immediately when pipe material or backfill material is observed during the cleaning of a sewer. The Contract Administrator will direct one of the following operations be performed.

(a) Complete or attempt to complete cleaning of the sewer.

(b) Suspend cleaning operations and inspect the sewer.

(c) Simultaneously clean and inspect the sewer

E36.3 Measurement and Payment

E36.3.1 Amend Section 4.1 of Specification CW 2140 to read:

(a) Sewer Cleaning will be measured on a time basis and paid for at the Contract Unit Price for "Sewer Cleaning". The time to be paid will be the total number of hours of sewer cleaned in accordance with this specification, accepted and measured by the Contract Administrator.

(b) Sewer Cleaning shall include all water supply costs, permits (D.F.O. or otherwise), cleaning, reverse set-up cleaning, dumping, travel time, tipping fees, units, flow control and whatever may be required for the cleaning of the outfall pipe.

(c) 75% of the payment will be made upon satisfactory completion of the cleaning work. The remaining 25% of the payment will be made upon final acceptance of the sewer cleaning as determined by the review of the corresponding video inspection.

E36.3.2 Delete sections 4.3, 4.7 and 4.8 of specification CW 2140.

E37. DE-WATERING / DE-ICING OUTFALL PIPE

E37.1 Description

E37.2 This Specification shall apply to the de-icing and de-watering of Outfall Pipes under frozen conditions as required for sewer inspection.

E37.3 Works for de-watering and de-icing of outfall pipe will only be permitted between January 01 and March 15 of any given year.

E37.4 Materials

E37.5 Equipment

E37.6 All equipment, implements, tools and facilities used shall be of a size and type as required to complete the Work in a reasonable time as approved by the Contract Administrator. The Contractor shall keep all equipment in good working order, and have sufficient standby equipment available at all times, as required.

E37.7 All equipment shall be operated and maintained in accordance with E15 (Environmental Protection Plan).

E37.8 Construction Methods

E37.8.1 De-Icing Outfall Pipe

(a) The Contractor shall supply heating and hoarding in accordance with CW 2160 to remove all ice from inside the outfall pipe as required.

E37.8.2 De-watering Outfall Pipe

(a) The Contractor must comply with all measures to avoid causing harm to fish and fish habitat as outlined in regulatory provisions including the requirements stated in any DFO guidelines, regulations or permits. Contractor shall submit a De-Watering Outfall Pipe plan to the Contract Administrator, including the type of pumping equipment to be used, prior to commencement of de-watering works.

(b) Contractor shall provide 24-hour monitoring of all de-watering pumping works.

(c) Contractor shall monitor the turbidity of the water. Upon turbid water and/or when the pump begins to take in sediment, the contractor shall stop pumping operations. All sediment shall then be pumped into a holding tank or tank truck and disposed of off site.

(d) Contractor shall make every reasonable effort to control sediment and dissipate water velocity in accordance with DFO guidelines.

(e) The contractor shall ensure the pumping system is sized properly and adjustments may be required to suit local conditions. The contractor shall be required to supply and operate at least (1) 100mm diameter flood pump. Primary pumps shall be critically silenced when used in residential settings where excessive noise levels would create a disturbance. A back-up pump should be readily available on-site in case of pump failure. Pumping operations shall follow in accordance with DFO guidelines, regulations, and permits

(f) Measurement and Payment

E37.8.3 De-watering and de-icing outfall pipes will be considered incidental to Sewer Cleaning Works specified herein. No separate measurement or payment is to be made.

E38. INTERNAL CONCRETE REPAIRS

E38.1 Description

E38.1.1 Concrete repairs shall include the internal repairs to the Doncaster Street Outfall. The miscellaneous concrete repairs include repairs to areas with deteriorated wall sections and surface spalling. Concrete Works shall be carried out at the locations noted on the drawing and indicated by the Contract Administrator. The Contractor will review the repairs and method of repairs with the Contract Administrator prior to starting the Work.

E38.2 Materials

E38.2.1 Equipment

All equipment, implements, tools and facilities used shall be of a size and type as required to complete the Work in a reasonable time as approved by the Contract Administrator. The Contractor shall keep all equipment in good working order, and have sufficient standby equipment available at all times, as required.

E38.2.2 Concrete

Concrete for large repairs to concrete sewers and manholes shall conform to CW 2160 Type A.

Patching of smaller repairs to concrete sewers (25mm – 75mm thickness) shall be with a sulphate resistant, non-shrink, cementitious mortar, Sikatop 123 Plus or approved equal in accordance with B7.

E38.2.3 Bonding Agents

Bonding agent shall be Duraweld-C or an approved equal in accordance with B7.

E38.2.4 Water Stop

Water stop shall be Hydrotite or an approved equal in accordance withB7.

E38.2.5 Other Requirements

(a) Water shall be potable water, which shall be imported to the Site.

(b) All materials shall be delivered to the Site in undamaged, unopened containers bearing the supplier's original labels.

(c) WHMIS labels on all containers shall conform with Canadian regulations, including English and French risk phrases, proper chemical name, shipping class, packing group and UN number.

(d) MSDS for all materials shall be used which are manufactured from or contain toluene diisocyante (TDI), toluene, acetone or methyl ethyl ketone.

(e) No materials shall be used which are flammable or which display shipping Class 3 red warning labels.

(f) The Contractor shall keep all materials from freezing as per the Manufacturer's specifications.

E38.3 Construction Methods

E38.3.1 Hazard Assessment and Safe Work Plan

(a) Before concrete repairs take place within the sewer, the Contractor shall assess the hazards and prepare a safe work plan in accordance with D9.

E38.3.2 Equipment Set Up

(a) In accordance with the safe work plan for the repair, the Contractor shall set up the required safety equipment and controls to safely perform the Work.

(b) Specialized equipment to perform the repair Work, such as lights, pressure washers, drills and chipping hammers shall in no way adversely affect the operation of the safety equipment required to perform the Work.

(c) Subsequent to completion of the repairs the Contractor shall remove all equipment from the sewers and manholes.

E38.3.3 Sewer Repairs

(a) Surface Repairs

(i) Patching of small surface repairs up to 75mm in thickness shall include a reasonable and limited level of surface preparation, including removal of unsound material and cleaning of the edges of the repair area. The Contractor shall apply the patching material in accordance with the manufacturer's printed instructions.

(b) Eroded Pipe Repairs

(i) An area where the pipe has deteriorated to a degree that requires large surface repairs (i.e., depth greater than 75mm). Surface preparation in these areas shall include the removal of unsound material and cleaning of edges of the repair area and setting of the required formwork and bracing. Concrete placement and finishing shall be done in accordance with CW 2160. All formwork and bracing shall be removed from the sewer/manhole at the completion of the Work. The Contractor is to remove all loose material and replace the concrete using reinforcement to secure the concrete repair to an acceptable existing concrete edge. Where the extent or edge of the repair meets with acceptable concrete, this edge shall be prepared for placement of 15M deformed tie bars. These bars shall be placed every 300mm along the repair edge. The thickness of the new concrete within the repair section shall not be less than 75 mm where reinforcing steel is required. The Contractor will review and determine the repair requirements and limits with the Contract Administrator prior to carrying out the repairs.

(c) Joint Repairs

(i) Two joint gaps within the Doncaster Outfall require joint repairs at locations as identified on the Drawings. Clean out dirt and debris in the gaps seen between pipe segments using a wire brush. The Contractor shall not use pressurized water so as to prevent soil erosion around the pipe. Apply bonding agent around perimeter of pipe gap for both sections of pipe as per Manufacturer's product instructions. Install sulphate resistant, non-shrink, cementitious mortar in gap between pipes as per Manufacturer's instructions.

E38.3.4 Cleanup

No wastes from the concrete repairs are to be allowed to enter the river system.

E38.3.5 Deficiencies

If deficiencies are found in the repaired section, the Contractor shall bear all costs of correcting the deficiencies including the cost of re-inspection to confirm that the deficiencies are rectified in accordance with these specifications.

E38.4 Basis of Measurement and Payment

E38.4.1 Miscellaneous Concrete Repairs

(a) Surface repairs will be measured on an area basis and paid for at the Contract Unit Price for "Surface Repairs". The area to be paid shall be the total square meters of pipe surface repaired in accordance with this Specification, accepted and measured by the Contract Administrator.

(b) Eroded pipe repairs will be measured on an area basis and paid for at the Contract Unit Price for "Eroded Pipe Repairs". The area to be paid shall be the total square meters of pipe surface cut back and repaired in accordance with this Specification, accepted and measured by the Contract Administrator.

(c) Joint repairs will be measured on an area basis and paid for at the Contract Unit Price for "Joint Repairs". The area to be paid shall be the total square meters of pipe

surface repaired in accordance with this Specification, accepted and measured by the Contract Administrator.

E39. WASTEWATER TEMPORARY BY-PASS PUMPING

E39.1 Description

E39.1.1 This section specifies the requirements for the temporary by-pass pumping of wastewater flows during the relocation and reconnection of the force main.

E39.1.2 Sewers can receive flow of an undetermined amount from watermain breaks, snow melt, rain, and other unforeseen sources. The Contractor will be responsible to monitor the flow in the sewer and adjust work activities accordingly, such as putting the spare standby by-pass pump into operation to handle any excessive flows due to unforeseen flow above the amount identified for PDWF.

E39.2 Materials

E39.2.1 Provide a complete fully automatic pumping system that includes a minimum of two submersible pumps, each with a capacity equal to or greater than the listed PDWF for that station. Expected PDWF is 25 l/s. Both pumps are to be installed, always connected to power and discharge piping and be available for operation. A replacement pump of equal capacity shall be immediately provided if one of the two original pumps must be removed from the site for repairs.

E39.2.2 Temporary By-Pass Pumping Equipment

(a) Non-clog, submersible pumping units, each sized to meet or exceed the required capacity. Complete with all required piping, fittings, floats, alarms, back-up generator, pump controls and related appurtenances suitable for temporary installation in a Lift Station.

(b) Duty Pump to provide 25 L/s.

(c) Stand-by pump(s) to provide 25 L/s.

(d) Pumps to operate in lead-lag configuration.

(e) Provide model and capacity cures to the Contract Administrator for approval.

(f) Power supply to be suitably sized for pumping equipment complete with all required controls. Fuel to be in lockable, tamperproof container, approved by the Contract Administrator.

E39.2.3 Fittings and Appurtenances

(a) Fittings, coupling and appurtenances to be used for repairs to existing force mains and sewers to be approved products for underground use in the City of Winnipeg.

E39.2.4 A combination of smaller sized pumps may be used concurrently if the total discharge flow of the pumps meets the PDWF volumes identified providing replacement pumps are available on-site to maintain the PDWF volume.

E39.2.5 Surface mount, vertical lift suction pumps are not acceptable.

E39.2.6 Inflatable Rubber Sewer Plugs

(a) Made of rubber, capable of remaining in place when inflated to the pressure required to withstand the expected sewer levels.

(b) Provided with an inflation/deflation hose, monitoring pressure valve, removal rope or cable and safety chain, all of sufficient length to reach ground elevations for monitoring and removal.

E39.3 Construction Methods

E39.3.1 General

(a) Provide a 24-hour contact person who can address any issues with the temporary pumping system.

(b) The Contractor pumps shall be installed in the wet well of the lift station. Discharge hoses shall move through the manhole south of the existing lift station. Contractor shall pump flows from wet well via the manhole south of the station. Discharges overflow to the river are not allowed, shall be controlled to show no overflows during by-pass pumping.

(c) All instrumentation in lift station and manholes shall be protected and avoided at all times. Any damage to the lift station instrumentation by the Contractor will be repaired or replaced to the satisfaction of the Contract Administrator.

(d) Critical Basement Elevation is 227.806 m.

(e) On a rise in the manhole water level to a predetermined point, the temporary pumping system shall come on automatically. Maintain the level of sewage in existing sewers below the overflow weir elevation of 225.394 m.

(f) The downstream flows of the temporary pumping system can be installed at the following locations shown on the Drawings: Manhole “A” (New), Manhole “B” (Existing), or directly into the new force main through the gate valve in the new By-Pass Manhole. The Contractor shall select the appropriate downstream location based on their construction schedule.

(g) Temporary pumping equipment and materials shall remain on-site until station construction is completed as described in these Specifications and to the satisfaction of the Contract Administrator.

(h) Provide a flow control plan to the Contract Administrator for review before construction starts. It shall provide detailed information for pumping equipment to be used including pump capacity and dimensions, depth of submergence, pump controls and installation details. Also include discharge piping details, arrangements to protect manhole openings required to run piping and power to the pumps and power supply details.

(i) Power supply connection to the existing site power supply shall be approved by the Contract Administrator before set-up.

(j) Provide suitable traffic ramps approved by the Contract Administrator if the by-pass pumping discharge pipe and power supply cables are laid across vehicle or pedestrian traffic areas on the force main site.

(k) Cooperation and coordination will always be required with the City to allow full access to the lift station to carry out maintenance and operational duties on the site.

(l) If wastewater gate operations are required, they shall only be operated by the City.

E39.3.2 Inflatable Sewer Plugs or Weirs

(a) Only inflatable rubber sewer plugs or weir structures shall be used to plug sewers.

(b) Clean sewer pipe as required to properly install inflatable sewer plug(s) in accordance with the manufacturer`s instructions.

(c) Secure inflatable sewer plugs at or near the ground surface.

(d) Continuously monitor air pressure while sewer plug is in place and have proper inflation equipment available at all times.

E39.3.3 Temporary By-Pass Pumping

(a) Provide a check valve on the by-pass pumping discharge pipe to prevent cycling.

(b) Power supply for the pumps is the responsibility of the Contractor and must be suitably sized for pumping equipment complete with all required automatic controls. Should one pump not perform, an alarm shall be raised to the contractor’s representative and the standby pump shall be used.

(c) If the first pump cannot maintain level, the second pump shall be used. That is the temporary pumping system shall have the capability to run both pumps at the same time.

(d) Monitor the upstream system at all times to ensure the stored level of wastewater does not exceed the elevation of 225.394 m. (Overflow Weir Elevation)

(e) Provide an alarm when the water level rises to 150 mm above pump start elevation. Send this alarm via cell phone to the contractor's office and at the same time to the Contract Administrator.

(f) The Contractor shall ensure temporary by-pass pumping equipment and materials will be properly insulated and heated, if required, to be protected from freezing and to maintain proper functioning during cold weather.

E39.4 Measurement and Payment

E39.4.1 Wastewater Temporary By-Pass Pumping will be paid for at the Contract Lump Sum Price for "Wastewater Temporary By-Pass Pumping". Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification, accepted by the Contract Administrator.

E39.4.2 There shall be no claim for additional costs or time due to increased standby pumping operations from high wet weather flows.

E40. TEMPORARY SHUTDOWN OF THE LIFT STATION

E40.1 Temporary shutdown of the wastewater lift station will be allowed for the following work activities.

(a) Switch-over between station pumps and temporary by-pass pumping during the reconnection of the force main.

E40.2 All shutdowns must be reviewed and approved by the Contract Administrator prior to the shutdown. Prepare and submit shutdown plans to Contract Administrator a minimum of forty-eight (48) hours prior to proposed shutdown, with the estimated date included in the Contractor's by-pass pumping plan which shall be issued two (2) calendar weeks prior to commencement of Work on the Force main.

E40.3 All gate operation and other control relating to the wastewater process will be by the City.

E40.4 The Contractor shall monitor the upstream system at all times to ensure the stored level of wastewater will not exceed the critical basement elevation.

E40.5 Schedule work activities requiring shutdown of pumping operations to be done at night, if required by the Contract Administrator.

E40.6 Water and Waste Department, Collection System personnel will be available to aid the Contractor for shutdown of the wastewater pumping station to facilitate transition of station pumping to the Contractor's temporary pumping system.

E40.7 Coordination of the lift station shutdown and any associated Work described herein is incidental to Temporary By-Pass Pumping.

E41. FLOW CONTROL

E41.1 Description

E41.1.1 During winter months land drainage and storm relief sewers can receive flow of an undetermined amount from groundwater infiltration, watermain breaks, snow melt and other unforeseen sources.

E41.1.2 Provide flow control measures to contend with and maintain flow in the wastewater sewer system. Flow control measures shall include but not be limited to diversions, flumes and by-pass pumping.

E41.1.3 Discharge hoses for by-pass pumping shall not be laid across vehicle or pedestrian traffic areas and must be protected from freezing during winter months. Pumping equipment if used, shall be set-up in a location and in such a way to not be a noise problem for nearby residences

E41.1.4 Provide a flow control plan to the Contract Administrator for review before removing any existing sewer pipe.

E41.1.5 In the event the flow in the sewer system is expected to exceed the sewer capacity due to spring runoff, the Contract Administrator may suspend Work activities that require temporary by-pass pumping and temporary shutdown of the Site. Suspension of these activities will continue until the high flow diminishes in the sewer.

E41.1.6 If in the opinion of the Contract Administrator suspension of Work activities that require temporary by-pass pumping and temporary shutdown of the Site may cause a delay in completion of the Work through no fault of the Contractor, the completion date of the Work will be adjusted accordingly.

E41.2 Measurement and Payment

(a) No separate pay item exists for this work. All work associated with Flow Control is considered incidental to Site Development and Restoration.

E42. PIPE SWABBING AND HYDROSTATIC LEAKAGE TESTING

E42.1 Pipe swabbing and hydrostatic pressure testing to be completed before force main connection to the lift station.

E42.2 Pipe Swabbing

(a) The contractor shall slowly fill the force main to expel as much air as possible by flushing.

(b) Swabs shall be open cell polyurethane foam with density of 16-30 kg/m^3 (1 to 2 lb/ft^3)

(c) Swabs shall be able to traverse standard piping configurations such as 45-degree elbows, tees, and valves.

(d) Three swabs shall be passed through the force main consecutively.

(e) Insert swabs from the station end of the force main, ensuring that the pipe is full of water while swabbing.

(f) Contractor to employ a method to ensure that the swabs being discharged at the force main tie-in manhole are retrieved.

(g) Ensure no air is introduced into the force main after swabbing and before leakage testing.

(h) Submit a swabbing procedure to the Contract Administrator for approval prior to swabbing.

E42.2.1 Pipe swabbing associated with the work herein described will be considered incidental to the cost of the force main renewal.

E42.3 Hydrostatic Leaking Testing

(a) When flushing and swabbing are completed, test the force main in accordance with CW2125 except as modified below.

(b) The force main will be tested to a pressure of 690 kPa (100 psi)

E42.3.1 Hydrostatic Leakage Testing associated with the work herein described will be considered incidental to the cost of the force main relocation.

E43. FORCE MAIN PIPE INSTALLATION

E43.1 Description

E43.1.1 This Specification shall cover the installation of the 150 mm force main. This Specification shall amend, and supplement Standard Specifications CW 2110 as follows:

(a) The term “force main” shall be considered equivalent to the term “watermain”.

(b) Disinfection of the force main pipe will not be required.

E43.2 Materials

E43.2.1 Force main Pipe

(a) The force main shall be constructed using 150mm PVC DR 25 (C900) pipe or equivalent product from the City of Winnipeg Approved Product list and as per Section B.7.

E43.2.2 Equipment

All equipment, implements, tools and facilities used shall be of a size and type as required to complete the Work in a reasonable time, approved by the Contract Administrator. The Contractor shall keep all equipment in good Working order, and always have sufficient standby equipment available, as required.

E43.3 Construction Methods

E43.3.1 Trench Shoring and Excavation

(a) Work must be completed in accordance with CW 2030, unless otherwise indicated by the Contract Administrator.

(b) The Contractor shall take precautionary steps to prevent damage from construction activities to adjacent properties. All damage to adjacent properties caused by the Contractor’s activities shall be repaired to, equal or better condition than prior to construction, as approved by the Contract Administrator. No separate measurement or payment will be made for the protection of adjacent private property.

(c) The force main shall be installed with Class B bedding and Class 2 backfill. Unless otherwise noted on the drawings.

(d) Sand bedding and Modified Class 2 backfill material as indicated on the drawings and per CW 2030, modified to have 0.6 m of compacted excavated Site select material as opposed to the detailed 0.3 m of compacted excavated material.

(e) The Contractor shall provide heating and hoarding of backfill material when the temperature is at or below 5° C or if the temperature will fall below 5° C within 24 hours after placing material.

E43.4 Method of Measurement and Payment

E43.4.1 Supply and Installation of 150 mm PVC C900 Force main Pipe.

(a) Force main installation will be measured on a length basis for each size, method of installation, type of bedding and type of backfill and paid for at the Contract Unit Price per metre for “Supply and Installation of Force Main Pipe”. Length to be paid for will be the total number of linear metres supplied and installed in accordance with this Specification, accepted and measured by the Contract Administrator.

(b) Measurement for length of force main installed trenchless will be made horizontally at grade above the centerline of pipe through fittings.

(c) Correction of alignment and grade exceeding the allowable variance will be at the Contractor’s own expense.

E44. BY-PASS MANHOLE AND VALVE ASSEMBLY

E44.1 Description

E44.1.1 The Work to be done by the Contractor under this Specification shall include the supply and construction of the By-Pass Manhole and Valve Assembly, excavation, bedding, and backfill. Furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for an incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E44.2 Materials

E44.2.1 Fittings and Appurtenances

(a) Acceptable Manufacturers

(i) Robar

(ii) Approved equal in accordance with B7

E44.2.2 Bedding and Backfill

(a) Bedding and initial backfill material to be sand in accordance with CW 2030.

(b) Backfill excavations in boulevard and pavement areas to be Class 2 in accordance with clause 3.8.2 of CW 2030.

(c) Sand bedding and Modified Class 2 backfill material as indicated on the drawings and per CW 2030, modified to have 0.6 m of compacted excavated Site select material as opposed to the detailed 0.3 m of compacted excavated material.

(d) Backfill under the force main connections shall extend past the flexible couplings to the base of the manhole with cement stabilized fill and bear against undisturbed soil.

(e) The Contractor shall provide heating and hoarding of backfill material when the temperature is at or below 5° C or if the temperature will fall below 5° C within 24 hours after placing material.

E44.2.3 By-Pass Manhole and Valve Assembly

(a) A by-pass manhole and valve assembly shall be installed at the station shown on the drawings to allow by-pass pumping operation to take place when required. This by-pass manhole assembly shall be installed as per SD-010 and shall include the installation of a gate valve on the force main upstream of the by-pass tee in the manhole.

(b) A 150 mm x 150 mm x 150 mm ductile iron tee fitting with a 150 mm gate valve shall be installed on the force main as shown on the drawings and is to be used for discharging wastewater flows during the by-pass pumping operations.

(c) The following items shall be procured and installed by the Contractor:

(i) Two (2) 150mm gate valves with non-rising stem. Gate valve to conform to current AWWA C590 Standard for Resilient Seated Gate Valves. To be epoxy coated cast iron with a counter clockwise opening rising spindle.

(ii) Two (2) ductile iron spool pieces for connecting the gate valve and by-pass tee to the Polyvinyl Chloride (PVC) force main on the up and downstream ends using an approved flexible Robar coupling or equivalent.

(iii) Standard 1500 mm Precast Concrete Manhole as per City of Winnipeg SD-010.

E44.3 Measurement and Payment

E44.3.1 The construction of the By-Pass Manhole and Valve Assembly will be paid for at the Contract Lump Sum Price for “Supply and Installation By-Pass Manhole and Valve Assembly”. Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification, accepted by the Contract Administrator.

E45. CONNECTION OF THE NEW FORCE MAIN TO THE EXISTING LIFT STATION

E45.1 Description

E45.1.1 This Specification shall cover the connection of the new 150mm PVC DR 25 (C900) force main to the existing lift station. This Specification shall amend and supplement Standard Specification CW 2130.

E45.1.2 The Work to be done by the Contractor under this Specification shall include the connection of the new 150mm PVC DR 25 (C900) force main, excavation, bedding, and backfill. Furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for an incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E45.2 Materials

E45.2.1 Fittings and Appurtenances

(a) Acceptable Manufacturers

(i) Robar

(ii) Approved equal in accordance with B7

E45.2.2 Force main Pipe

(a) The force main shall be constructed using 150mm PVC DR 25 (C900) pipe or equivalent product from the City of Winnipeg Approved Product list and as per Section B7.

E45.2.3 Bedding and Backfill

(a) Bedding and initial backfill material to be sand in accordance with CW 2030.

(b) Backfill excavations in boulevard and pavement areas to be Class 2 in accordance with clause 3.8.2 of CW 2030.

(c) Sand bedding and Modified Class 2 backfill material as indicated on the drawings and per CW 2030, modified to have 0.6 m of compacted excavated Site select material as opposed to the detailed 0.3 m of compacted excavated material.

(d) Backfill under the Connection of New Force main to Existing Lift Station shall be with cement stabilized fill and bear against undisturbed soil. The cement stabilized fill shall extend past the flexible coupling toward the lift station.

(e) The Contractor shall provide heating and hoarding of backfill material when the temperature is at or below 5° C or if the temperature will fall below 5° C within 24 hours after placing material.

E45.3 Method of Measurement and Payment

E45.3.1 Connection of the new 150 mm force main to the existing Lift Station will be paid for at the Contract Lump Sum Price for “Connection of the New Force Main to the Existing Lift Station”. Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification, accepted by the Contract Administrator.

E46. CONNECTION OF THE NEW FORCE MAIN TO THE FORCE MAIN TIE-IN MANHOLE

E46.1 Description

E46.1.1 This Specification shall cover the Connection of the New Force main to the Force main Tie-In Manhole. This Specification shall amend and supplement CW 2130, CW 2030 and SD-010D.

E46.1.2 The Work to be done by the Contractor under this Specification shall include the supply and construction of:

(a) Pipe couplings

(b) Ductile iron pipe, drop pipe, fittings, and appurtenances

(c) Down pipe anchor straps

(d) Concrete Collar

(e) Excavation, Bedding and Backfill

(f) As well as the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for an incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E46.2 Materials

E46.2.1 Fittings and Appurtenances

(a) Fittings, couplings, and appurtenances to be used for the relocation of the force main and sewers are to be approved products for underground use in the City of Winnipeg.

(b) Acceptable Manufacturers

(i) Robar

(ii) Approved equal in accordance with B7

E46.2.2 Force main Pipe

(a) Ductile iron spool pieces for connecting the ductile iron drop tee to the PVC force main.

(b) Ductile iron spool pieces for connecting the ductile iron drop tee to the ductile iron bend.

E46.2.3 Bedding and Backfill

(a) Bedding and initial backfill material to be sand in accordance with CW 2030.

(b) Backfill excavations in boulevard and pavement areas to be Class 2 in accordance with clause 3.8.2 of CW 2030.

(c) Sand bedding and Modified Class 2 backfill material as indicated on the drawings and per CW 2030, modified to have 0.6 m of compacted excavated Site select material as opposed to the detailed 0.3 m of compacted excavated material.

(d) Backfill under the Connection of New Force main to the Force main Tie-In Manhole shall be with cement stabilized fill and bear against undisturbed soil. The cement stabilized fill shall extend past the flexible coupling down towards the base of the manhole.

(e) The Contractor shall provide heating and hoarding of backfill material when the temperature is at or below 5° C or if the temperature will fall below 5° C within 24 hours after placing material.

E46.3 Method of Measurement and Payment

E46.3.1 Connection of New Force main to the Force main Tie-In Manhole will be paid for at the Contract Lump Sum Price for “Connection of the New Force Main to the Force Main Tie-In Manhole”. Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification, accepted by the Contract Administrator.

E47. REMOVAL OF CONCRETE DEBRIS

E47.1 Description

E47.1.1 This Specification shall cover the removal of the concrete debris located at the lower bank and outlet of the Park Blvd. Outfall.

E47.2 Construction Methods

E47.2.1 All existing concrete, including debris and damaged headwall, located near the outfall outlet shall be removed and appropriately disposed off site.

E47.3 Measurement and Payment

E47.3.1 The removal of concrete debris shall be measured by tonnes and paid for at the Contract Unit Price for “Removal of Concrete Debris”. The weight to be paid for shall be the total tonnes of garbage removed from Site and taken to a waste facility, in accordance with this Specification, and accepted and measured by the Contract Administrator.

E47.3.2 The Contractor shall supply and deliver receipts of weigh bills to the Contract Administrator before payment will be made.

E47.3.3 All costs associated with removal of concrete debris, which includes collection of debris, transport, and tipping fees, will be considered incidental to the Work.

E48. CONSTRUCTION OF CONCRETE COLLAR

E48.1 Description

E48.1.1 All concrete work in this project, materials and construction methods, shall be according to the Drawings, Details and this specification.

E48.2 Materials

Concrete Mix Design

Concrete mix design and steel reinforcement shall be as indicated on the Drawings and in accordance with E32(Cast in Place Concrete Construction).

E48.2.1 Cold Weather Requirements

Cold weather requirements shall be in accordance with E33(Cold Weather Requirements).

E48.3 Construction Methods

E48.3.1 Cast in place Concrete Construction

(a) Construct cast in place concrete in accordance with CW 2160, except as supplemented, revised or amended in this specification and as indicated in the construction notes on the Drawings.

(b) Adjust the location of reinforcing steel adjacent to openings to frame those openings in accordance with good practice, and maintain the bar spacing intent.

(c) Do not use welded splices for reinforcing steel.

(d) Order all wall reinforcing steel in lengths to best suit the spacing of walers so that reinforcing bars will not be bent or misformed in order to remove the walers.

E48.3.2 Backfill

(a) Place and compact backfill material as indicated on the Drawings in accordance with CW 2030.

(b) Do not place backfill material in a frozen state.

(c) Supply heating and hoarding in accordance with CW 2160 if required to ensure material does not freeze before compaction is complete.

(d) Notify the Contract Administrator at least one (1) full Working Day in advance of any backfilling operation. No Backfill shall be placed against concrete until approved by the Contract Administrator and in no case before field cured test cylinders show the concrete strength to be 75% of that specified.

E48.3.3 Grout

(a) Mix and apply grout in accordance with the manufacturer’s instructions. Consistency to be suitable for the intended application.

E48.4 Measurement and Payment

(a) Construction of the concrete collar will be measured on a unit basis and paid for at the Contract Unit Price for ""Items of Work" listed below. Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification.

(b) Cold weather requirements shall be considered incidental to the construction of cast-in-place concrete and no measurement or payment will be made for this item.

Items of Work: Construction of Concrete Collar

a) 2120 mm diameter

LANDSCAPING

E49. WILDERNESS TRAIL – CRUSHED GRANULAR PATHWAY

E49.1 Definition

E49.1.1 The Work to be done by the Contractor under this Specification shall include the furnishing 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 as shown on the Drawings and as hereinafter specified, including, but not necessarily confined to the following:

(a) Supply and Installation of granular base course, surface course materials and geotextile, for pathways as indicated on the Drawings including river access trail;

(b) Supply and Installation of Wilderness Trail Features as identified on the Drawings are to occur to augment existing landform and drainage patterns, with every effort to reduce weight of material on the riverbank.

E49.2 Materials

E49.2.1 All materials supplied under this Specification shall be of a type approved by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.

E49.2.2 Compacted Subgrade

(a) Granular base course material (where required) for the pathway shall consist of 150mm of 20mm down crushed limestone and shall conform to CW3110 for crushed limestone base course material.

(b) Generally, the base for the Wilderness Trail will be well compacted existing clay material.

E49.2.3 Granular Surface Course for Crushed Limestone Pathway

(a) Granular surface course material for the pathway shall consist of 25.4mm of crusher fines/ toppings crushed limestone.

E49.2.4 Geotextile Fabric

(a) Where required, geotextile fabric shall be in accordance with CW 3130.

E49.3 Construction Methods

E49.3.1 Construction method shall conform to Specification CW 3110 "Sub-Grade, Sub-Base and Base Course Construction".

E49.3.2 Contractor shall visit the Site and verify all data and dimensions and report any errors, omissions or discrepancies to the Contract Administrator prior to any installation.

E49.3.3 Contract Administrator to pin flag entire layout of Wilderness Trail and Trail Features. Trail Building Contractor shall review the overall layout with Contract Administrator and shall be responsible for interpretation of grades and protection of stakes.

E49.3.4 Granular Base

(a) Geotextile fabric to be placed between subgrade and granular base as per CW 3130 and as directed by Contract Administrator;

(b) Place granular base material to the lines and grades as shown on Drawings, and supplemented with site instructions. Extend base minimum 150mm beyond width of surface course;

(c) Compact material to a minimum of 95 percent Standard Proctor Density.

E49.3.5 Granular Surface Course

(a) Place granular surface course material to the lines and grades as shown on Drawings, and as directed though site instructions;

(b) Compact material to a minimum of 95 percent Standard Proctor Density.

E49.4 Method of Measurement

(a) Crushed Granular Pathway shall be measured on a linear metre basis. The total unit to be paid for shall be the total number of units that are installed, and include Trail Features in accordance with this Specification and the Construction Drawings, and as acceptable to the Contract Administrator

E49.5 Basis of Payment

(a) Crushed Granular Pathway will be paid for at the Contract Unit Prices per linear metre for Item “Wilderness Trail and Features” on Form B: Prices and measured as specified herein. This price shall be payment in full for supplying all labour, equipment and materials, and performing all operations herein described and all other items incidental to the Work included in this Specification.

E50. TREE PLANTING

E50.1 General

E50.1.1 The Work to be done by the Contractor under this Specification shall include the furnishing 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 as shown on the Drawings and as hereinafter specified, including, but not necessarily confined to the following:

(a) Supply and installation of topsoil, mulch, trees and all other miscellaneous materials, as listed in this specification and indicated on the drawings.

E50.1.2 Reference

(a) Supply trees in accordance with the Canadian Nursery Stock Standards Current Edition, published by the Canadian Nursery Landscape Association, except where specified otherwise.

E50.1.3 Source Quality Control

(a) All plant material shall be randomly inspected at the source upon request of the Contract Administrator.

(b) Trees are to be grown in nurseries in accordance with the Canadian Nursery Stock Standard Current Edition, published by the Canadian Nursery Landscape Association.

(c) Only those trees that have been grown for at least the four (4) previous years in local Manitoba nurseries located in an Agriculture Canada Plant Hardiness Zone designation of 2(a or b) or 3(a or b) and within a 250 kilometre radius of Winnipeg, will be accepted. Trees that have been grown in plant hardiness zones 1 and 4 or greater will be rejected.

E50.1.4 Maintenance

(a) The Contractor shall be responsible for the maintenance of the trees for a period of two (2) year from the date of Total Performance. Any areas planted after September 15th, the maintenance period will commence on May 15th of the following year or such date as mutually agreed upon by all parties.

(b) All newly planted trees shall be watered on a weekly basis between spring (May 15) continuing through to early fall (October 15), for the first year and two-year maintenance period thereafter to keep the soil in and around the root ball moist. With the Contract Administrator's or designate's approval, adjustments may be made in watering frequency depending on soil type, weather, drainage, tree species, and weekly amounts of rainfall

(c) Ensure watering techniques do not cause erosion.

(d) Turf and weed growth shall be removed from in and around planting site bi-monthly throughout the two-year maintenance and warranty period.

(e) Wood chips or other approved mulch shall be topped up as required.

(f) Reform damaged watering saucers.

(g) If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Contract Administrator prior to application.

(h) Remove dead, broken or hazardous branches from plant material.

(i) Keep trunk protection and tree supports in proper repair and adjustment.

(j) Remove trunk protection, tree supports and level watering saucers at end of warranty period.

(k) Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

(l) Submit monthly written reports to Contract Administrator identifying:

(i) Maintenance work carried out.

(ii) Development and condition of plant material.

(iii) Preventative or corrective measures required which are outside Contractor's responsibility.

E50.1.5 Warranty

(a) The Contractor shall, at his/her expense, warrant the Work against any and all defects or deficiencies resulting from insect infestation, disease and mechanical damage due to improper handling, installation or maintenance, for a period of two (2) years from the date of the Total Performance. Nursery stock damaged by vandalism or reasons beyond the control of the Contractor shall be replaced by the client.

(b) End-of-Warranty inspection will be conducted by the Contract Administrator.

(c) The Contract Administrator reserves the right to request material replacement or extend the Contractor's Maintenance responsibilities for an additional one (1) year if, at the end of the Warranty Period, leaf development and growth are not sufficient to ensure future survival of the plant material.

E50.1.6 Replacements

(a) During the Maintenance Period, the Contractor shall remove from Site any plant material that has died or failed to grow satisfactorily as determined by the Contract Administrator and replace as per Specifications within a maximum ten (10) day period from notification.

(b) Defective plants shall be replaced within three (3) days of notification to the Contractor.

(c) The Contractor shall extend Maintenance and Warranty on replacement tree for a period equal to the original Maintenance and Warranty Periods.

(d) The Contractor shall continue such replacement, Maintenance and Warranty until tree is acceptable.

E50.2 Materials

E50.2.1 Planting Soil

(a) Planting Soil shall consist of black top soil, a fertile friable natural loam containing by volume not less than 4% and no more than 25% of organic matter for clay loams, and not less than 2% and no more than 25% for sandy loams, with an acidity value ranging from pH 6.0 to 8.0 and capable of sustaining vigorous plant growth. Topsoil is to be free of any mixture of subsoil, clay lumps and free of stones and other extraneous matter. It is not to contain couch or crab grass rhizomes.

E50.2.2 Mulch

(a) Enviro Mulch shall be Charcoal Black Colour, free of leaves, branches and other extraneous matter. The recommended mulch shall consist of chips not less than 15mm not larger than 75mm in size and not more than 20mm thick.

(b) Contact for Enviro Mulch:
St. Boniface Pallet Company
220 Panet Road
Winnipeg. MB R2J 0S3

Telephone No. (204) 233-0383
Facsimile No. (204) 233-6633
Email: info@stbpallet.com

E50.2.3 Miscellaneous Materials

(a) Water shall be potable and free of minerals which may be detrimental to plant growth.

(b) Stakes shall be metal T-Bar, steel, 40x40x5x2440mm.

(c) ArborTie flat woven polyester guying

E50.2.4 Plant Material

(a) All nursery stock supplied shall be Canadian Prairie nursery grown, and of species and sizes indicated in the plant list on the drawings. Its quality shall be in accordance with the "Canadian Nursery Stock Standards of the Canadian Nursery Landscape Association".

(b) Any nursery stock dug from native stands, wood lots, orchards, or neglected nurseries and which do not meet the Canadian Nursery Stock Standard of the Canadian Nursery Landscape Association shall be designated as "collected plants". The use of "collected plants" will not be permitted unless specified below.

(c) Plants larger than specified may be used if approved by the Contract Administrator. The use of such plants shall not increase the Contract price.

(d) Plants shall be free of disease, insect infestation, rodent damage, or environmental stress.

E50.2.5 Tree Quantity and Size

(a) Trees are to be planted at the quantities and caliper listed on the Plant Lists which are shown on the drawings. Any variation from the specified quantity is to be clearly identified on the Schedule of Prices. Any variations to species, size or caliper of specified trees will require a request for approval from the Contract Administrator.

(b) Any changes in planting locations will be determined on-site by the Contract Administrator.

(c) The Contractor shall supply trees as indicated in the Schedule of Prices and PLANT LISTS.

(d) Trees are to conform to the measurements specified in the on drawing PLANT LISTS, except that trees larger than specified may be used if approved by the Contract Administrator.

E50.2.6 Shipment and Pre-Planting Care

(a) Coordinate shipping of trees and excavation of holes to ensure minimum time lapse between digging and planting.

(b) Protect trees against branch breakage, abrasion and other mechanical damage, exposure and extreme temperature change during transit. Avoid binding of trees with rope or wire which would damage bark, break branches or destroy natural shape of tree. Give full support to root ball of trees during lifting.

(c) Cover tree foliage with tarpaulin, and protect bare roots by means of dampened straw, peat moss, saw dust or other acceptable material to prevent loss of moisture during transit and storage.

(d) Remove broken and damaged roots with sharp pruning shears to make clean cuts.

(e) Keep roots moist and protected from sun and wind. Heel-in trees which cannot be planted immediately in shaded areas and water well to prevent drying out of root system.

E50.3 Construction Methods

E50.3.1 Workmanship

(a) All areas and locations provided for planting shall be staked out or painted on Site by the Contractor according to layout shown on the Drawings. Excavation shall not proceed until the layout has been inspected and approved by the Contract Administrator. Excavation shall not be undertaken until all underground utilities have been located and protected.

(b) Coordinate operations. Keep Site clean and planting holes drained. Immediately remove soil or debris spilled onto street pavement, grass or sidewalk.

E50.3.2 Planting Time

(a) Trees noted for spring planting only, must be planted in dormant period.

(b) Plant only under conditions that are conducive to health and physical conditions of trees.

(c) Provide planting schedule to Contract Administrator. Extending planting operations over long period using limited crew will not be accepted.

(d) The Contractor must obtain all above and below ground clearances from all the utilities as well as the appropriate District Operations Branch in a timely manner so as not to jeopardize the schedule of the complete tree planting Contract.

E50.3.3 Excavation

(a) Tree Pit to be dug with back hoe.

(b) Excavate tree pits as indicated by stakes or paint marks.

(c) Protect bottom of excavations against freezing.

(d) Remove water which enters excavations prior to planting. Ensure source of water is not ground water and notify Contract Administrator.

(e) Tree pit depth shall be such that the top of the root ball is even with the existing grade, and the root flare to be at or slightly above the finished grade. Determine how deep the root flare is in the root ball before excavation or before the tree is placed in the planting hole. If necessary, at installation, raise the top of the root ball until the root flare is at the proper planting depth and/or soil must be removed from the top of the ball.

(f) Upon excavation of the planting bed, the excavation shall be backfilled with a topsoil mixture to a depth to permit adequate installation and stabilization of the plant

material. Topsoil shall be placed in accordance with City of Winnipeg Standard Construction Specification CW 3540 to a 300mm depth

E50.3.4 Installation

(a) All nursery stock shall be set plumb in the centre of pits and at levels as shown on the planting details after settlement has taken place.

(b) Nursery stock shall be faced to give the best appearance or relationship to adjacent structure and to the approval of the City of Winnipeg representative.

(c) Each tree must be planted such that the trunk flare is visible at the top of the root ball. Trees where the trunk flare is not visible shall be considered a deficiency and payment for the planting will not be received until the deficiency is addressed. Do not cover the top of the root ball with soil.

(d) Planting shall be done during periods of suitable weather conditions and in accordance with locally accepted practice.

(e) No tree pit is to be left open at the end of the Contractor's Work Day. Planting program is to be planned to ensure that all approved trees delivered to the Site at designated planting locations are installed and thoroughly watered the same day as delivery.

(f) With balled and burlapped root balls and root balls in wire baskets, burlap shall be loosened and cut away from the top 1/3 without disturbing root ball. Wire shall be cut away and removed from the top 1/3 of the root ball. Burlap or rope shall not be pulled from under root ball. All twine and non-biodegradable wrapping shall be removed.

(g) Backfill with topsoil and gently tamp soil around the root ball. Thoroughly water the root ball and planting pit

(h) Each tree is to have an earth saucer at its base having a diameter as large as the excavation with a berm no greater than 10cm in height and width formed at the perimeter of the saucer to retain water.

(i) Install tree trunk protection around the base of each tree trunk.

(j) Install wood chips or other approved mulch. Mulch shall be a clean bark or wood chip free of leaves, branches and other extraneous matter:

(k) (ii) Mulch shall consist of chips not less than fifteen (15) mm nor larger than seventy-five (75) mm in size and not more than twenty (20) mm thick.

(l) (iii) Mulch shall be to the depth of no more than fifty (50mm) or two (2”) inches to one hundred (75mm) or three (3”) inches and must not be placed within eight (10cm) or three (4”) inches of the trunks of trees.

(m) Apply water to area around planting hole immediately after planting.

(n) Install stakes and straps (do not use wire in garden hose) as necessary, or as directed by Contract Administrator or designate.

E50.3.5 Pruning

(a) The Contractor shall provide a qualified arborist for each work crew or work site in accordance with the Forest Health Protection Act and Arborist Regulations for each work crew or work site.

(b) Remove dead, broken and injured branches. All pruning will be done in accordance with the most current edition of the American National Standards Institute (ANSI) A300 and the most current edition of the companion publication “Best Management Practices – Tree Pruning”.

(c) No Pruning work is permitted on elm trees for the period April 1st to July 31st as directed in the Manitoba Forest Health Protection Act and Regulations unless deemed a safety hazard by the Contract Administrator

E50.3.6 Watering

(a) Trees are to be watered during the planting procedure as described previously, and once a week thereafter, or more frequently if required, between spring (May 15) and early fall (October 15) as described previously in Maintenance. With the Contract Administrator's or designate's approval, adjustments may be made in watering frequency depending on soil type, weather, drainage, tree species, and weekly amounts of rainfall.

(b) A complete record is to be kept of each series of waterings for all planted trees noting: 1) location, and 2) date of watering. This record shall be sent bi-weekly to the Contract Administrator.

(c) The area in and around the planting site shall be watered to allow enough time for the water to penetrate the soil to a depth of 15 to 30cm.

(d) Watering must be done slowly to ensure that water does not run away from the root zone and so the top 30cm of the soil around the root system of the tree are well saturated. The water stream must not gouge out a hole in the soil or mulch.

(e) The Contractor shall provide a water supply, all costs to provide water for the watering operation and all associated costs shall be borne by the Contractor. These costs may include hydrant permit and meter rental fees.

(f) Water shall be free of oils, acids, alkalis, salts and other substances that may be detrimental to plant growth. Water suitable for human consumption shall be acceptable without testing.

(g) Water from rivers and streams shall not be used without prior approval of the Contract Administrator.

(h) Should the Contract Administrator determine that water quality testing is necessary, an approved testing laboratory shall perform the test at the sole expense of the Contractor.

E50.4 Measurement and Payment

E50.4.1 Installation of trees shall be measured on a per unit basis. The amount to be paid for shall be the total number of trees supplied and installed in accordance with this Specification and the Construction Drawings, and as acceptable to the Contract Administrator.

E50.4.2 Plant maintenance shall be measured on a per year basis at the successful completion of all activities and reporting in accordance with this specification, the Construction Drawings, and as acceptable to the Contract Administrator.

E50.5 Basis of Payment

E50.5.1 Payment for installation of trees and plant maintenance shall be paid for at the Contract Unit Prices for the "Items of Work" listed below. This price shall be payment in full for supplying all labour, equipment and materials, and performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

Item of Work:

(a) Deciduous Trees
  (i) Manitoba Maple (5 gal)
  (ii) Baron Manitoba Maple (5 gal)
  (iii) Hackberry (5 gal)
  (iv) Plains Cottonwood (caliper)
  (v) Bur Oak (caliper)
  (vi) American Basswood (5 gal)
  (vii) Prairie Expedition Elm (5 gal)
  (viii) Discovery Elm (caliper)

(b) Coniferous Trees

(i) Black Hills White Spruce (B&B 1.8-2.4m tall)

(c) Deciduous Shrub

(i) Red Osier Dogwood (2 gal)
(ii) Bush Honeysuckle (5 gal)
(iii) Smooth Sumac (5 gal)
(iv) Wild Black Currant (2 gal)
(v) Raspberry (2 gal)
(vi) Buffaloberry (5 gal)
(vii) Western Snowberry (2 gal)
(viii) Nannyberry (5 gal)
(ix) Highbush Cranberry (5 gal)

(d) Year of Plant Maintenance

E51. NATURALIZATION

E51.1 Definition

E51.1.1 The work to be done by the Contractor under this Specification shall include the supply, installation, labour, equipment, tools and all other things necessary for and incidental to the satisfactory performance and completion of all work shown in the drawings and as hereinafter specified, including, but not necessarily confined to the following:

(a) Site preparation (Growth Media Preparation)

(b) Weed control (by City of Winnipeg)

(c) Erosion Control (by City of Winnipeg)

(d) Supply and install topsoil

(e) Supply and install seed (by City of Winnipeg)

(i) Seed mixes will consist of pre-mixed, grass based native seed mixes with forb seed component. Three (3) mixes will be seeded;

- Tree/Shrub area mix (Mix A)
- Tall height mix (Mix B)
- Lower slope mix (Mix C)

(f) Supply and install rooted specimens for Flower Patches (by City of Winnipeg)

E51.1.2 The Contractor shall ensure coordination with other site Works.

E51.1.3 The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification. All materials shall be subject to inspection and testing by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for inspection and testing purposes.

E51.1.4 Submittals

(a) Detailed work schedule

(b) Weed control plan (by City of Winnipeg)

(c) Erosion control plan (by City of Winnipeg)

(d) Native seeding establishment plan (by City of Winnipeg)

(e) Herbicide applicator’s license (by City of Winnipeg)

(f) Monthly written report of plant material condition during establishment period (by City of Winnipeg)

(g) Soil analysis report from accredited soil testing lab. Testing parameters to be supplied by the Contract Administrator.

E51.2 Materials

E51.2.1 Topsoil

(a) Topsoil shall consist of 60% organic matter, 30% Topsoil (clay textured), and 10% sand. Soil shall be free of roots and stones over 30 mm in diameter or subsoil clay lumps over 30 mm in diameter.

(b) Salinity ratings shall be less than 1.0 mmhos/cm. The pH range shall be between 6.5 and 7.5.

(c) Topsoil shall be free of residual chemical properties originating from past herbicide applications or other forms of contamination which can potentially negatively affect the growth and successful establishment of planted material as specified.

(d) Topsoil shall not contain the roots of quack grass (*Elymus repens*), smooth brome (*Bromus inermus*), Canada thistle (*Cirsium arvense*), sweet clover (*Melilotus officinale*, *M. alba*), dandelion (*Taraxascum officinale*) roots or other noxious weeds.

E51.2.2 Topsoil Testing

(a) The Contractor shall inform the Contract Administrator of the proposed topsoil source. The Contract Administrator reserves the right to reject topsoil not conforming to the requirements of this Specification.

(b) The Contractor will submit soil samples for review and approval by the Contract Administrator. Topsoil will be subject to tests for nitrate, phosphate, potassium, sulphate, pH, E.C. (salinity) and volume of organic matter by a testing laboratory designated by the Contract Administrator.

E51.3 Construction Methods

E51.3.1 Growth Media Preparation

E51.3.2 Subsoil

(a) The subsoil shall be graded in accordance with Specifications, the Construction Drawings.

(b) The subsoil grade on seeded areas shall be disked (fractured) to a minimum depth of 300mm but not more than 450mm, prior to topsoil placement to the satisfaction of the Contract Administrator.

E51.3.3 Topsoil

(a) Prior to any topsoil placement, the Contract Administration shall conduct on-site field inspection.

(b) 150mm of Topsoil shall be spread across the seeding area. Topsoil shall be placed in a manner as to avoid compaction of disked subsoils.

(c) Once placed, topsoil shall be incorporated evenly into disked subsoils to a maximum depth of 200mm.

(i) The Contractor shall take care not to bury topsoil when incorporating into disked subsoils

(d) Spring topsoil placement, incorporation and seedbed grooming/conditioning must be completed no later than June 8. Topsoil placement after June 8 shall be at the direction of the Contract Administrator.

E51.3.4 Fine Grading

(a) Topsoil and Finish Grading shall be as shown on the drawings.

(b) The Contractor shall fine grade Topsoil, to eliminate rough spots, ruts or other similar low areas to ensure positive drainage and to facilitate consistent seed placement and seed rate during planting.

(c) The incorporated Topsoil shall be rolled or harrow/packed in order to consolidate soil material and leave the surface smooth, firm and level to the satisfaction of the Contract Administrator.

(d) All seeded areas are to be free of woody debris and rocks. The Contract Administrator shall advise the contractor of any debris clean-up requirements.

E51.4 Method of Measurement

E51.4.1 Supply, placement and establishment of topsoil for all areas of disturbance / Naturalization will be measured on an area basis. The area to be paid for shall be the total number of square meters installed in accordance with this specification and accepted by Contract Administrator.

E51.5 Basis of Payment

(a) Placement of topsoil and related Work specified herein will be measured on an area basis and paid for at the Contract Unit Price per square meter for "Naturalization Area" The area to be paid for shall be the total number of square meters of topsoil in accordance with this Specification, accepted and measured by the Contract Administrator upon completion of installation.

E52. GABIONS

E52.1 Description

E52.1.1 The Work to be done by the Contractor under this Specification shall include the furnishing 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 as shown on the Drawings and as hereinafter specified, including, but not necessarily confined to the following:

(a) Supply and Installation of Gabion Baskets and Stone fill including along river access trail.

E52.2 Materials

E52.2.1 Product Sample

(a) Submit illustrative samples of gabion basket and stone fill in accordance with Specification "Submittals".

(b) Contractor to submit product samples five (5) Working Days prior to ordering material.

E52.2.2 All materials supplied under this specification shall be of a type approved by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.

E52.2.3 Geotextile:

(a) Geotextile for base shall be in accordance with CW 3130, "Supply and Installation of Geotextile Fabric"

E52.2.4 Granular Base:

(a) Granular Base shall be in accordance with CW 3110 "Sub-grade, Sub-Base and Base Course Construction"

E52.2.5 Gabion Baskets:

(a) Gabion baskets shall be architectural welded wire with uniform square pattern in a 75x75mm grid. Wire shall be hot dip galvanized with minimum coverage of 260 g/m2 to CSA G164. Interlocking wire fasteners shall be galvanized steel to ASTM A764, Finish 1, Class1, Type 3.

(b) Contractor ensure that gauge of wire mesh identified for pricing purposes, gauge (4.11mm) provide enough support for the proposed filled platform construction.

(c) The baskets shall be factory fabricated so that sides, ends, lid and internal diaphragms readily assemble on site into rectangular baskets of a size as indicated on Drawings. Baskets shall have single unit construction. When length exceeds horizontal width, provide diaphragms of same mesh as gabion walls to divide basket into equal cells of length not in excess of horizontal width.

(d) Gabion baskets shall be connected together using stainless steel ring fasteners on exposed sides, lacing wire or ring fasteners may be used to connect other areas. All fasteners shall meet all of the closing requirements of the gabion manufacturer and be accepted by the Contract Administrator.

E52.2.6 Stone Fill:

(a) Stone Fill shall be locally available, clean, hard, durable, abrasion-resistant field stone. Field Stone shall be such that it will not disintegrate from action of wetting and drying, or freezing and thawing cycles.

(b) No Limestone will be allowed. Any limestone to be removed from baskets prior to placement.

(c) Individual stones shall have a diameter of 100 mm minimum to 200 mm maximum. The Contractor is to note that no smaller stones will be accepted.

E52.3 Construction Methods

E52.3.1 Layout shall be marked on site by the Contractor and verified by the Contract Administrator prior to excavation.

E52.3.2 Excavate for foundation bed, compact subgrade and install geotextile in accordance with CW 3110 and CW 3170 respectively, as shown on the Drawings, and as directed by the Contract Administrator.

E52.3.3 Gabion Installation:

(a) Care shall be taken during gabion installation to prevent damage to surrounding area.

(b) The gabions shall be opened and unfolded on a flat hard surface to ensure no unwanted folds occur. The sides, ends, and diaphragms shall be lifted into place to form an open box, and all sides connected as per manufacturer's installation instructions.

(c) After foundation preparation, the pre-assembled gabions shall be placed to lines and grades as indicated on Drawings and as verified by Contract Administrator. Placement, elevations and geometry shall be verified prior to filling with stones.

(d) Adjacent baskets shall be connected as recommended by manufacturer prior to stone fill placement.

E52.3.4 Filling

(a) After adjacent empty woven wire gabion units are set to the required line and grade and common sides connected, they shall be placed in straight line tension and stretched to remove any kinks from the mesh and to gain a uniform alignment. The gabions may be staked to maintain the established proper alignment or connected to concrete walls before the rock is placed. No stakes shall be placed through geotextile material. Connecting fasteners shall be attached during the filling operation to preserve the strength and shape of the structure.

(b) The gabions shall be carefully filled with Stone by hand or a combined machine/ hand method to ensure alignment, avoid bulges, and provide a compact mass that minimizes voids. Machine method requires supplementing with hand work to ensure the desired result. On exposed faces of gabions, place stones by hand with flattest surfaces bearing against face mesh to produce a neat, compact placement with a uniform appearance.

(c) Stone Fill should appear random in placement with no large gaps or unsecured stones.

(d) Care shall be taken during delivery and installation to protect stones from breakage. Any Stone Fill smaller than 100mm in diameter will not be accepted due to the potential for vandalism.

(e) Fill gabion cells in lifts not exceeding 300 mm and connect opposite walls with 2 tie wires after each lift. Each gabion shall appear, upon completion, to be aligned properly with adjacent gabions.

(f) Once Stone Fill has been installed, fill in small gaps between stones with river washed stone infill to assure no gaps between stones are visible.

(g) The last layer of rock shall be uniformly levelled to the top edges of the gabions. Lids shall be placed tight over the rock fill using only approved lid closing tools as necessary. The use of crowbars or other single point leverage bars for lid closing is prohibited as they may damage the baskets. The lid shall be stretched until it meets the perimeter edges of the front and end panels. The gabion lid shall then be secured to the sides, ends, and diaphragms with approved fasteners.

(h) Any damage to the wire during assembly, placement, and filling shall be repaired promptly in accordance with the manufacturer's recommendations or replaced with undamaged gabion baskets.

E52.3.5 Placement of Geotextile and Topsoil

(a) The Geotextile is to be placed prior to the commencement of backfilling with clean fill and/or topsoil as per Construction Drawings

(b) Geotextile shall be laid smooth and free of tension, stress, folds, wrinkles or creases. Joints in the geotextile fabric shall be overlapped not less than 0.5 metres.

(c) Securing pins with washers shall be inserted through the fabric at intervals not greater than 1.5 metres along a line 100 mm from both the lowest and highest exterior edge of the geotextile fabric.

(d) Geotextile is to be trimmed and shall not be visible after completion of Work.

(e) Precautions shall be taken when backfilling to avoid contamination of rock fill with topsoil.

E52.4 Method of Measurement

E52.4.1 Gabions shall be measured on a linear meter basis. The area to be paid for shall be the total number of linear meters that are installed in accordance with this Specification and the Drawings, and as acceptable to the Contract Administrator.

E52.5 Basis of Payment

E52.5.1 Gabions will be paid for at the Contract Unit Prices per linear meter for “Gabions” measured as specified herein, which price shall be payment in full for supplying all labour, equipment and materials, and performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E53. COMPOSITE WOOD BENCH

E53.1 Description

E53.1.1 The Work to be done by the Contractor under this Specification shall include the furnishing 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 as shown on the Drawings and as hereinafter specified, including, but not necessarily confined to the following:

(a) Supply and Installation of Composite Wood Benches.

E53.2 Materials

E53.2.1 Product Sample

(a) Submit product samples of composite wood in accordance with Specification "Submittals".

(b) Contractor to submit product samples five (5) Working Days prior to ordering material.

E53.2.2 All materials supplied under this specification shall be of a type approved by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.

E53.2.3 Composite Wood:

(a) Composite wood to meet the dimensional specifications as provided on construction drawings.

(b) Composite wood must be able to provide proof of resilience to fluctuation in local weather conditions, as well as provide a smooth and clear surface from burs, slivers, and other issues that may affect day to day use by the public

(c) Colour: TBD

E53.2.4 Fasteners:

(a) All fasteners to be hot dip galvanized

E53.3 Construction Methods

E53.3.1 Must adhere to the Construction Drawings and local best practices to ensure longevity and resilience to vandalism.

E53.4 Method of Measurement

E53.4.1 Composite Wood Benches shall be measured on a linear meter basis. The area to be paid for shall be the total number of linear meters that are installed in accordance with this Specification and the Construction Drawings, and as acceptable to the Contract Administrator.

E53.5 Basis of Payment

E53.5.1 Composite Wood Benches will be paid for at the Contract Unit Prices per linear meter for "Composite Wood Bench" measured as specified herein, which price shall be payment in full for supplying all labour, equipment and materials, and performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E54. ORGANIC MULCH

E54.1 Description

E54.1.1 The Work to be done by the Contractor under this Specification shall include the furnishing 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 as shown on the Drawings and as hereinafter specified, including, but not necessarily confined to the following:

(a) Supply and Installation of Organic Wood Mulch.

E54.2 Materials

E54.2.1 Mulch

(a) Enviro Mulch shall be Charcoal Black Colour, free of leaves, branches and other extraneous matter. The recommended mulch shall consist of chips not less than 15mm not larger than 75mm in size and not more than 20mm thick.

(b) Contact for Enviro Mulch:
St. Boniface Pallet Company
220 Panet Road

Winnipeg. MB R2J 0S3

Telephone No. (204) 233-0383
Facsimile No. (204) 233-6633
Email: info@stbpallet.com

E54.3 Construction Methods

E54.3.1 Supply and Installation of Mulch

(a) Contractor to supply and install mulch in tree pit, planters and in areas as indicated in the Drawings.

(b) Mulch supplied shall cover entire planting area to a consistent depth of 50mm and must not be placed within 8cm (3in.) of the trunks of trees.

(c) Mulch to be removed and disposed of when native seeding occurs.

E54.4 Method of Measurement

E54.4.1 Organic Mulch shall be measured on a square meter basis. The area to be paid for shall be the total number of linear meters that are installed in accordance with this Specification and the Construction Drawings, and as acceptable to the Contract Administrator.

E54.5 Basis of Payment

E54.5.1 Organic Mulch will be paid for at the Contract Unit Prices per square meter for "Organic Mulch" measured as specified herein, which price shall be payment in full for supplying all labour, equipment and materials, and performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

STRUCTURAL

E55. ASSINIBOINE PARK GATE RELOCATION

E55.1 Description

(a) This specification in addition to specification provided on the Drawings shall cover the relocation of the entrance gates to the East Assiniboine Park. The entrance is located in the vicinity of intersection of Wellington Crescent and Park Boulevard.

(b) The type and alignment of the existing underground power feed to gate is unknown. The Contractor shall be responsible for locating and realigning the underground power feed to the relocated gate structure.

E55.2 Materials

(a) Refer to Drawings for information on construction materials as they relate to gate relocation work. Material specifications provided on the Drawings take precedence over the material specifications provided anywhere else in this project documentation.

E55.3 Construction Methods

(a) The Contractor shall take every reasonable precautionary measure to avoid damaging the existing gate structure during its relocation.

(b) The Contractor shall provide written plan of gate relocation identifying every step of relocation to Contract Administrator for review and approval. Gate relocation shall not commence prior to relocation plan approval is granted.

(c) The Contractor shall locate and realign the underground power feed to the relocated gate and make the necessary electrical connections.

(i) Locate existing power feed to existing gates.

(ii) Disconnect from power at source.

(iii) Expose existing feed and make splice connection at locations approved by the Contract Administrator.

(iv) Install new power feed from splice to relocated gate structures and make necessary connections.

(v) Coordinate work with Assiniboine Park Conservancy.

E55.4 Measurement and Payment

(a) All gate relocation work according to Drawings L13 and L14 will be paid on a lump sum and percentage completion basis. Percentage completion will be as determined by the Contract Administrator.

(b) Realigning the underground power feed to the relocated gate will be measured on a linear metre basis and paid at the Contract unit price for “Realign Gate Electrical Feed”. The price shall include all work completed in accordance with this Specification and as shown on the Drawings, as measured in the field and accepted by the Contract Administrator.

APPENDIX ‘A’

GEOTECHNICAL REPORT

APPENDIX 'A' - GEOTECHNICAL REPORT

TABLE OF CONTENTS

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.

Geotechnical Report for 2020 Detailed Design Investigations (Shallow Testholes for Roadworks)

Test Hole Locations

Summary of Core Samples

City of Winnipeg - Public Works
Wellington Crescent Riverbank, Path, and Roadway Works
Detailed Design Geotechnical Investigations

Testhole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Location (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (m)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Plastic Limit	Liquid Limit	Plasticity Index
TH20-06	South lane of Wellington Cres., 25 m east of Grenfell Blvd.	Asphalt	50	20 mm Limestone	125	Pavement Structure	0.2	6.4							
						Clay (CH)	0.4	20.4				N/A			
							0.6	30.0							
							0.9	37.3							
		Concrete	150				1.2	35.6							
							1.5	35.9							
							2.1	38.2							
							2.7	41.9							
TH20-07	South Boulevard (30 m east of Girton Blvd.)	N/A		N/A	N/A	Clay Fill (CH)	0.0	22.0							
							0.3	25.4							
							0.6	26.7							
							0.9	26.6				N/A			
							1.2	22.5							
						Sand	1.5	15.3							
						Clay (CH)	2.1	19.6							
							2.7	27.0							
TH20-08	South Boulevard (6 m east of Chataway Blvd.)	N/A		N/A	N/A	Topsoil	0.0	26.0							
						Clay Fill (CH)	0.3	14.6							
							0.6	19.3							
							0.9	20.2	0	1	55	44	62	22	40
							1.2	24.3							
							1.5	22.8							
						Clay (CH)	2.1	27.5	0	1	60	39	56	21	35
							2.7	22.3							
TH20-09	South Boulevard (85 m east of Chataway Blvd.)	N/A		N/A	N/A	Topsoil	0.0	17.1							
						Clay (CH)	0.3	27.5							
							0.6	33.5							
							0.9	33.5				N/A			
							1.2	34.9							
							1.5	30.5							
							2.1	29.1							
							2.7	32.7							
TH20-10	South Boulevard (95 m west of Doncaster St.)	N/A		N/A	N/A	Topsoil	0.0	14.0							
							0.3	28.1							
						Clay Fill (CH)	0.6	26.7							
							0.9	25.0							
							1.2	25.0				N/A			
							1.5	20.5							
							2.1	20.7							
							2.7	32.6							
						Clay (CH)	3.0	23.8							
							4.3	22.6							
TH20-11	South Boulevard (12m east of Chataway Blvd.)	N/A		N/A	N/A	Topsoil	0.0	21.4							
						Clay (CH)	0.3	29.6							
							0.6	29.4							
							0.9	36.9				N/A			
							1.2	39.8							
							1.5	45.0							
							2.1	48.3							
							2.7	51.2							
TH20-12	North lane of Fulham Ave., 12 m east of Doncaster St.	Asphalt	50	20 mm Granular	1200	Pavement Structure	0.2	-							
							0.3	19.7							
							0.6	30.6	25	41	27	7	-	-	-
							0.9	12.7							
		Concrete	165				1.2	6.3							
						Clay (CH)	1.5	26.4							
							2.1	39.1							
							2.7	49.5							
TH20-13	North lane of Fulham Ave. 8 m west from Frank St.	Asphalt	75	20 mm Granular	700	Pavement Structure	0.2	8.1							
							0.3	7.6							
							0.6	27.4							
						Clay (CH)	0.9	32.6				N/A			
		Concrete	150				1.2	35.0							
							1.5	40.9							
							2.1	44.7							
							2.7	43.0							

TH20-14	South lane of Wellington Cres., 19 m east of Doncaster St.	Asphalt	90	20 mm Limestone	125	Pavement Structure	0.3	9.8				N/A			
						Clay (CH)	0.4	33.0							
							0.6	34.1							
							0.9	35.0							
		Concrete	200				1.2	36.9							
							1.5	35.2							
							2.1	43.3							
							2.7	50.2							

Notes:

i. Bulk sample for Proctor and CBR testing taken from TH20-07 to TH20-11 native clay samples.
ii. Proctor results consist of:
    1. Maximum Dry Density = 1530 kg/m3
    2. Optimum Moisture Content = 24.5%
iii. CBR value for sample prepared at the maximum dry density and optimum moisture content consists of:
    1. 4.6 at 2.54 mm Penetration
    2. 3.6 at 5.08 mm Penetration

Proctor Test Results

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

CERTIFIED BY CCIL Canadian Council of Independent Laboratories For specific tests as listed on www.ccil.com

PROCTOR TEST REPORT

TO KGS Group Inc.
3rd Floor - 865 Waverley St
Winnipeg, MB
R3T 5P4

ATTN: Nolan Bray

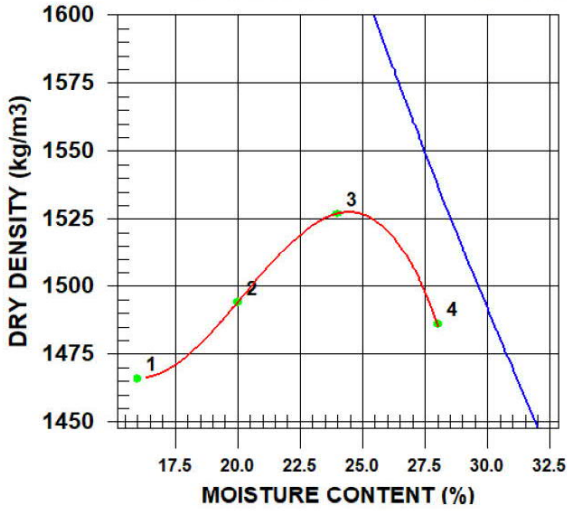
CLIENT KGS Group Inc.
C.C.

PROJECT Wellington Crescent Prelim Design

PROJECT NO. 123314092
PROCTOR NO. 1 DATE SAMPLED 2020.Aug.27 DATE RECEIVED 2020.Aug.28 DATE TESTED 2020.Sep.03

INSITU MOISTURE 38.5 %
TESTED BY Donald Eliazar
MATERIAL IDENTIFICATION
MATERIAL USE Subgrade
MAX. NOMINAL SIZE
MATERIAL TYPE Clay
SUPPLIER
SOURCE Existing Material

COMPACTION STANDARD Standard Proctor, ASTM D698
COMPACTION PROCEDURE A: 101.6mm Mold, Passing 4.75mm
RAMMER TYPE Manual
PREPARATION Dry
OVERSIZE CORRECTION METHOD None
RETAINED 4.75mm SCREEN



TRIAL NUMBER	WET DENSITY (kg/m3)	DRY DENSITY (kg/m3)	MOISTURE CONTENT (%)
1	1700	1466	16.0
2	1793	1494	20.0
3	1894	1527	24.0
4	1902	1486	28.0

	MAXIMUM DRY DENSITY (kg/m3)	OPTIMUM MOISTURE CONTENT (%)
CALCULATED	1530	24.5
OVERSIZE CORRECTED		

COMMENTS

Material tested was identified by the client as a composite sample of clay taken from TH20-07, TH20-08, TH20-09, TH20-10 & TH20-11.

Page 1 of 1 2020.Sep.04

REVIEWED BY Jason Thompson, C.E.T.

CBR Test Results

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

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

TO KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, Manitoba
R3T 5P4

ATTN: Nolan Bray

PROJECT Wellington Crescent Preliminary Design (18-0107-011, 2200.01)

PROJECT NO. 123314092

REPORT NO. 1 (Data page - see Page 2 for Chart)

DATE SAMPLED: Not Provided
SAMPLED BY: KGS Group

DATE RECEIVED: 2020.Aug.28
SUBMITTED BY: KGS Group

DATE TESTED: 2020.Sep.04
TESTED BY: Lynn Memita

MATERIAL IDENTIFICATION

MATERIAL USE	Subgrade	SUPPLIER	Existing Material
MAX. NOMINAL SIZE	< 4.75 mm	SOURCE	Site
MATERIAL TYPE	Clay	SAMPLE LOCATION	TH20-07 to TH20-11 Composite
SPECIFICATION	Not Applicable		

IMMERSION PERIOD	96 ± 2 hr	TARGET MAX. DRY DENSITY	1530 kg/m^3
		TARGET OPTIMUM MOISTURE	24.5 %
CONDITION OF SAMPLE	Soaked		
		AS-COMPACTED MAX. DRY DENSITY	1521 kg/m^3
SURCHARGE MASS	4.54 kg	AS-COMPACTED MOISTURE CONTENT	24.2 %
SWELL OF SAMPLE	2.6%	POST-TEST MOISTURE CONTENT (TOP 25 mm)	33.3 %

CBR VALUE AT **2.54 mm** PENETRATION	**4.6**
CBR VALUE AT **5.08 mm** PENETRATION	**3.6**

COMMENTS:
Sample prepared at the maximum dry density and optimum moisture content determined from ASTM D698.

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

REPORT DATE 2020.Sep.09

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

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

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

TO KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, Manitoba
R3T 5P4

ATTN: Nolan Bray

PROJECT Wellington Crescent Preliminary Design (18-0107-011, 2200.01)

PROJECT NO. 123314092

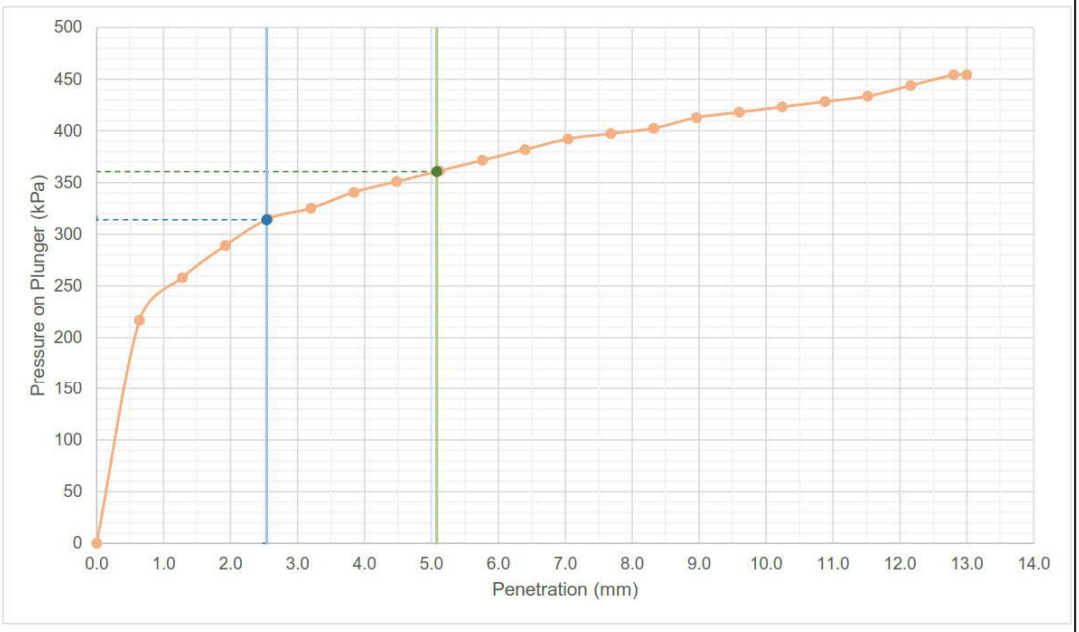
REPORT NO. 1 (Chart page - See Page 1 for Data)

DATE SAMPLED: Not Provided
SAMPLED BY: KGS Group

DATE RECEIVED: 2020.Aug.28
SUBMITTED BY: KGS Group

DATE TESTED: 2020.Sep.04
TESTED BY: Lynn Memita

LOAD PENETRATION CURVE



REPORT DATE 2020.Sep.09

Test Hole Log for TH20-06

KGS GROUP

TEST HOLE LOG

HOLE NO. **TH20-06**

SHEET 1 of 1

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	231.83 m
LOCATION	Winnipeg, MB	**DATE DRILLED**	8/19/2020
DESCRIPTION	South lane of Wellington Crescent, 25 m east of Grenfell Boulevard	**UTM (m)**	N 5,526,064.46
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer		E 628,276.42
METHOD(S)	0.0 m to 3.0 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	WATER LEVEL	SAMPLE TYPE	NUMBER / RUN
231	0	0		**ASPHALT** - 50 mm thickness.	231.8			
				CONCRETE - 150 mm thickness.	231.6			
				GRANULAR FILL - Brown, dry, 125 mm thickness, well graded, fine to coarse grained sand, fine gravel, 20 mm max particle size.	231.5			
	1	5		**CLAY (CH)** - Black, dry to damp, very stiff, high plasticity, trace organics, trace rootlets. - Brown below 0.8 m.				S1
230	2							S2
								S3
								S4
				- Mottled brown and grey, damp, trace silt inclusions below 1.5 m.				S5
								S6
229	3	10						S7
					228.8			S8
228	4							
		15						
227	5							
226	6	20						
225	7							
		25						
224	8							
223	9	30						
222	10							
		35						

PL MC LL

Cu TORVANE (kPA) ◆

Cu POCKET PEN (kPA) ★

SPT (N) BLOWS/0.30 m ▲ 20 40 60 80

Notes:
1. End of test hole at 3.0 m.
2. Test hole caved to 2.7 m upon completion of drilling.
3. Test hole backfilled with auger cuttings and bentonite chips.
4. 1.2 m offset from curb, 25 m from Grenfell Boulevard.

WATER LEVELS ▼ **Upon Completion of Drilling** on 8/19/2020 None Encountered

CONTRACTOR **Paddock Drilling**	INSPECTOR **N. BRAY**
APPROVED C. ROBAK	DATE 9/11/2020

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Test Hole Log for TH20-07

KGS GROUP

TEST HOLE LOG

HOLE NO. **TH20-07**

SHEET 1 of 1

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	231.14 m
LOCATION	Winnipeg, MB	**DATE DRILLED**	8/20/2020
DESCRIPTION	Boulevard 30 m east of Girton Boulevard (on re-alignment)	**UTM (m)**	N 5,526,091.5
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer		E 628,389.35
METHOD(S)	0.0 m to 3.0 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	WATER LEVEL	SAMPLE TYPE	NUMBER
231				**CLAY FILL** - Brown, dry to damp, very stiff, high plasticity, trace fine grained sand, trace rootlets, trace organics.				S1
230	1	5			229.6			S2
				POORLY GRADED SAND (SP) - Brown, damp, fine grained sand.	229.5			S3
229	2			**CLAY (CH)** - Brown, damp, very stiff, high plasticity, some silt, trace fine to medium grained sand.				S4
	3	10			228.1			S5
228				Notes: 1. End of test hole at 3.0 m. 2. Test hole remained open to 3.0 m upon completion of drilling. 3. Test hole backfilled with auger cuttings and bentonite chips.				S6
227	4	15						S7
226	5							S8
225	6	20						
224	7	25						
223	8							
222	9	30						
221	10							
		35						

PL MC LL

Cu TORVANE (kPA) ◆

Cu POCKET PEN (kPA) ★

SPT (N) BLOWS/0.30 m ▲

20 40 60 80

WATER LEVELS ▼ **Upon Completion of Drilling** on 8/20/2020 None Encountered

CONTRACTOR **Paddock Drilling**	INSPECTOR **N. BRAY**
APPROVED C. ROBAK	DATE 9/11/2020

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Test Hole Log for TH20-08

KGS GROUP

TEST HOLE LOG

HOLE NO. **TH20-08**

SHEET 1 of 1

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	231.27 m
LOCATION	Winnipeg, MB	**DATE DRILLED**	8/20/2020
DESCRIPTION	Boulevard 6 m east of Chataway Boulevard (on re-alignment)	**UTM (m)**	N 5,526,071.16
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer		E 628,471.24
METHOD(S)	0.0 m to 3.0 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	WATER LEVEL	SAMPLE TYPE	NUMBER
231	0	0		**TOPSOIL/ORGANICS** - Black, dry, friable, some fine gravel.	231.0			S1
				CLAY FILL - Brown, dry, very stiff, high plasticity, friable, trace fine to coarse sand, trace rootlets, trace organics. - Trace fine gravel to 0.3 m. - LL=62, PL=22, PI=40 at 0.9 m. - PSA: 0% gravel, 1% sand, 55% silt, 44% clay at 0.9 m.				S2
230	1	5						S3
					229.7			S4
				CLAY (CH) - Mottled grey/brown, damp, very stiff, high plasticity, trace silt inclusions.				S5
229	2							S6
				- LL=56, PL=21, PI=35 at 2.1 m. - PSA: 0% gravel, 1% sand, 60% silt, 39% clay at 2.1 m. - Increased silt content below 2.4 m.				S7
	3	10			228.2			S8
228				Notes: 1. End of test hole at 3.0 m. 2. Test hole caved to 2.7 m upon completion of drilling. 3. Test hole backfilled with auger cuttings and bentonite chips.				
227	4	15						
226	5							
225	6	20						
224	7	25						
223	8							
222	9	30						
221	10	35						

PL MC LL
Cu TORVANE (kPA) ◆
Cu POCKET PEN (kPA) ★
SPT (N) BLOWS/0.30 m ▲
20 40 60 80

WATER LEVELS ▼ **Upon Completion of Drilling** on 8/20/2020 None Encountered

CONTRACTOR **Paddock Drilling**	INSPECTOR **N. BRAY**
APPROVED C. ROBAK	DATE 9/11/2020

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Test Hole Log for TH20-09

KGS GROUP

TEST HOLE LOG

HOLE NO. **TH20-09**

SHEET 1 of 1

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	231.21 m
LOCATION	Winnipeg, MB	**DATE DRILLED**	8/20/2020
DESCRIPTION	Boulevard 85 m east of Chataway Boulevard (on re-alignment)	**UTM (m)**	N 5,526,057.3
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer		E 628,549.33
METHOD(S)	0.0 m to 3.0 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	WATER LEVEL	SAMPLE TYPE	NUMBER
231	0	0		**TOPSOIL/ORGANICS** - Black, dry, friable, some fine to coarse grained sand, trace fine gravel.	230.8			S1
				CLAY (CH) - Mottled grey/brown, damp, stiff, high plasticity, trace silt inclusions, trace fine grained sand.				S2
230	1	5						S3
								S4
								S5
229	2							S6
								S7
	3	10		- Firm, moist below 2.7 m.	228.2			S8
228				Notes: 1. End of test hole at 3.0 m. 2. Test hole caved to 2.7 m upon completion of drilling. 3. Test hole backfilled with auger cuttings and bentonite chips.				
227	4	15						
226	5							
225	6	20						
224	7	25						
223	8							
222	9	30						
221	10	35						

PL MC LL
Cu TORVANE (kPA) ◆
Cu POCKET PEN (kPA) ★
SPT (N) BLOWS/0.30 m ▲
20 40 60 80

WATER LEVELS ▼ **Upon Completion of Drilling** on 8/20/2020 None Encountered

CONTRACTOR **Paddock Drilling**	INSPECTOR **N. BRAY**
APPROVED C. ROBAK	DATE 9/11/2020

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Test Hole Log for TH20-10

KGS GROUP

TEST HOLE LOG

HOLE NO. **TH20-10**

SHEET 1 of 1

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	233.02 m
LOCATION	Winnipeg, MB	**DATE DRILLED**	8/20/2020
DESCRIPTION	Boulevard 95 m west of Doncaster St (on re-alignment)	**UTM (m)**	N 5,526,045.56
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer		E 628,653.62
METHOD(S)	0.0 m to 4.6 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	WATER LEVEL	SAMPLE TYPE	NUMBER
232	1	5		**TOPSOIL/ORGANICS** - Black.	232.4			S1
				CLAY FILL - Grey and black, dry to damp, very stiff, intermediate to high plasticity, trace organics, trace fine to coarse sand, trace rootlets.				S2
								S3
								S4
231	2							S5
								S6
								S7
230	3	10			230.0			S8
				CLAY (CH) - Mottled grey/brown, damp, stiff, high plasticity, trace silt inclusions, some fine to coarse grained sand, trace fine gravel.				S9
229	4			- Some silt inclusions below 4.0 m.				
		15			228.4			S10
228	5			Notes: 1. End of test hole at 4.6 m. 2. Test hole caved to 4.3 m upon completion of drilling. 3. Test hole backfilled with auger cuttings and bentonite chips.				
227	6	20						
226	7							
		25						
225	8							
224	9	30						
223	10							
		35						

PL MC LL

Cu TORVANE (kPA) ◆

Cu POCKET PEN (kPA) ★

SPT (N) BLOWS/0.30 m ▲

20 40 60 80

WATER LEVELS ▼ **Upon Completion of Drilling** on 8/20/2020 None Encountered

CONTRACTOR **Paddock Drilling**	INSPECTOR **N. BRAY**
APPROVED C. ROBAK	DATE 9/11/2020

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Test Hole Log for TH20-11

KGS GROUP

TEST HOLE LOG

HOLE NO. **TH20-11**

SHEET 1 of 1

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	233.57 m
LOCATION	Winnipeg, MB	**DATE DRILLED**	8/20/2020
DESCRIPTION	Boulevard 12 m west of Doncaster St (on re-alignment)	**UTM (m)**	N 5,526,062.75
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer		E 628,736.35
METHOD(S)	0.0 m to 3.0 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	WATER LEVEL	SAMPLE TYPE	NUMBER
233	0	0		**TOPSOIL/ORGANICS** - Black, dry, friable.	233.3			S1
	1	5		**CLAY (CH)** - Mottled grey/brown, dry, stiff, high plasticity, trace fine to coarse grained sand, trace fine gravel. - Increased silt content to 0.6 m.				S2
232								S3
	2			- Damp, trace to some silt inclusions (1 to 5 mm dia.) below 1.5 m.				S4
231								S5
	3	10		- Firm below 2.7 m.	230.5			S6
230	4	15		Notes: 1. End of test hole at 3.0 m. 2. Test hole remained open to 3.0 m upon completion of drilling. 3. Test hole backfilled with auger cuttings and bentonite chips.				S7
229	5							S8
228								
227	6	20						
226	7	25						
225	8							
224	9	30						
223	10	35						

PL MC LL

Cu TORVANE (kPA) ◆

Cu POCKET PEN (kPA) ★

SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)

WATER LEVELS ▼ **Upon Completion of Drilling** on 8/20/2020 None Encountered

CONTRACTOR **Paddock Drilling**	INSPECTOR **N. BRAY**
APPROVED C. ROBAK	DATE 9/11/2020

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Test Hole Log for TH20-12

KGS GROUP — **TEST HOLE LOG** — HOLE NO. **TH20-12** — **SHEET 1 of 1**

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	233.95 m
LOCATION	Winnipeg, MB	**DATE DRILLED**	8/19/2020
DESCRIPTION	North lane of Fulham Ave, 12 m east of Doncaster St.	**UTM (m)**	N 5,526,076.88
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer		E 628,771.39
METHOD(S)	0.0 m to 3.0 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	WATER LEVEL	SAMPLE TYPE	NUMBER / RUN	PL MC LL; Cu TORVANE (kPA) ◆; Cu POCKET PEN (kPA) ★; SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)
233	1 — 5		**ASPHALT** - 50 mm thickness.	233.9			S1	
			CONCRETE - 165 mm thickness.	233.7			S2	
			GRANULAR FILL - Brown, dry, well-graded, 20 mm max particle size. - PSA: 25% gravel, 41% sand, 27% silt, 7% clay at 0.6 m.				S3	
				232.6			S4	
232	2 — 10		**CLAY (CH)** - Mottled grey/brown, damp, stiff, high plasticity, trace silt inclusions (1 to 5 mm dia.). - Trace fine gravel to 1.4 m.				S5	
							S6	◆
							S7	
231	3 — 10			230.9			S8	◆
230	4 — 15		Notes: 1. End of test hole at 3.0 m. 2. Test hole remained open to 3.0 m upon completion of drilling. 3. Test hole backfilled with auger cuttings and bentonite chips. 4. 2 m offset from curb, 12 m from Doncaster St.					
229	5 — 15							
228	6 — 20							
227	7 — 25							
226	8 — 25							
225	9 — 30							
224	10 — 35							

WATER LEVELS ▼ **Upon Completion of Drilling** on 8/20/2020 None Encountered

CONTRACTOR **Paddock Drilling**	INSPECTOR **N. BRAY**
APPROVED C. ROBAK	DATE 9/11/2020

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Test Hole Log for TH20-13

KGS GROUP

TEST HOLE LOG

HOLE NO. **TH20-13**

SHEET 1 of 1

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	234.31 m
LOCATION	Winnipeg, MB	**DATE DRILLED**	8/20/2020
DESCRIPTION	North lane of Fulham Ave, 8 m west of Frank St.	**UTM (m)**	N 5,526,112
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer		E 628,849.59
METHOD(S)	0.0 m to 3.0 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	WATER LEVEL	SAMPLE TYPE	NUMBER / RUN
234				**ASPHALT** - 75 mm thickness.	234.2			S1
				CONCRETE - 150 mm thickness.	234.1			S2
				GRANULAR FILL - Brown, damp, well-graded, fine to coarse grained sand, some fine grained gravel, 20 mm max particle size.	233.4			S3
233	1	5		**CLAY (CH)** - Mottled grey/brown, damp, high plasticity, trace fine to coarse grained sand.				S4
				- Trace silt inclusions (1 to 5 mm dia.).				S5
232	2							S6
								S7
	3	10		- Firm below 2.7 m.	231.3			S8
231	4			Notes: 1. End of test hole at 3.0 m. 2. Test hole caved to 1.8 m upon completion of drilling. 3. Test hole backfilled with auger cuttings and bentonite chips. 4. 1.5 offset from curb, 8 m from Frank St.				
230		15						
	5							
229								
	6	20						
228								
	7							
227		25						
	8							
226								
	9	30						
225								
	10							
224		35						

PL MC LL
Cu TORVANE (kPA) ◆
Cu POCKET PEN (kPA) ★
SPT (N) BLOWS/0.30 m ▲
20 40 60 80

WATER LEVELS ▼ **Upon Completion of Drilling** on 8/20/2020 None Encountered

CONTRACTOR **Paddock Drilling**	INSPECTOR **N. BRAY**
APPROVED C. ROBAK	DATE 9/11/2020

KGS_LOG_U:\FMS\18-0107-011\WELLINGTON DD.GPJ

Test Hole Log for TH20-14

KGS GROUP — **TEST HOLE LOG** — HOLE NO. **TH20-14** — **SHEET 1 of 1**

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	233.90 m
LOCATION	Winnipeg, MB	**DATE DRILLED**	8/19/2020
DESCRIPTION	South lane of Wellington Crescent, 19 m east of Doncaster St.	**UTM (m)**	N 5,526,095.04
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer		E 628,775.26
METHOD(S)	0.0 m to 3.0 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	SAMPLE TYPE	NUMBER / RUN
				ASPHALT - 90 mm thickness.	233.8		
				CONCRETE - 200 mm thickness.	233.6		
				GRANULAR FILL - Brown, damp, 125 mm thickness, well-graded, medium to coarse grained sand, fine gravel, 20 mm max particle size.	233.5		
233	1	5		**CLAY (CH)** - Dark grey, dry to damp, very stiff, high plasticity.			S1
				- Some medium to coarse grained sand, trace fine gravel to 0.6 m.			S2
				- Mottled brown and grey, trace silt inclusions below 1.2 m.			S3
232	2			- Trace fine to coarse grained sand, trace fine gravel at 1.5 m.			S4
							S5
							S6
				- Increased moisture below 2.4 m.			S7
231	3	10			230.9		S8
230	4	15					
229	5						
228	6	20					
227	7						
226	8	25					
225	9	30					
224	10						
		35					

PL MC LL — Cu TORVANE (kPA) ◆ — Cu POCKET PEN (kPA) ★ — SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)

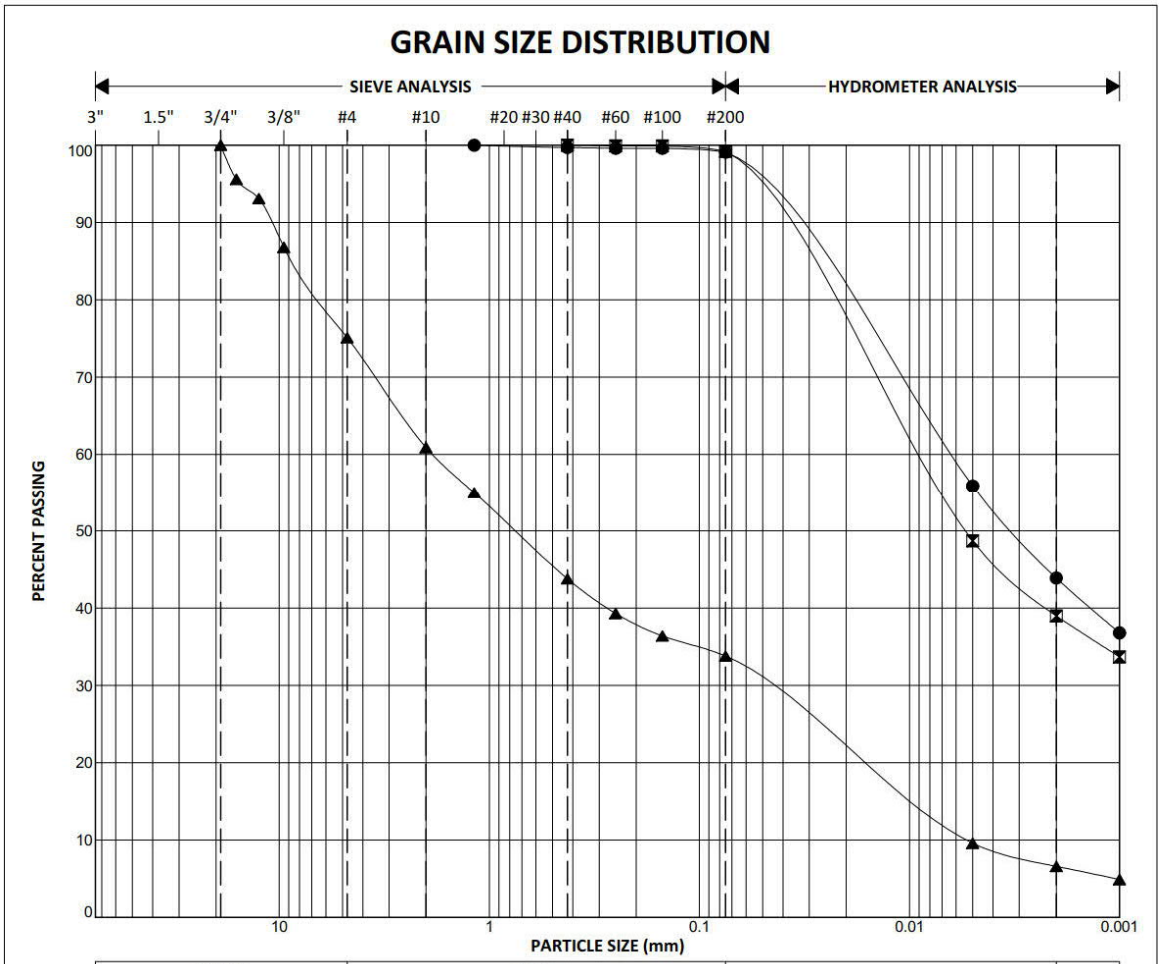
Notes:
1. End of test hole at 3.0 m.
2. Test hole remained open to 3.0 m upon completion of drilling.
3. Test hole backfilled with auger cuttings and bentonite chips.
4. 1.8 m offset from curb, 19 m from Doncaster St.

WATER LEVELS

CONTRACTOR **Paddock Drilling**	INSPECTOR **N. BRAY**
APPROVED C. ROBAK	DATE 9/11/2020

KGS_LOG_U:\FMS\18-0107-011\WELLINGTON DD.GPJ

Particle Size Analysis for TH20-08 and TH20-12



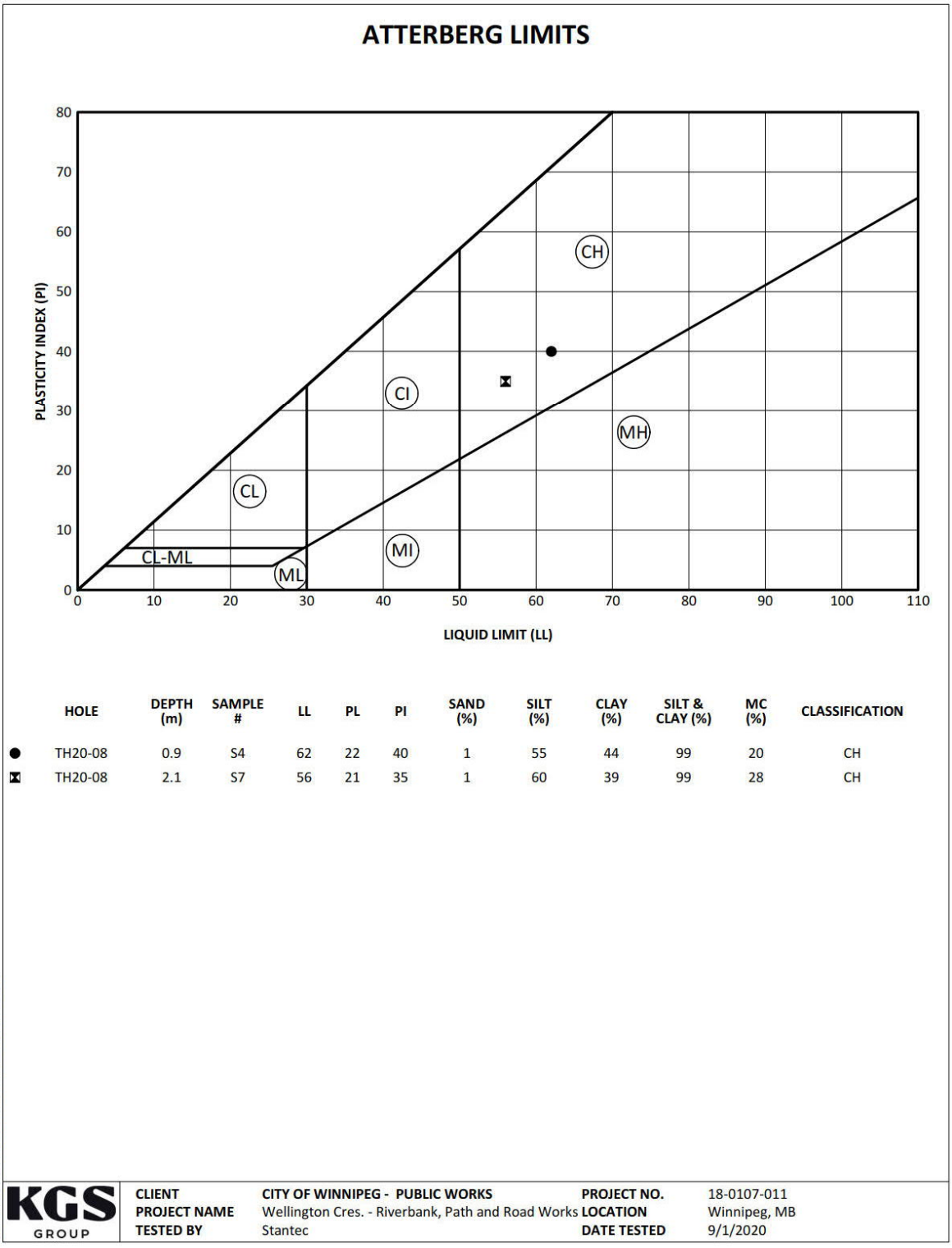
	HOLE	DEPTH (m)	SAMPLE #	GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)	SILT & CLAY (%)	Cu	Cc	CLASSIFICATION
●	TH20-08	0.9	S4	0	1	55	44	99			CH
⊠	TH20-08	2.1	S7	0	1	60	39	99			CH
▲	TH20-12	0.6	S3	25	41	27	7	34	352.9	0.2	GC-GM

SIEVE ANALYSIS U:\FMS\18-0107-011\WELLINGTON DD.GPJ

KGS GROUP

CLIENT	CITY OF WINNIPEG - PUBLIC WORKS	PROJECT NO.	18-0107-011
PROJECT NAME	Wellington Cres. - Riverbank, Path and Road Works	LOCATION	Winnipeg, MB
TESTED BY	Stantec	DATE TESTED	08/28/2020

Atterberg Limits for TH20-08



	HOLE	DEPTH (m)	SAMPLE #	LL	PL	PI	SAND (%)	SILT (%)	CLAY (%)	SILT & CLAY (%)	MC (%)	CLASSIFICATION
●	TH20-08	0.9	S4	62	22	40	1	55	44	99	20	CH
⧓	TH20-08	2.1	S7	56	21	35	1	60	39	99	28	CH

A-LINE PLOT U:\FMS\18-0107-011\WELLINGTON DD.GPJ

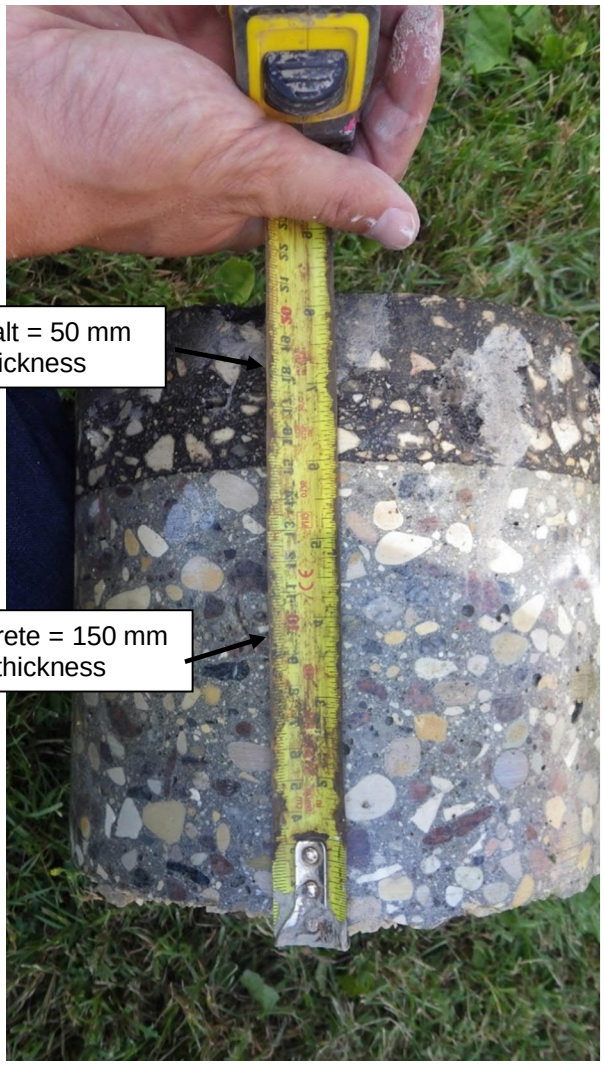
KGS GROUP

CLIENT	CITY OF WINNIPEG - PUBLIC WORKS	PROJECT NO.	18-0107-011
PROJECT NAME	Wellington Cres. - Riverbank, Path and Road Works	LOCATION	Winnipeg, MB
TESTED BY	Stantec	DATE TESTED	9/1/2020

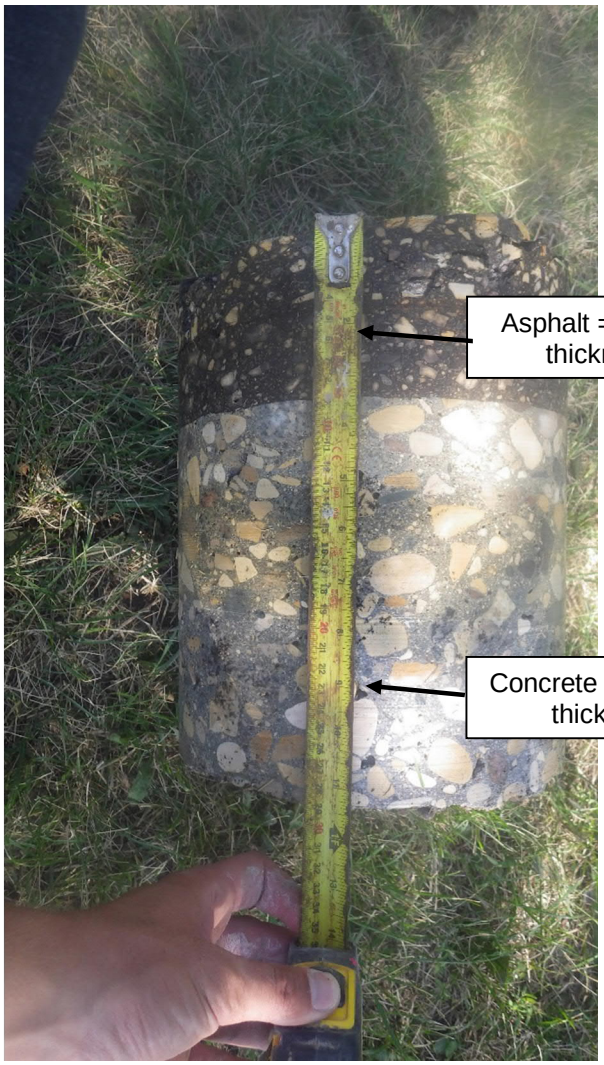
Pavement Core Photos

Wellington Crescent

TH20-06

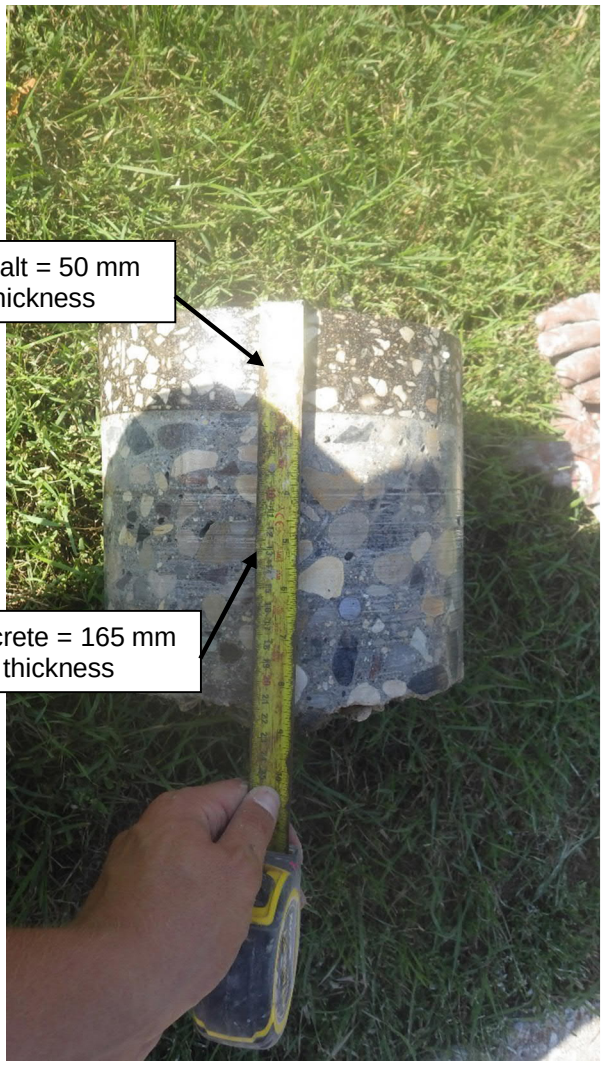


TH20-14

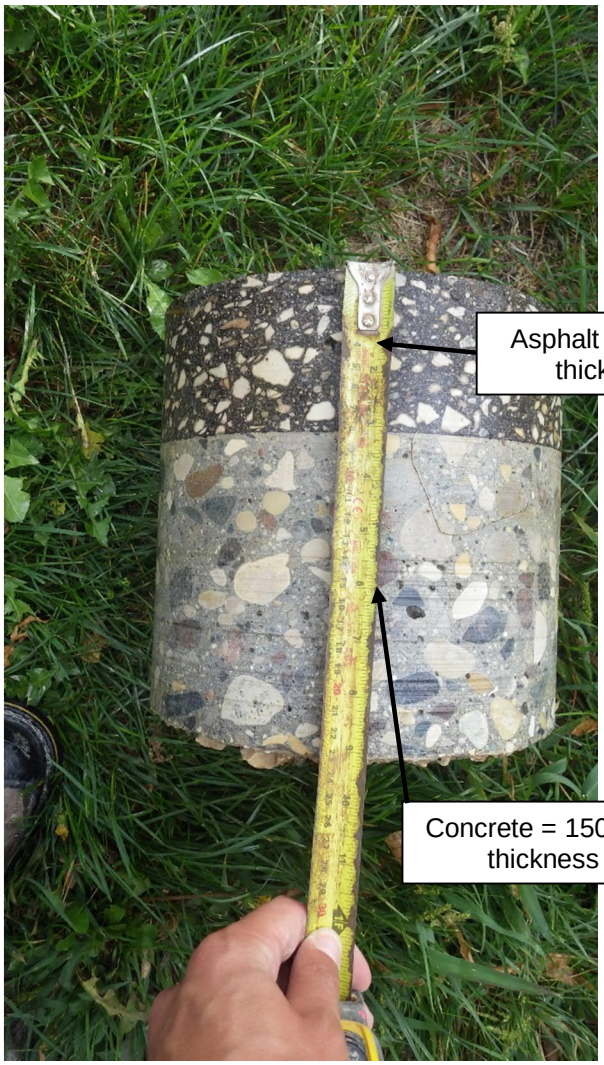


Fulham Ave.

TH20-12



TH20-13



Geotechnical Report for 2020 Detailed Design Investigations (Deep Testholes for Riverbank Works)

Test Hole Locations

Summary of Soil Samples

City of Winnipeg - Public Works
Wellington Crescent Riverbank, Path, and Roadway Works
Detailed Design Geotechnical Investigations

Testhole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Location (m)
		Type	Thickness (mm)	Type	Thickness (m)		
TH20-01	Upper Bank, 130 m West of Park Blvd.	N/A		N/A	N/A	Clay Fill	0.3
						Clay (CH)	1.1
							2.3
							3.8
							5.3
							6.9
							7.3
							8.2
							8.8
							9.1
						Silt Till	10.1
							10.7
TH20-03	Upper Bank, at Lamont Blvd.	N/A		N/A	N/A	Clay Fill (CH)	0.3
						Clay (CH)	0.9
							1.8
							3.5
							5.0
							6.6
							7.9
							8.5
						Silt Till	8.8
							9.6
							10.4
							11.1
							11.9
							12.2
TH20-04	Mid Bank, East of Bank Failure near Grenfell Blvd.	N/A		N/A	N/A	Topsoil	0.0
						Clay (CI)	1.2
							1.8
							2.4
							3.0
						Clay (CH)	4.0
							5.3
						Clay Till	6.7
						Silt Till	7.3
							8.2
							8.8
							9.1
							9.4
TH20-05	Upper Bank, at Doncaster Street, West of Gate Chamber	N/A		N/A	N/A	Clay Fill (CI)	0.8
							1.8
							2.3
						Clay (CH)	4.0
							4.6
						Clay Till	5.5

					Sand Till	6.1
					Silt Till	6.4
						7.3

Test Hole Log for TH20-01

KGS GROUP — **TEST HOLE LOG** — HOLE NO. **TH20-01** — **SHEET 1 of 2**

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	232.46 m
LOCATION	Winnipeg, MB	**DATE DRILLED**	8/20/2020
DESCRIPTION	Upper Bank, 130 m +/- West of Park Blvd.	**UTM (m)**	N 5,525,976.09 E 627,783.02
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer		
METHOD(S)	0.0 m to 10.8 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	WATER LEVEL	SAMPLE TYPE	NUMBER	RECOVERY %	BLOWS/0.15 m	N-VALUE
			TOPSOIL/ORGANICS - Black, dry, friable.	232.2						
232			**CLAY FILL** - Dark grey, dry, friable.	231.8			S1			
	1		**CLAY (CH)** - Brown, dry to damp, stiff, high plasticity, trace to some fine to coarse grained sand, trace rootlets.				S2			
231	5		- Mottled grey/brown, damp, trace silt inclusions (1-5mm dia.) below 1.5 m.							
	2						S3			
230										
	3		- Firm below 3.0 m.							
229	10									
	4		- Trace oxidation, trace gypsum inclusions (1 to 2 mm dia.) below 4.0 m.				S4			
228	15									
	5		- Damp to moist, trace to some silt inclusions (1 to 5 mm dia.) below 5.2 m.				S5			
227										
	6									
226	20									
	7		- Soft, trace fine grained gravel below 7.0 m.				S6			
225	25						S7			
	8									
224							S8			
	9		- Silt till inclusions below 8.8 m.		▼		S9			
	30						S10			
223				223.0						
	10		**SILT TILL** - Light brown, dry to damp, compact, low plasticity, some fine to coarse grained sand, some fine grained gravel, some clay.				S11			
222	35									

N-VALUE: PL — MC — LL; Cu TORVANE (kPa) ◆; Cu POCKET PEN (kPa) ★; SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)

WATER LEVELS ▼ **Upon Completion of Drilling** 8.84 m

CONTRACTOR **Paddock Drilling** — INSPECTOR **N. BRAY**

APPROVED C. ROBAK — DATE 9/11/2020

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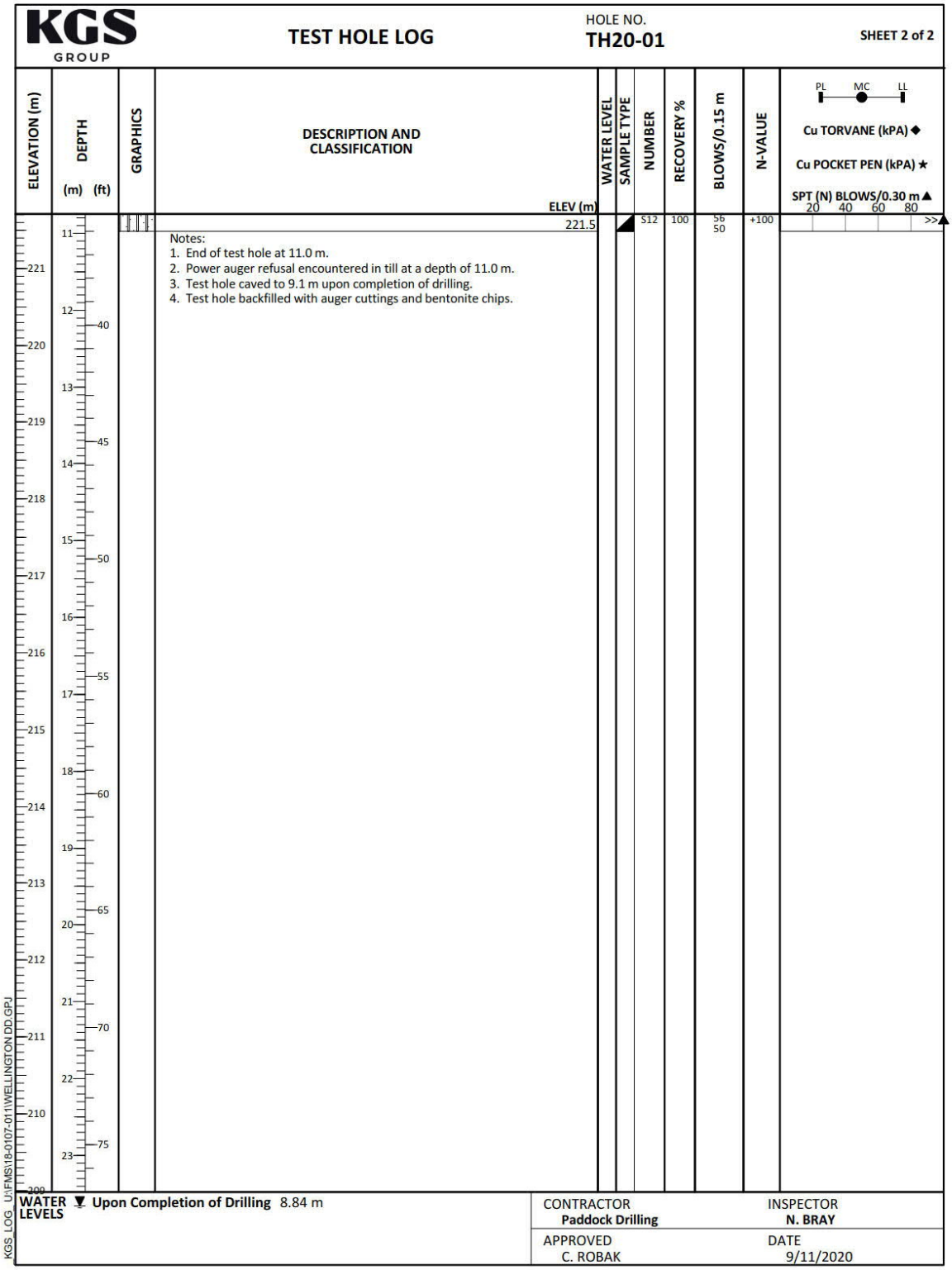

KGS GROUP

TEST HOLE LOG

HOLE NO. **TH20-01**

SHEET 2 of 2

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	WATER LEVEL	SAMPLE TYPE	NUMBER	RECOVERY %	BLOWS/0.15 m	N-VALUE	PL MC LL; Cu TORVANE (kPA) ◆; Cu POCKET PEN (kPA) ★; SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)
221	11				221.5			S12	100	56 50	+100	>>
220	12	40										
219	13	45										
218	14											
217	15	50										
216	16											
215	17	55										
214	18	60										
213	19											
212	20	65										
211	21	70										
210	22											
209	23	75										

Notes:
1. End of test hole at 11.0 m.
2. Power auger refusal encountered in till at a depth of 11.0 m.
3. Test hole caved to 9.1 m upon completion of drilling.
4. Test hole backfilled with auger cuttings and bentonite chips.

WATER LEVELS ▼ **Upon Completion of Drilling** 8.84 m

CONTRACTOR **Paddock Drilling**

INSPECTOR **N. BRAY**

APPROVED C. ROBAK

DATE 9/11/2020

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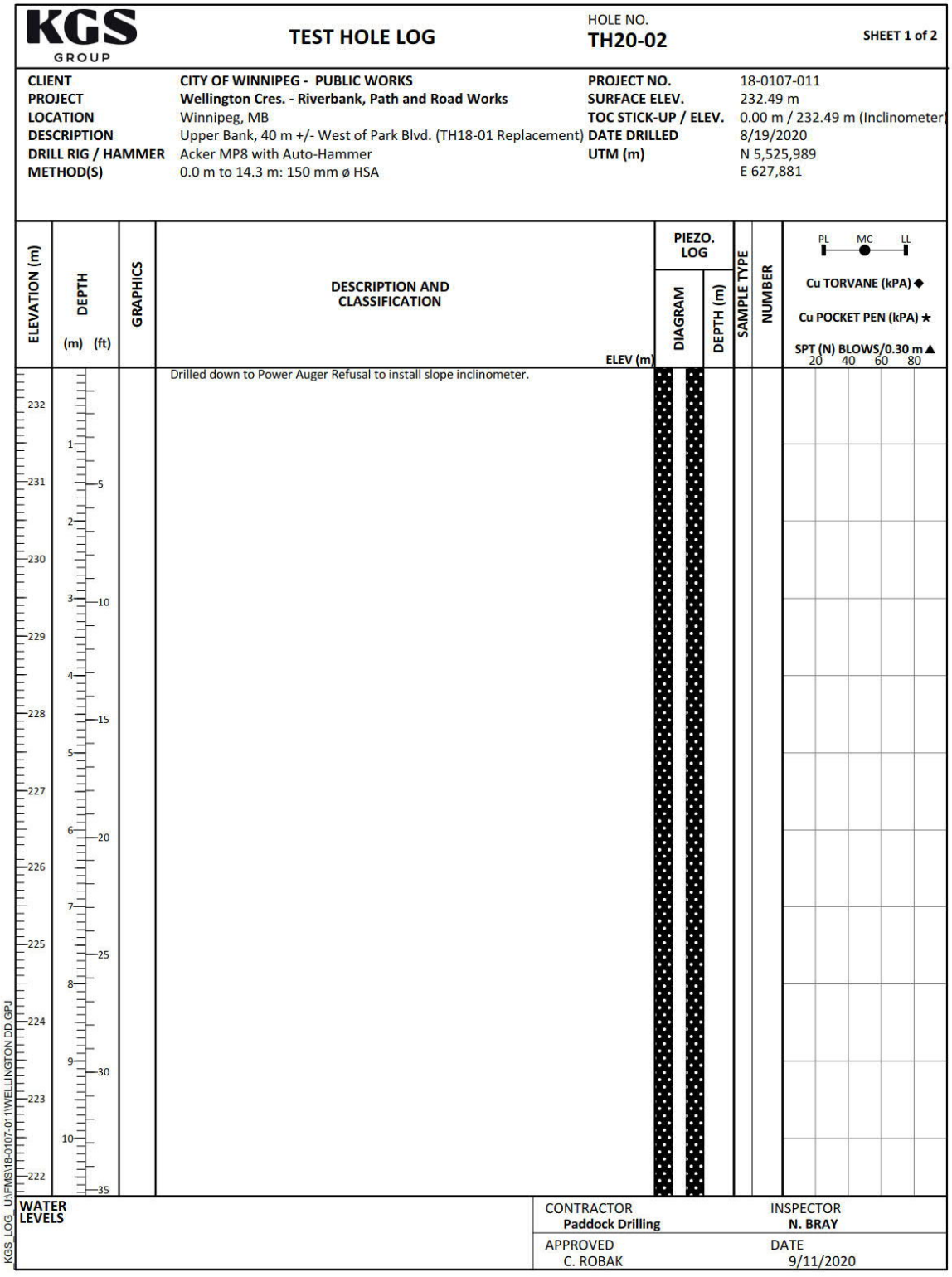
Test Hole Log for TH20-02



KGS GROUP

TEST HOLE LOG

HOLE NO. **TH20-02**

SHEET 1 of 2

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	232.49 m
LOCATION	Winnipeg, MB	**TOC STICK-UP / ELEV.**	0.00 m / 232.49 m (Inclinometer)
DESCRIPTION	Upper Bank, 40 m +/- West of Park Blvd. (TH18-01 Replacement)	**DATE DRILLED**	8/19/2020
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer	**UTM (m)**	N 5,525,989
METHOD(S)	0.0 m to 14.3 m: 150 mm ø HSA		E 627,881

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	PIEZO. LOG DIAGRAM	PIEZO. LOG DEPTH (m)	SAMPLE TYPE	NUMBER	PL MC LL; Cu TORVANE (kPA) ◆; Cu POCKET PEN (kPA) ★; SPT (N) BLOWS/0.30 m ▲ 20 40 60 80
232	0		Drilled down to Power Auger Refusal to install slope inclinometer.						
231	1 5								
230	2								
229	3 10								
228	4 15								
227	5								
226	6 20								
225	7 25								
224	8								
223	9 30								
222	10 35								

WATER LEVELS

CONTRACTOR **Paddock Drilling**

INSPECTOR **N. BRAY**

APPROVED C. ROBAK

DATE 9/11/2020

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KGS GROUP

TEST HOLE LOG

HOLE NO.
TH20-02

SHEET 2 of 2

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	PIEZO. LOG DIAGRAM	PIEZO. LOG DEPTH (m)	SAMPLE TYPE	NUMBER	PL MC LL; Cu TORVANE (kPa) ◆; Cu POCKET PEN (kPa) ★; SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)
221	11									
	12	40								
220										
	13									
219		45								
	14				218.2		14.3			
218				Notes: 1. End of test hole at 14.3 m. 2. Power auger refusal encountered in till at a depth of 14.3 m. 3. Slope inclinometer installed to a depth of 14.3 m. 4. Test hole backfilled with cement-bentonite grout.						
	15	50								
217										
	16									
216		55								
	17									
215										
	18	60								
214										
	19									
213		65								
	20									
212										
	21	70								
211										
	22									
210										
	23	75								

WATER LEVELS

CONTRACTOR	INSPECTOR
Paddock Drilling	**N. BRAY**
APPROVED	DATE
C. ROBAK	9/11/2020

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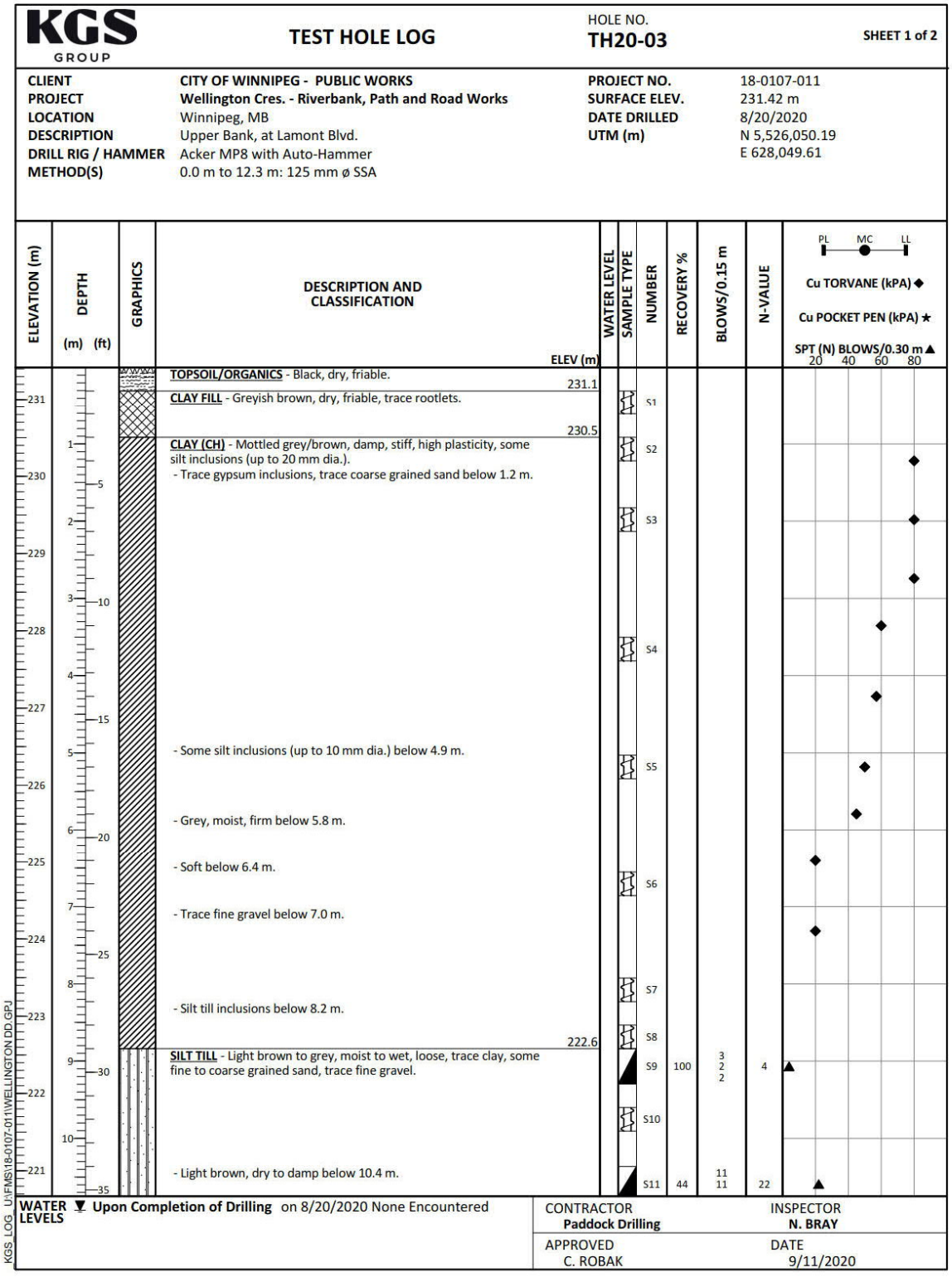
Test Hole Log for TH20-03



KGS GROUP

TEST HOLE LOG

HOLE NO. **TH20-03**

SHEET 1 of 2

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	231.42 m
LOCATION	Winnipeg, MB	**DATE DRILLED**	8/20/2020
DESCRIPTION	Upper Bank, at Lamont Blvd.	**UTM (m)**	N 5,526,050.19
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer		E 628,049.61
METHOD(S)	0.0 m to 12.3 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	DESCRIPTION AND CLASSIFICATION	ELEV (m)	SAMPLE TYPE	NUMBER	RECOVERY %	BLOWS/0.15 m	N-VALUE
231	0	0	**TOPSOIL/ORGANICS** - Black, dry, friable.	231.1					
			CLAY FILL - Greyish brown, dry, friable, trace rootlets.	230.5		S1			
230	1	5	**CLAY (CH)** - Mottled grey/brown, damp, stiff, high plasticity, some silt inclusions (up to 20 mm dia.). - Trace gypsum inclusions, trace coarse grained sand below 1.2 m.			S2			
229	2					S3			
228	3	10				S4			
227	4	15							
226	5		- Some silt inclusions (up to 10 mm dia.) below 4.9 m.			S5			
225	6	20	- Grey, moist, firm below 5.8 m. - Soft below 6.4 m.			S6			
224	7	25	- Trace fine gravel below 7.0 m.			S7			
223	8		- Silt till inclusions below 8.2 m.			S8			
			SILT TILL - Light brown to grey, moist to wet, loose, trace clay, some fine to coarse grained sand, trace fine gravel.	222.6		S9	100	3 2 2	4
222	9	30				S10			
221	10	35	- Light brown, dry to damp below 10.4 m.			S11	44	11 11	22

PL MC LL — Cu TORVANE (kPa) ◆ — Cu POCKET PEN (kPa) ★ — SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)

WATER LEVELS ▼ **Upon Completion of Drilling** on 8/20/2020 None Encountered

CONTRACTOR **Paddock Drilling** — INSPECTOR **N. BRAY**

APPROVED C. ROBAK — DATE 9/11/2020

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KGS GROUP

TEST HOLE LOG

HOLE NO. **TH20-03**

SHEET 2 of 2

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	WATER LEVEL	SAMPLE TYPE	NUMBER	RECOVERY %	BLOWS/0.15 m	N-VALUE	PL MC LL; Cu TORVANE (kPA) ◆; Cu POCKET PEN (kPA) ★; SPT (N) BLOWS/0.30 m ▲ (20 40 60 80)
220	11						S12		11		
219	12 — 40			219.1			S13 S14	33	5 8 20	28	▲
218	13 — 45										
217	14										
216	15 — 50										
215	16										
214	17 — 55										
213	18 — 60										
212	19										
211	20 — 65										
210	21 — 70										
209	22										
208	23 — 75										

Notes:
1. End of test hole at 12.6 m.
2. Power auger refusal encountered in till at a depth of 12.3 m.
3. Test hole caved to 10.7 m upon completion of drilling.
4. Test hole backfilled with auger cuttings and bentonite chips.

WATER LEVELS ▼ **Upon Completion of Drilling** on 8/20/2020 None Encountered

CONTRACTOR	INSPECTOR
Paddock Drilling	**N. BRAY**
APPROVED	DATE
C. ROBAK	9/11/2020

KGS_LOG_U:\FMS\18-0107-011\WELLINGTON DD.GPJ

Test Hole Log for TH20-04

KGS GROUP

TEST HOLE LOG

HOLE NO. **TH20-04**

SHEET 1 of 1

CLIENT	**CITY OF WINNIPEG - PUBLIC WORKS**	**PROJECT NO.**	18-0107-011
PROJECT	**Wellington Cres. - Riverbank, Path and Road Works**	**SURFACE ELEV.**	231.25 m
LOCATION	Winnipeg, MB	**DATE DRILLED**	8/20/2020
DESCRIPTION	Mid Bank, East of Bank Failure near Grenfell Blvd.	**UTM (m)**	N 5,526,095.68
DRILL RIG / HAMMER	Acker MP8 with Auto-Hammer		E 628,212.59
METHOD(S)	0.0 m to 9.6 m: 125 mm ø SSA		

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEV (m)	WATER LEVEL	SAMPLE TYPE	NUMBER	RECOVERY %	BLOWS/0.15 m	N-VALUE
231				**TOPSOIL/ORGANICS** - some sand / gravel.	230.9			S1			
				CLAY (CI) - Brown, dry, intermediate plasticity, friable, some fine to coarse grained sand, with silt.							
230	1	5						S2			
	2							S3			
229				- Damp, soft, decreased silt content below 2.4 m.				S4			
	3	10						S5			
228					227.9						
				CLAY (CH) - Mottled grey/brown, damp, stiff, high plasticity, trace silt inclusions (1 to 5 mm dia.), trace fine grained sand.							
	4							S6			
227		15		- Trace to some silt inclusions below 4.6 m.							
	5										
226				- Grey, soft, trace fine grained gravel below 5.2 m.				S7			
	6	20									
225					224.7						
				CLAY TILL - Light grey, wet, soft, intermediate plasticity, some silt, some fine to coarse grained sand, trace fine grained gravel.				S8			
	7				223.9						
224		25		**SILT TILL** - Light brown, moist, compact, some fine to coarse grained sand, some fine grained gravel, trace coarse grained gravel.				S9			
	8										
223				- Dry, very dense below 8.2 m.		▼		S10			
								S11			
222	9	30						S12	67	50/100mm	+100
					221.6			S13			
221	10			Notes: 1. End of test hole at 9.6 m. 2. Power auger refusal encountered in till at a depth of 9.6 m. 3. Test hole caved to 9.0 m upon completion of drilling. 4. Test hole backfilled with auger cuttings.							
		35									

PL MC LL
Cu TORVANE (kPA) ◆
Cu POCKET PEN (kPA) ★
SPT (N) BLOWS/0.30 m ▲
20 40 60 80

WATER LEVELS ▼ **Upon Completion of Drilling** 8.23 m

CONTRACTOR **Paddock Drilling**

INSPECTOR **N. BRAY**

APPROVED C. ROBAK

DATE 9/11/2020

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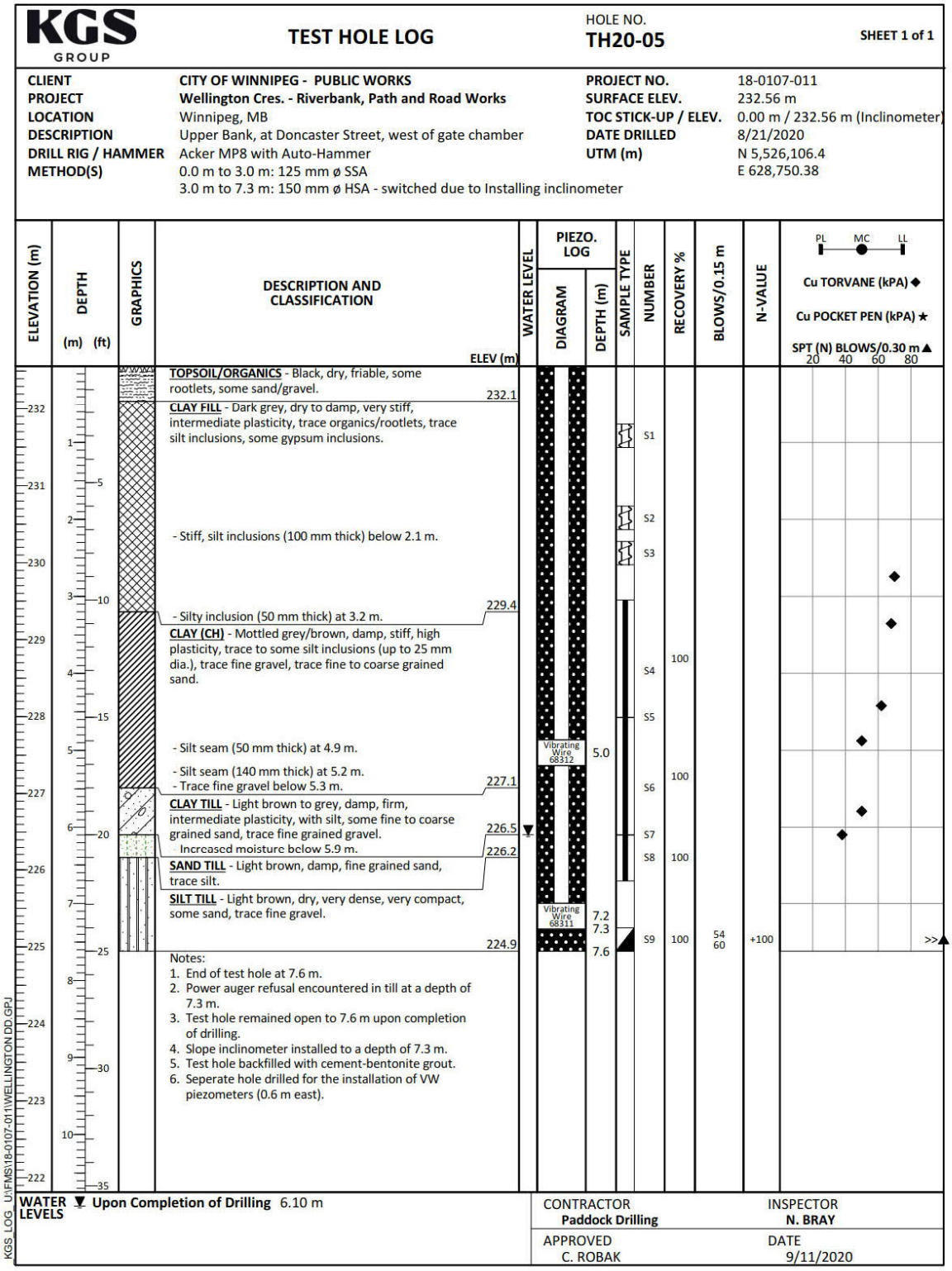
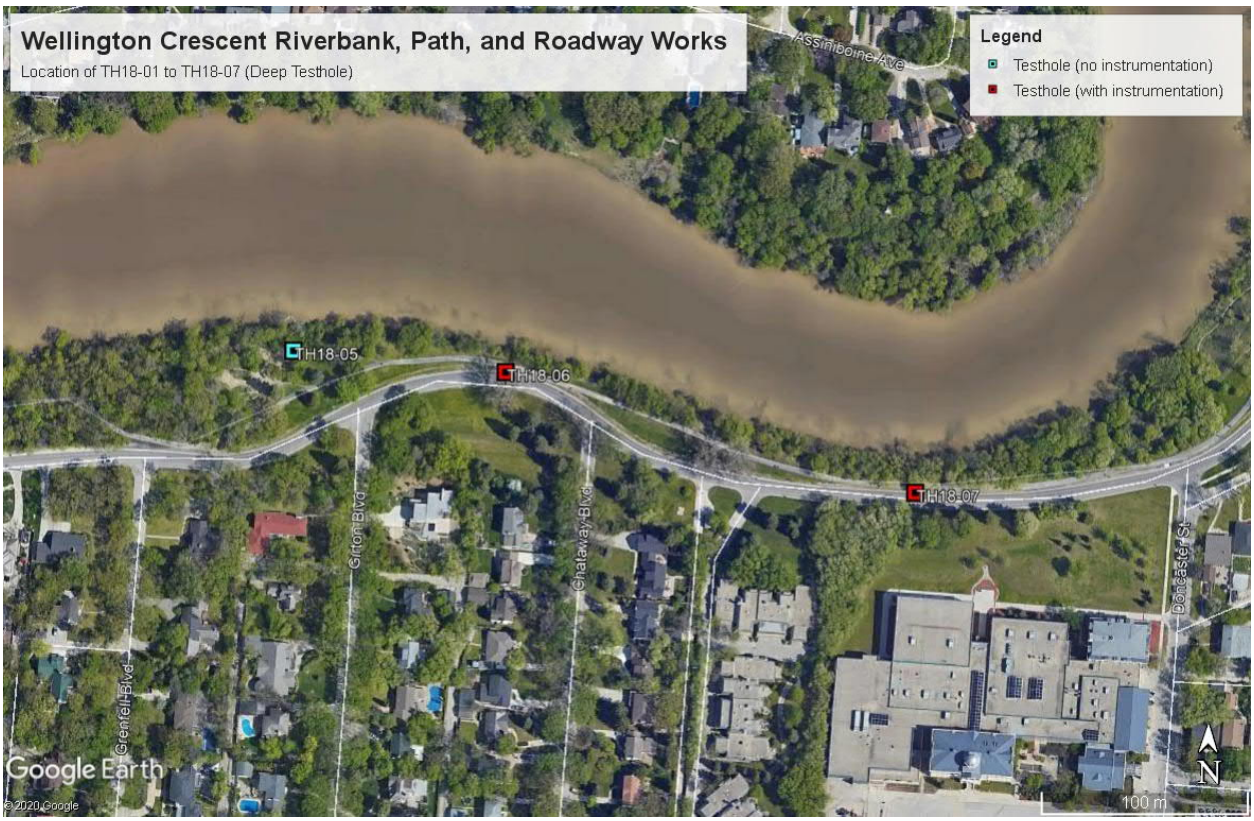
Test Hole Log for TH20-05



Geotechnical Report for 2018 Preliminary Design Investigations (Deep Testholes for Riverbank Works)

Test Hole Locations



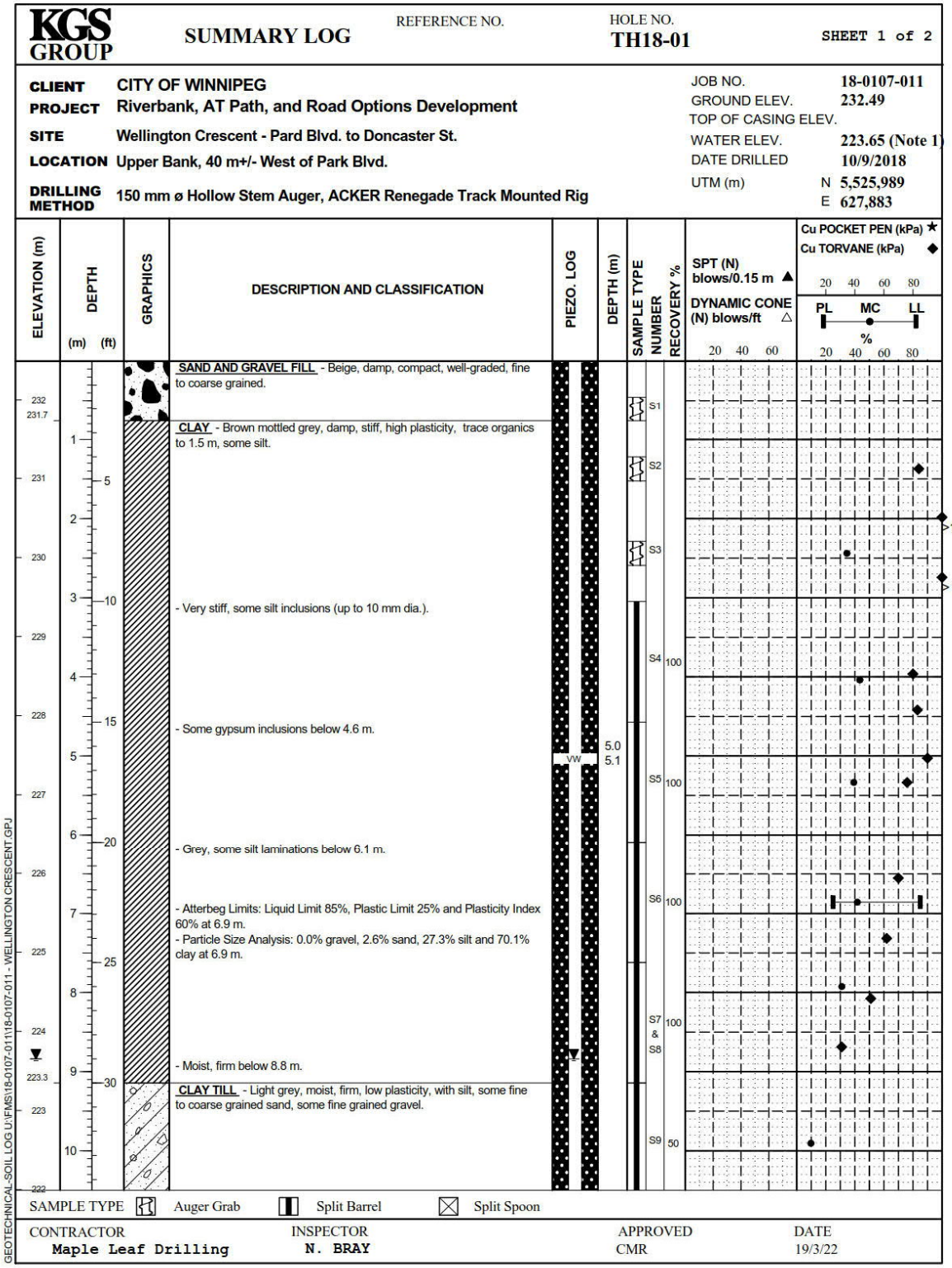
Summary of Soil Samples

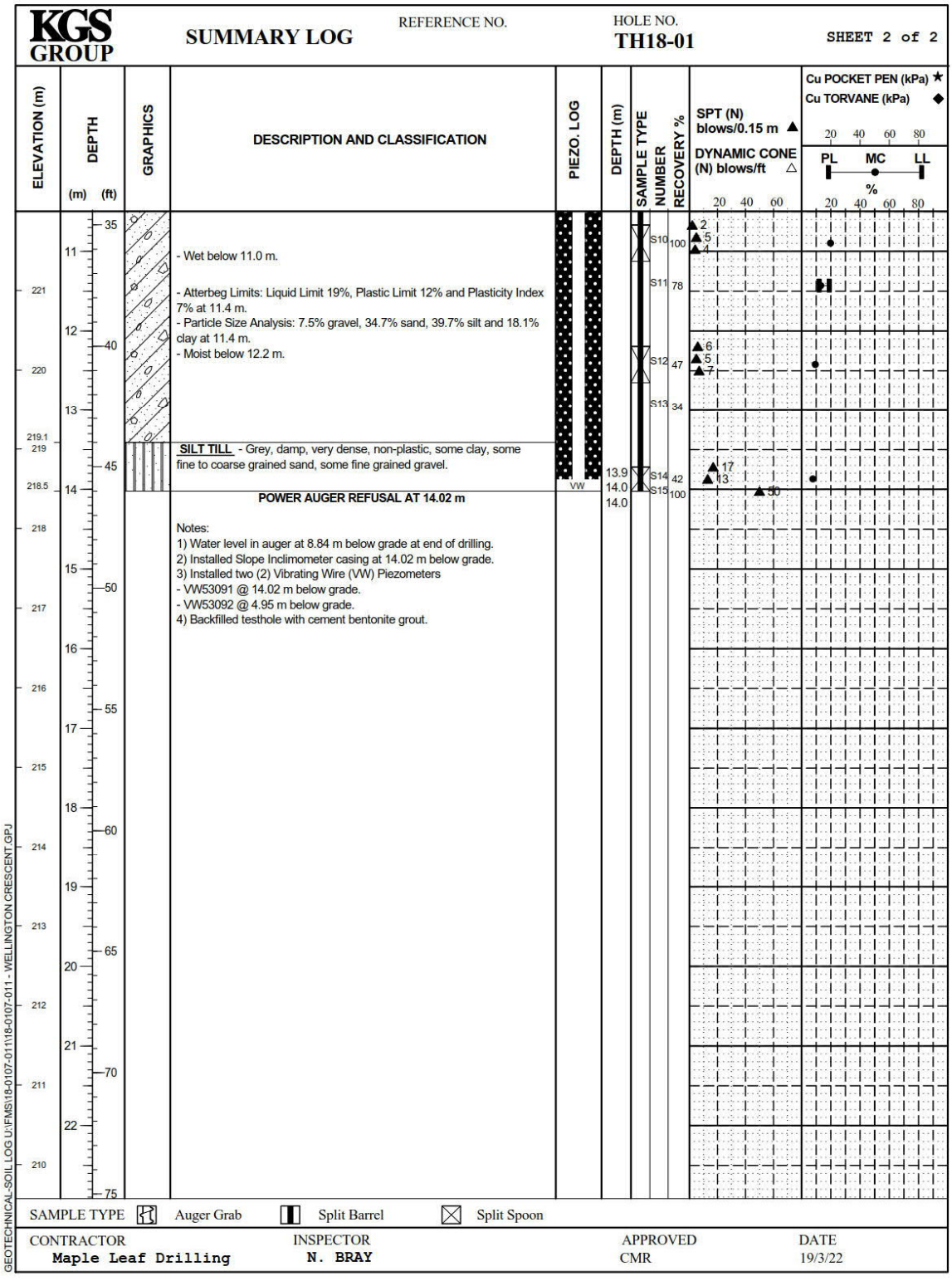
City of Winnipeg - Public Works
Wellington Crescent Riverbank, Path, and Roadway Works
Preliminary Design Geotechnical Investigations

Testhole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Location (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (m)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Plastic Limit	Liquid Limit	Plasticity Index
TH18-01	Upper Bank, 40 m West of Park Blvd.	N/A		N/A	N/A	Granular Fill	0.5	-							
						Clay	1.2	-							
							2.3	34.5							
							3.0	43.4							
							4.6	39.3							
							6.1	41.7	0	3	27	70	85	25	60
							7.6	31							
							7.6	-							
						Clay Till	9.1	9.8							
							10.7	19.8	8	35	40	18	19	12	7
							10.7	13.1							
							12.2	9.4							
							12.2	-							
						Silt Till	13.7	7.7							
							13.7	-							
TH18-02	Mid Bank, North of Park Blvd., West of Outfall 58	N/A		N/A	N/A	Clay	0.9	-							
							2.1	47.9							
							3.0	55.6							
							4.6	49.7							
							6.1	-							
						Clay Till	7.6	-							
							7.6	11.2							
							9.1	9.8	2	38	44	16			
						Silt Till	10.2	-							
TH18-03	Upper Bank, 40 m West if Lamont Blvd.	N/A		N/A	N/A	Clay	0.3	-							
							2.1	37.4							
							4.1	44.9							
							5.3	48.3							
							7.2	52.3							
							8.7	45.5							
						Clay Till	10.2	11.7				N/A			
							10.7	-							
							11.3	9.4							
						Silt Till	12.2	8.4							
							13.1	-							
							13.3	-							
TH18-04	Mid Bank, West of Bank Failure at Handsart Blvd.	N/A		N/A	N/A	Clay	1.2	-							
							1.8	-							
							3.0	-							
							4.6	-				N/A			
							4.6	-							
							6.1	-							
							6.1	-							
						Silt Till	7.6	-							
							9.1	-							
							10.7	-							
TH18-05	Upper Bank, 350 m West of Girton Blvd.	N/A		N/A	N/A	Clay	1.1	13.4							
							1.8	-							
							2.7	25.1							
							3.8	-							
							5.3	30	0	3	64	33	44	20	24
							6.4	-							
						Silt Till	7.6	9							
							8.4	-							
							9.0	7.8							
TH18-06	Upper Bank, 45 m West of Chataway Blvd.	N/A		N/A	N/A		0.8	24.8							
							2.3	28.9							
							3.0	30.7							
							4.6	30.6				N/A			
							4.6	-							
							6.1	8.2							
							7.6	9							
TH18-07	Upper Bank, 105 m East of	N/A		N/A	N/A		1.1	35.3							
							2.3	21.1							
							5.3	28.6	0	21	52	27	34	18	16
							6.4	35.7							

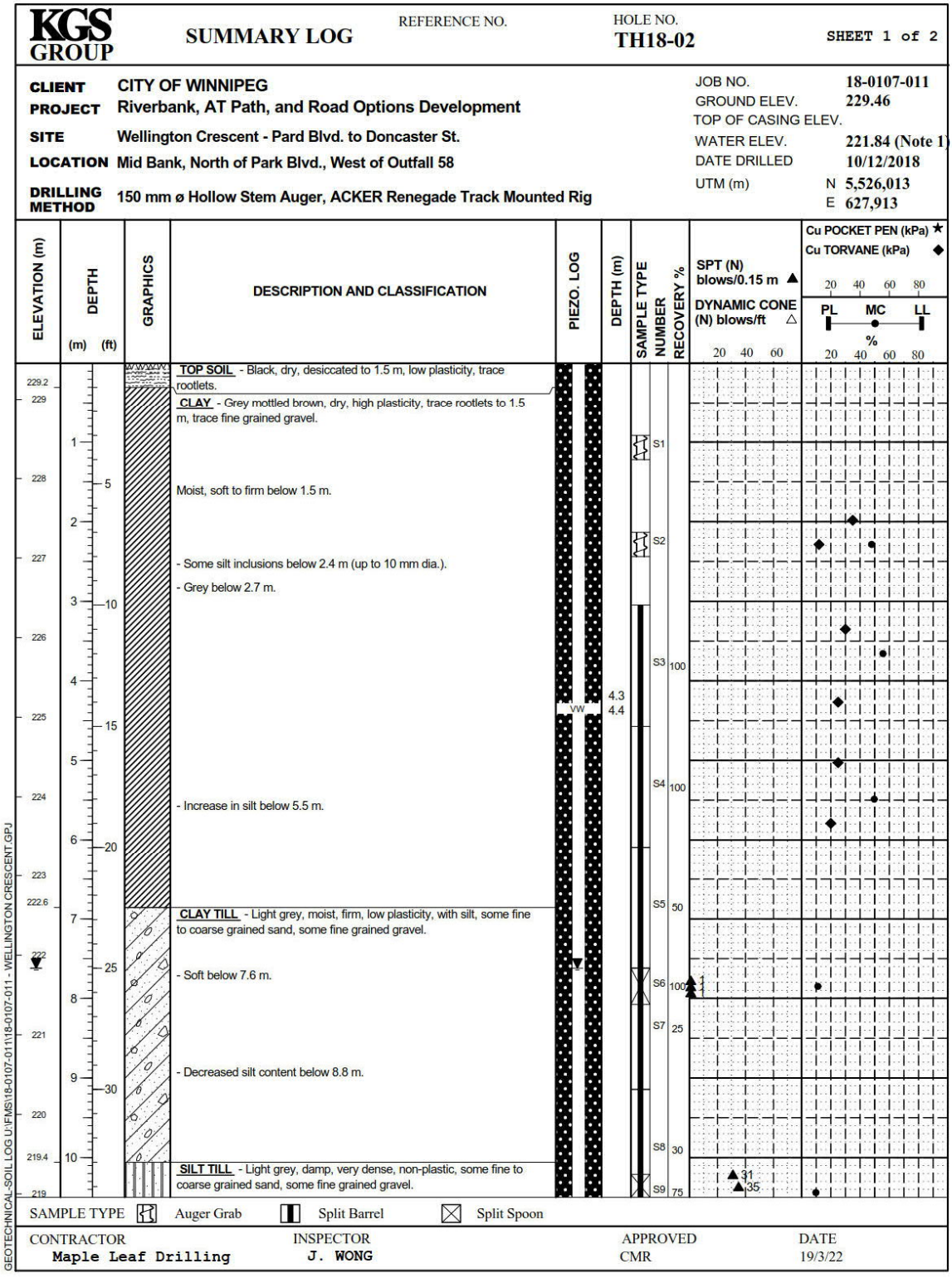
	Edgeland Blvd.					6.9	37.9						
						7.6	-						

Test Hole Log for TH18-01




KGS GROUP
SUMMARY LOG
REFERENCE NO.
HOLE NO.
TH18-01
SHEET 2 of 2
ELEVATION (m)
DEPTH (m) (ft)
GRAPHICS
DESCRIPTION AND CLASSIFICATION
PIEZO. LOG
DEPTH (m)
SAMPLE TYPE NUMBER
RECOVERY %
SPT (N) blows/0.15 m
DYNAMIC CONE (N) blows/ft
Cu POCKET PEN (kPa)
Cu TORVANE (kPa)
PL MC LL
- Wet below 11.0 m.
- Atterbeg Limits: Liquid Limit 19%, Plastic Limit 12% and Plasticity Index 7% at 11.4 m.
- Particle Size Analysis: 7.5% gravel, 34.7% sand, 39.7% silt and 18.1% clay at 11.4 m.
- Moist below 12.2 m.
SILT TILL - Grey, damp, very dense, non-plastic, some clay, some fine to coarse grained sand, some fine grained gravel.
POWER AUGER REFUSAL AT 14.02 m
Notes:
1) Water level in auger at 8.84 m below grade at end of drilling.
2) Installed Slope Inclimometer casing at 14.02 m below grade.
3) Installed two (2) Vibrating Wire (VW) Piezometers
- VW53091 @ 14.02 m below grade.
- VW53092 @ 4.95 m below grade.
4) Backfilled testhole with cement bentonite grout.
VW
13.9
14.0
14.0
SAMPLE TYPE Auger Grab Split Barrel Split Spoon
CONTRACTOR Maple Leaf Drilling
INSPECTOR N. BRAY
APPROVED CMR
DATE 19/3/22
GEOTECHNICAL-SOIL LOG U:\FMS\18-0107-011\18-0107-011 - WELLINGTON CRESCENT.GPJ

Test Hole Log for TH18-02



KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. TH18-02

SHEET 1 of 2

CLIENT CITY OF WINNIPEG
PROJECT Riverbank, AT Path, and Road Options Development
SITE Wellington Crescent - Pard Blvd. to Doncaster St.
LOCATION Mid Bank, North of Park Blvd., West of Outfall 58
DRILLING METHOD 150 mm ø Hollow Stem Auger, ACKER Renegade Track Mounted Rig

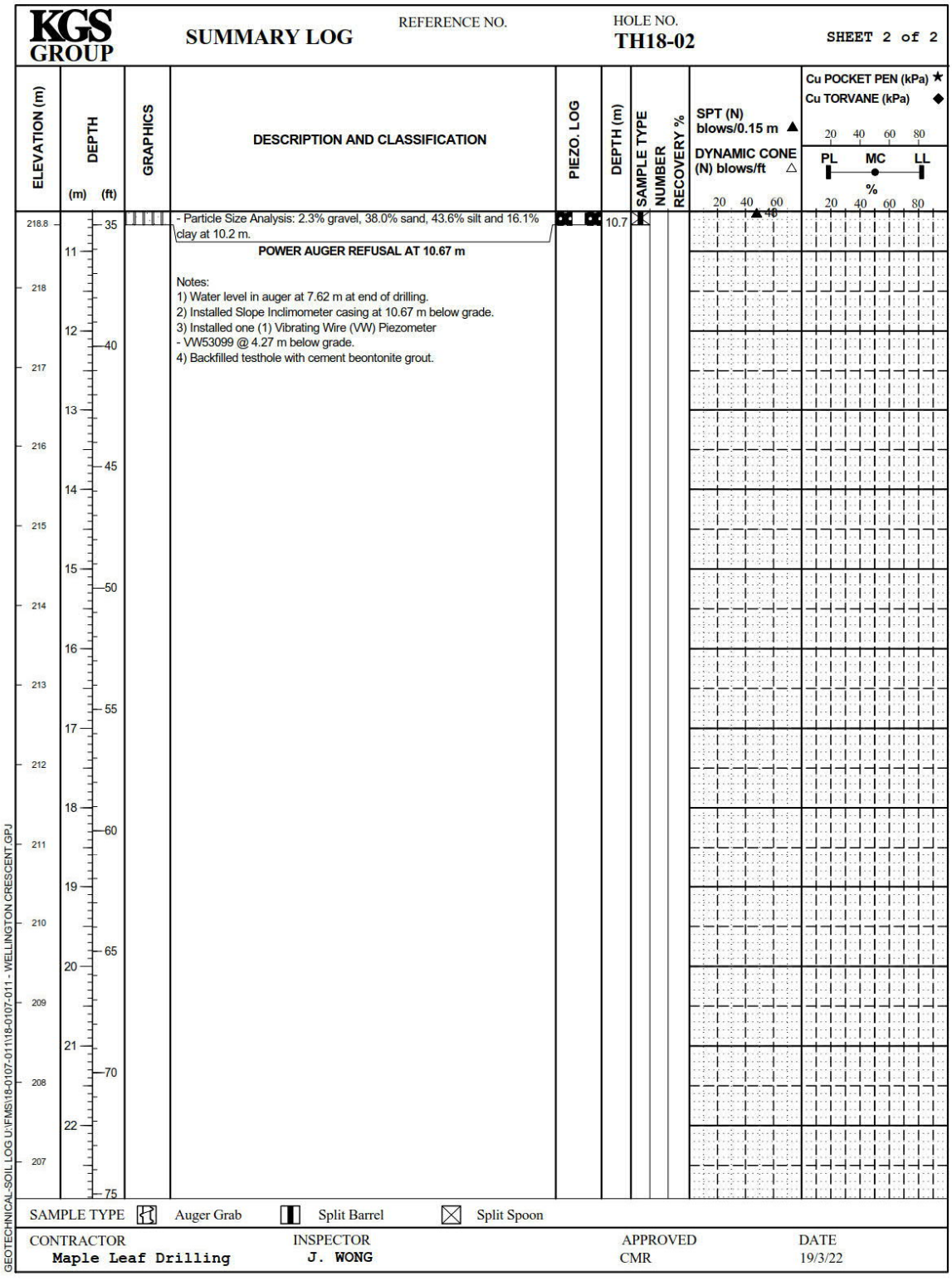
JOB NO. 18-0107-011
GROUND ELEV. 229.46
TOP OF CASING ELEV.
WATER ELEV. 221.84 (Note 1)
DATE DRILLED 10/12/2018
UTM (m) N 5,526,013
E 627,913

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZO. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆ / PL MC LL %
229.2				TOP SOIL - Black, dry, desiccated to 1.5 m, low plasticity, trace rootlets.							
229				CLAY - Grey mottled brown, dry, high plasticity, trace rootlets to 1.5 m, trace fine grained gravel.							
	1							S1			
228		5		Moist, soft to firm below 1.5 m.							
	2							S2			
227				- Some silt inclusions below 2.4 m (up to 10 mm dia.).							
	3	10		- Grey below 2.7 m.							
226								S3	100		
	4				VW	4.3					
225		15				4.4					
	5							S4	100		
224				- Increase in silt below 5.5 m.							
	6	20									
223								S5	50		
222.6	7			CLAY TILL - Light grey, moist, firm, low plasticity, with silt, some fine to coarse grained sand, some fine grained gravel.							
222		25		- Soft below 7.6 m.				S6	100	1 1	
	8							S7	25		
221				- Decreased silt content below 8.8 m.							
	9	30									
220								S8	30		
219.4	10			SILT TILL - Light grey, damp, very dense, non-plastic, some fine to coarse grained sand, some fine grained gravel.				S9	75	▲31 ▲35	
219											

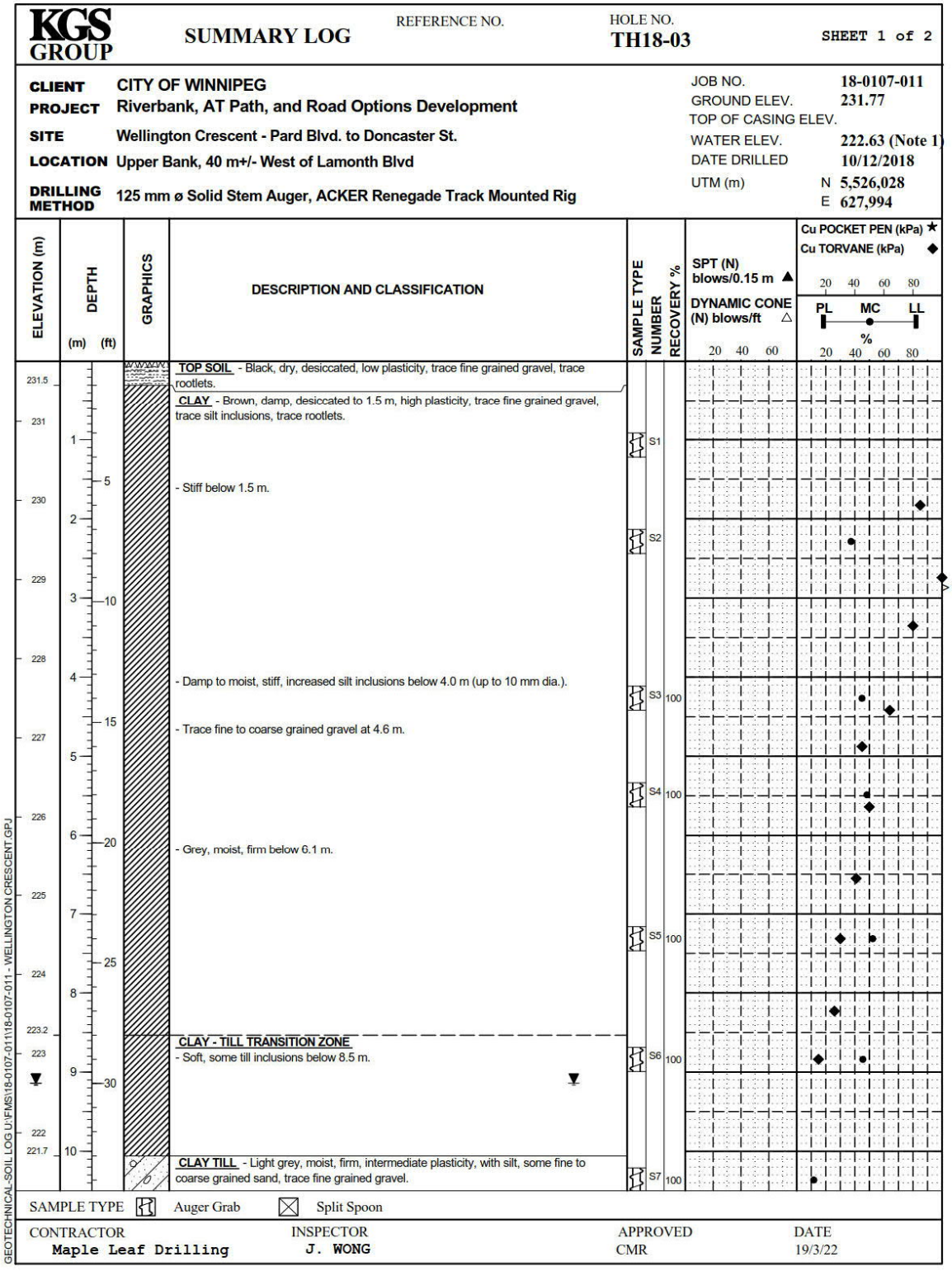
SAMPLE TYPE Auger Grab Split Barrel Split Spoon

CONTRACTOR Maple Leaf Drilling
INSPECTOR J. WONG
APPROVED CMR
DATE 19/3/22

GEOTECHNICAL-SOIL LOG U:\FMS\18-0107-011\18-0107-011 - WELLINGTON CRESCENT.GPJ


KGS GROUP
SUMMARY LOG
REFERENCE NO.
HOLE NO.
TH18-02
SHEET 2 of 2
ELEVATION (m)
DEPTH (m) (ft)
GRAPHICS
DESCRIPTION AND CLASSIFICATION
PIEZO. LOG
DEPTH (m)
SAMPLE TYPE
NUMBER
RECOVERY %
SPT (N) blows/0.15 m
DYNAMIC CONE (N) blows/ft
Cu POCKET PEN (kPa)
Cu TORVANE (kPa)
PL MC LL
%
- Particle Size Analysis: 2.3% gravel, 38.0% sand, 43.6% silt and 16.1% clay at 10.2 m.
10.7
POWER AUGER REFUSAL AT 10.67 m
Notes:
1) Water level in auger at 7.62 m at end of drilling.
2) Installed Slope Inclimometer casing at 10.67 m below grade.
3) Installed one (1) Vibrating Wire (VW) Piezometer
- VW53099 @ 4.27 m below grade.
4) Backfilled testhole with cement beontonite grout.
SAMPLE TYPE
Auger Grab
Split Barrel
Split Spoon
CONTRACTOR
Maple Leaf Drilling
INSPECTOR
J. WONG
APPROVED
CMR
DATE
19/3/22
GEOTECHNICAL-SOIL LOG U:\FMS\18-0107-011\18-0107-011 - WELLINGTON CRESCENT.GPJ

Test Hole Log for TH18-03



KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. TH18-03

SHEET 1 of 2

CLIENT CITY OF WINNIPEG
PROJECT Riverbank, AT Path, and Road Options Development
SITE Wellington Crescent - Pard Blvd. to Doncaster St.
LOCATION Upper Bank, 40 m+/- West of Lamonth Blvd
DRILLING METHOD 125 mm ø Solid Stem Auger, ACKER Renegade Track Mounted Rig

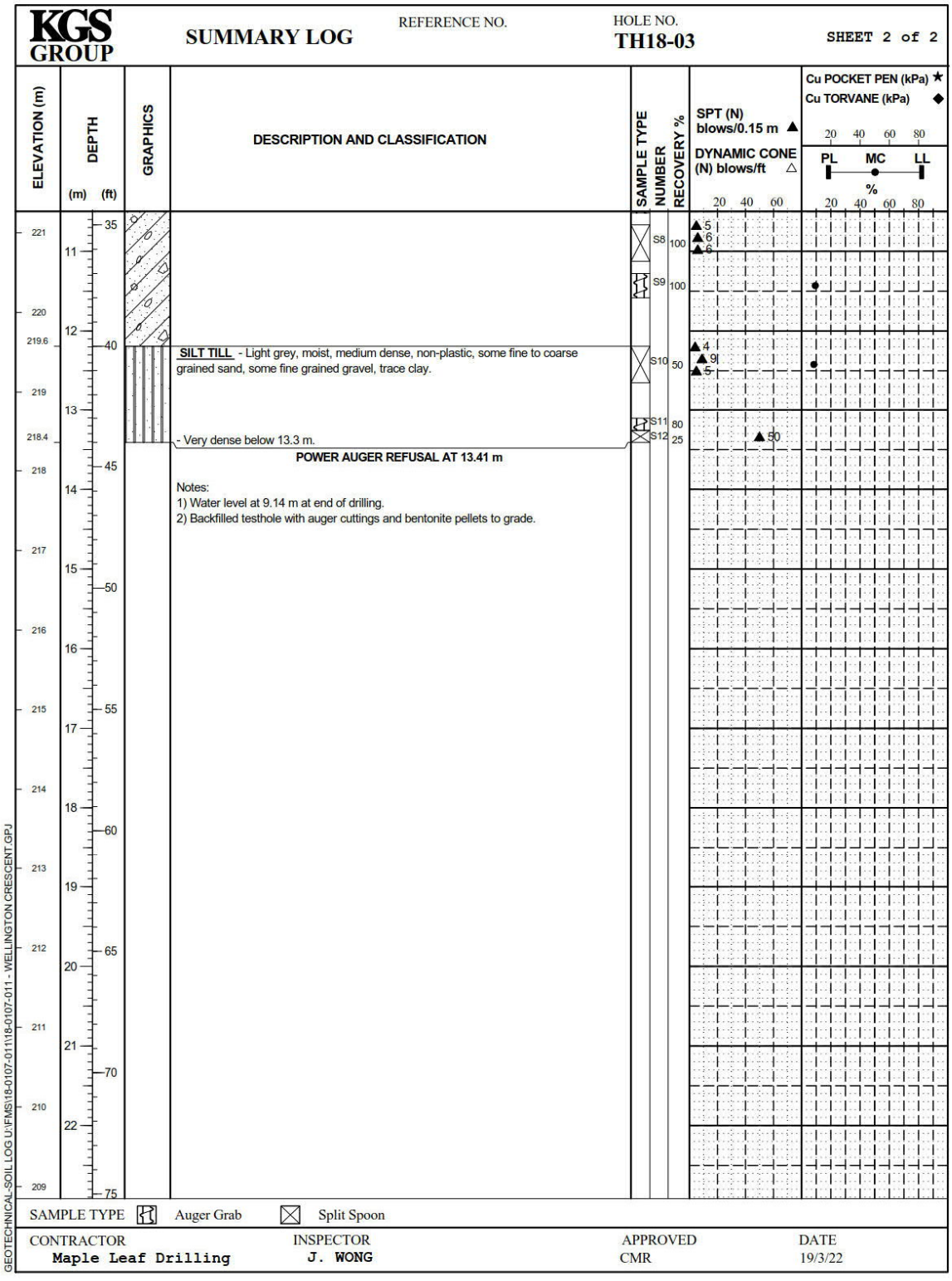
JOB NO. 18-0107-011
GROUND ELEV. 231.77
TOP OF CASING ELEV.
WATER ELEV. 222.63 (Note 1)
DATE DRILLED 10/12/2018
UTM (m) N 5,526,028
E 627,994

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆ / PL MC LL %
231.5				TOP SOIL - Black, dry, desiccated, low plasticity, trace fine grained gravel, trace rootlets.					
231	1	5		CLAY - Brown, damp, desiccated to 1.5 m, high plasticity, trace fine grained gravel, trace silt inclusions, trace rootlets.		S1			
230	2			- Stiff below 1.5 m.		S2			
229	3	10							> 100
228	4			- Damp to moist, stiff, increased silt inclusions below 4.0 m (up to 10 mm dia.).		S3	100		
227	5	15		- Trace fine to coarse grained gravel at 4.6 m.		S4	100		
226	6	20		- Grey, moist, firm below 6.1 m.					
225	7					S5	100		
224	8	25							
223.2				CLAY - TILL TRANSITION ZONE					
223	9	30		- Soft, some till inclusions below 8.5 m.		S6	100		
222									
221.7	10			CLAY TILL - Light grey, moist, firm, intermediate plasticity, with silt, some fine to coarse grained sand, trace fine grained gravel.		S7	100		

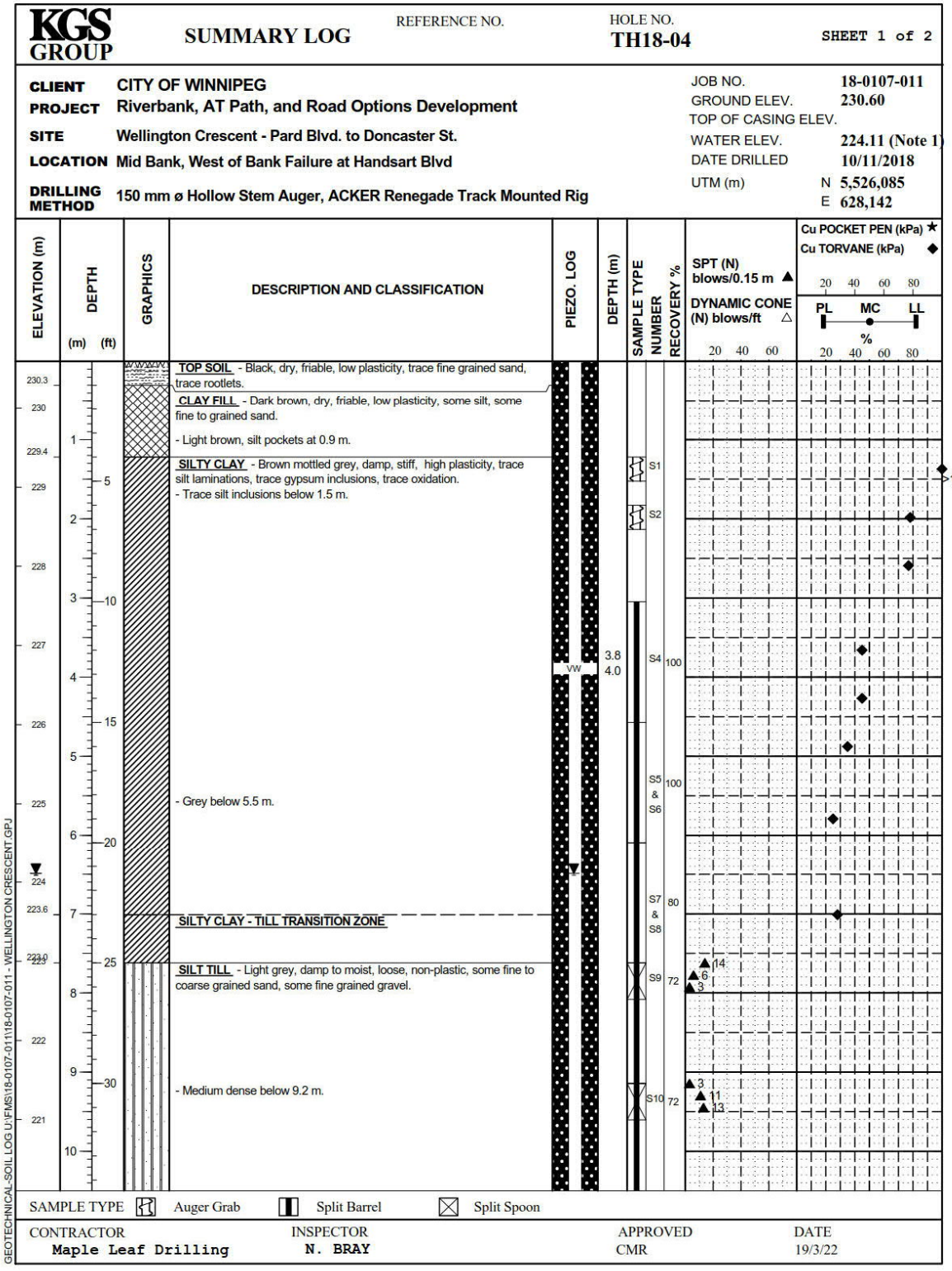
SAMPLE TYPE Auger Grab ☒ Split Spoon

CONTRACTOR Maple Leaf Drilling
INSPECTOR J. WONG
APPROVED CMR
DATE 19/3/22

GEOTECHNICAL-SOIL LOG U:\FMS\18-0107-011\18-0107-011 - WELLINGTON CRESCENT.GPJ


KGS GROUP
SUMMARY LOG
REFERENCE NO.
HOLE NO.
TH18-03
SHEET 2 of 2
ELEVATION (m)
DEPTH (m) (ft)
GRAPHICS
DESCRIPTION AND CLASSIFICATION
SAMPLE TYPE
NUMBER
RECOVERY %
SPT (N) blows/0.15 m
DYNAMIC CONE (N) blows/ft
Cu POCKET PEN (kPa)
Cu TORVANE (kPa)
PL MC LL
%
SILT TILL - Light grey, moist, medium dense, non-plastic, some fine to coarse grained sand, some fine grained gravel, trace clay.
- Very dense below 13.3 m.
POWER AUGER REFUSAL AT 13.41 m
Notes:
1) Water level at 9.14 m at end of drilling.
2) Backfilled testhole with auger cuttings and bentonite pellets to grade.
S8 100
S9 100
S10 50
S11 80
S12 25
SAMPLE TYPE Auger Grab Split Spoon
CONTRACTOR Maple Leaf Drilling
INSPECTOR J. WONG
APPROVED CMR
DATE 19/3/22
GEOTECHNICAL-SOIL LOG U:\FMS\18-0107-011\18-0107-011 - WELLINGTON CRESCENT.GPJ

Test Hole Log for TH18-04



KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. TH18-04

SHEET 1 of 2

CLIENT CITY OF WINNIPEG
PROJECT Riverbank, AT Path, and Road Options Development
SITE Wellington Crescent - Pard Blvd. to Doncaster St.
LOCATION Mid Bank, West of Bank Failure at Handsart Blvd
DRILLING METHOD 150 mm ø Hollow Stem Auger, ACKER Renegade Track Mounted Rig

JOB NO. 18-0107-011
GROUND ELEV. 230.60
TOP OF CASING ELEV.
WATER ELEV. 224.11 (Note 1)
DATE DRILLED 10/11/2018
UTM (m) N 5,526,085
E 628,142

ELEVATION (m) | DEPTH (m) (ft) | GRAPHICS | DESCRIPTION AND CLASSIFICATION | PIEZO. LOG | DEPTH (m) | SAMPLE TYPE NUMBER | RECOVERY % | SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △ | Cu POCKET PEN (kPa) ★ Cu TORVANE (kPa) ◆ | PL MC LL %

230.3 — 0 — 0
TOP SOIL - Black, dry, friable, low plasticity, trace fine grained sand, trace rootlets.
CLAY FILL - Dark brown, dry, friable, low plasticity, some silt, some fine to grained sand.
- Light brown, silt pockets at 0.9 m.

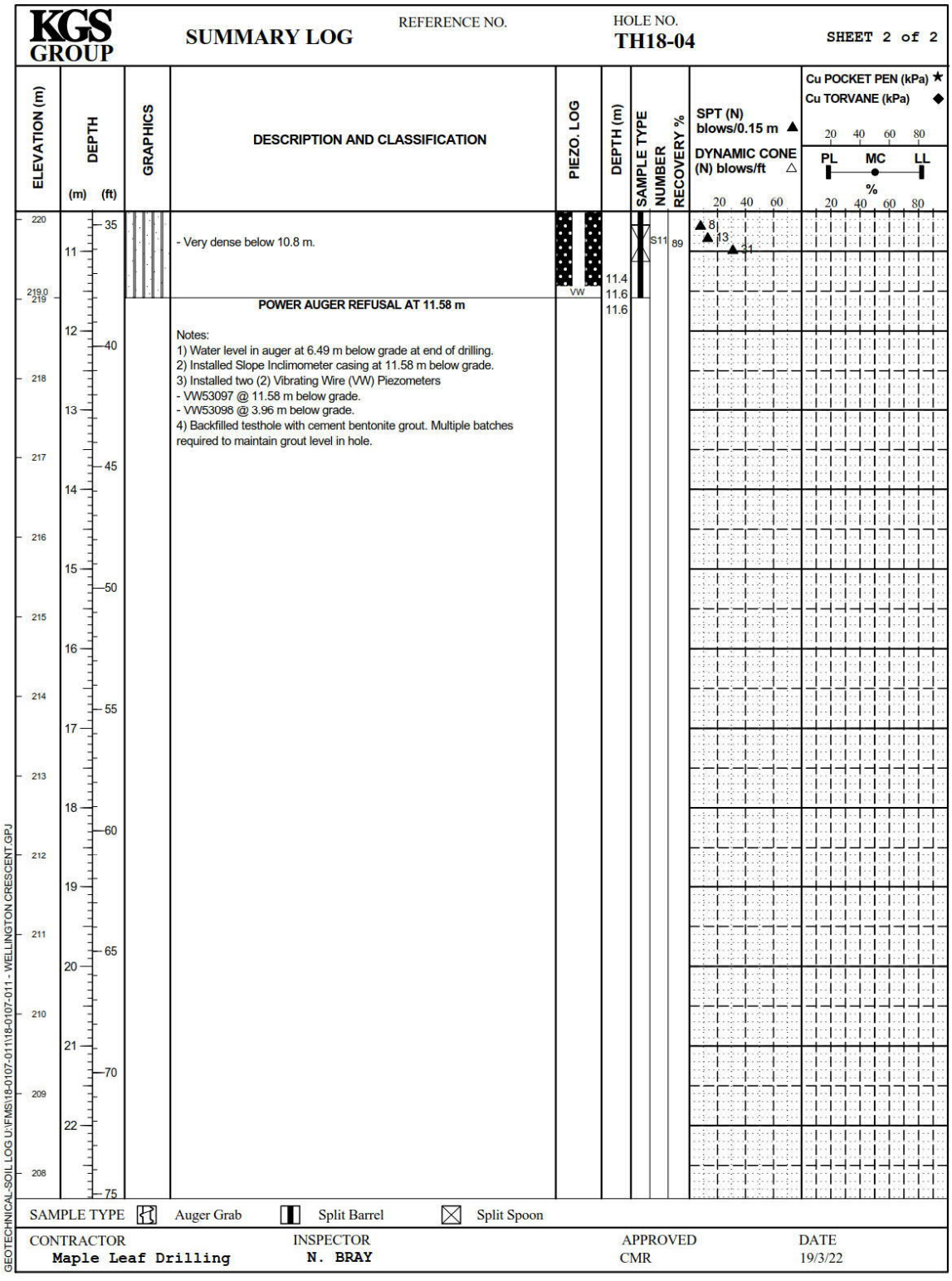
229.4 — 1 — 5
SILTY CLAY - Brown mottled grey, damp, stiff, high plasticity, trace silt laminations, trace gypsum inclusions, trace oxidation.
- Trace silt inclusions below 1.5 m.

229 — 2 — 5 — S1 — >100
228 — 3 — 10 — S2
227 — 4 — 15 — VW — 3.8 / 4.0 — S4 — 100
226 — 5 — 15
- Grey below 5.5 m.
225 — 6 — 20 — S5 & S6 — 100
224 ▼ — 6 — 20
223.6 — 7 — 25
SILTY CLAY - TILL TRANSITION ZONE — S7 & S8 — 80
223.0 — 7 — 25
SILT TILL - Light grey, damp to moist, loose, non-plastic, some fine to coarse grained sand, some fine grained gravel. — S9 — 72 — ▲14 ▲6 ▲3
222 — 8 — 30
- Medium dense below 9.2 m. — S10 — 72 — ▲3 ▲11 ▲13
221 — 9 — 30
10 — 10

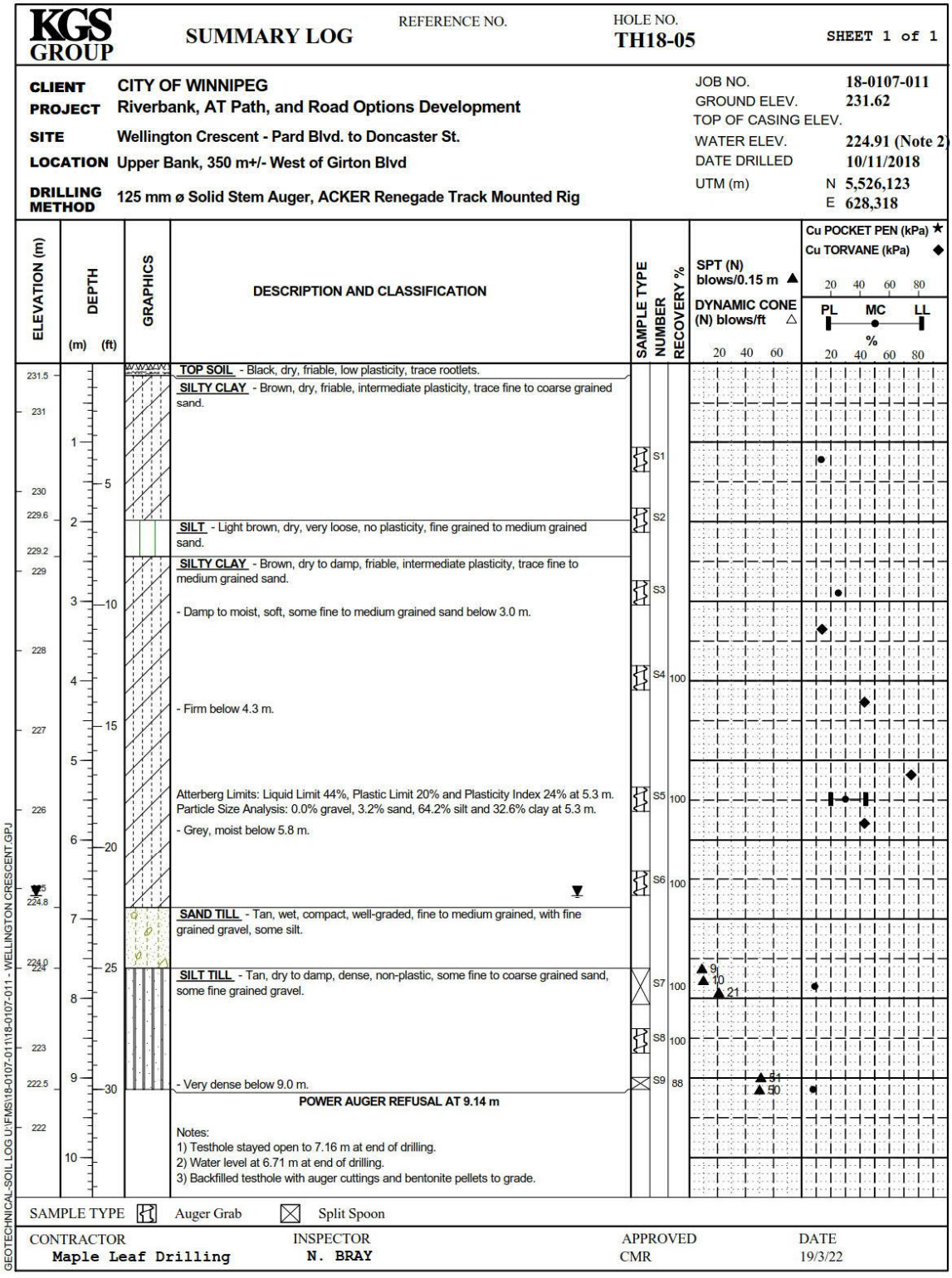
SAMPLE TYPE: Auger Grab | Split Barrel | Split Spoon

CONTRACTOR: Maple Leaf Drilling
INSPECTOR: N. BRAY
APPROVED: CMR
DATE: 19/3/22

GEOTECHNICAL-SOIL LOG U:\FMS\18-0107-011\18-0107-011 - WELLINGTON CRESCENT.GPJ


KGS GROUP
SUMMARY LOG
REFERENCE NO.
HOLE NO.
TH18-04
SHEET 2 of 2
ELEVATION (m)
DEPTH (m) (ft)
GRAPHICS
DESCRIPTION AND CLASSIFICATION
PIEZO. LOG
DEPTH (m)
SAMPLE TYPE
NUMBER
RECOVERY %
SPT (N) blows/0.15 m
DYNAMIC CONE (N) blows/ft
Cu POCKET PEN (kPa)
Cu TORVANE (kPa)
PL MC LL
%
- Very dense below 10.8 m.
VW
11.4
11.6
11.6
S11
89
8
13
21
POWER AUGER REFUSAL AT 11.58 m
Notes:
1) Water level in auger at 6.49 m below grade at end of drilling.
2) Installed Slope Inclimometer casing at 11.58 m below grade.
3) Installed two (2) Vibrating Wire (VW) Piezometers
- VW53097 @ 11.58 m below grade.
- VW53098 @ 3.96 m below grade.
4) Backfilled testhole with cement bentonite grout. Multiple batches required to maintain grout level in hole.
SAMPLE TYPE
Auger Grab
Split Barrel
Split Spoon
CONTRACTOR
Maple Leaf Drilling
INSPECTOR
N. BRAY
APPROVED
CMR
DATE
19/3/22
GEOTECHNICAL-SOIL LOG U:\FMS\18-0107-011\18-0107-011 - WELLINGTON CRESCENT.GPJ

Test Hole Log for TH18-05



KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. **TH18-05**

SHEET 1 of 1

CLIENT CITY OF WINNIPEG
PROJECT Riverbank, AT Path, and Road Options Development
SITE Wellington Crescent - Pard Blvd. to Doncaster St.
LOCATION Upper Bank, 350 m+/- West of Girton Blvd
DRILLING METHOD 125 mm ø Solid Stem Auger, ACKER Renegade Track Mounted Rig

JOB NO. 18-0107-011
GROUND ELEV. 231.62
TOP OF CASING ELEV.
WATER ELEV. 224.91 (Note 2)
DATE DRILLED 10/11/2018
UTM (m) N 5,526,123
E 628,318

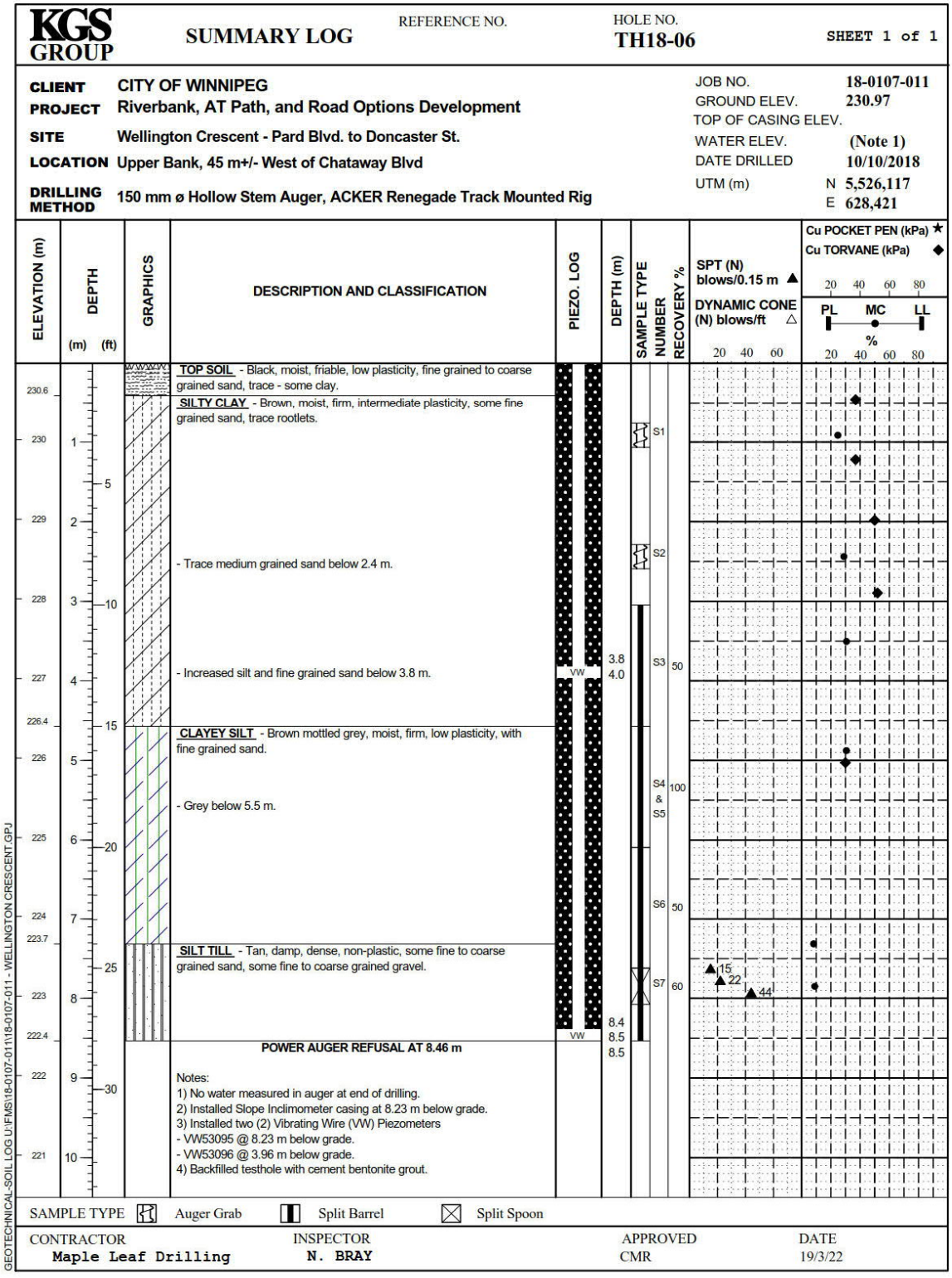
ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆ / PL MC LL %
231.5				**TOP SOIL** - Black, dry, friable, low plasticity, trace rootlets.					
231				**SILTY CLAY** - Brown, dry, friable, intermediate plasticity, trace fine to coarse grained sand.					
	1	5				S1			
230									
229.6	2			**SILT** - Light brown, dry, very loose, no plasticity, fine grained to medium grained sand.		S2			
229.2									
229				**SILTY CLAY** - Brown, dry to damp, friable, intermediate plasticity, trace fine to medium grained sand.					
	3	10		- Damp to moist, soft, some fine to medium grained sand below 3.0 m.		S3			
228									
	4					S4	100		
227		15		- Firm below 4.3 m.					
	5								
				Atterberg Limits: Liquid Limit 44%, Plastic Limit 20% and Plasticity Index 24% at 5.3 m. Particle Size Analysis: 0.0% gravel, 3.2% sand, 64.2% silt and 32.6% clay at 5.3 m.		S5	100		
226				- Grey, moist below 5.8 m.					
	6	20				S6	100		
224.8				**SAND TILL** - Tan, wet, compact, well-graded, fine to medium grained, with fine grained gravel, some silt.					
224	7	25		**SILT TILL** - Tan, dry to damp, dense, non-plastic, some fine to coarse grained sand, some fine grained gravel.		S7	100	▲9 ▲10 ▲21	
	8					S8	100		
223									
222.5	9	30		- Very dense below 9.0 m.		S9	88	▲31 ▲50	
				POWER AUGER REFUSAL AT 9.14 m					
222				Notes: 1) Testhole stayed open to 7.16 m at end of drilling. 2) Water level at 6.71 m at end of drilling. 3) Backfilled testhole with auger cuttings and bentonite pellets to grade.					
	10								

SAMPLE TYPE ⊠ Auger Grab ⊠ Split Spoon

CONTRACTOR	INSPECTOR	APPROVED	DATE
Maple Leaf Drilling	N. BRAY	CMR	19/3/22

GEOTECHNICAL-SOIL LOG U:\FMS\18-0107-011\18-0107-011 - WELLINGTON CRESCENT.GPJ

Test Hole Log for TH18-06



KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. TH18-06

SHEET 1 of 1

CLIENT CITY OF WINNIPEG
PROJECT Riverbank, AT Path, and Road Options Development
SITE Wellington Crescent - Pard Blvd. to Doncaster St.
LOCATION Upper Bank, 45 m+/- West of Chataway Blvd
DRILLING METHOD 150 mm ø Hollow Stem Auger, ACKER Renegade Track Mounted Rig

JOB NO. 18-0107-011
GROUND ELEV. 230.97
TOP OF CASING ELEV.
WATER ELEV. (Note 1)
DATE DRILLED 10/10/2018
UTM (m) N 5,526,117
E 628,421

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION
230.6	0	0		TOP SOIL - Black, moist, friable, low plasticity, fine grained to coarse grained sand, trace - some clay.
230	1	5		SILTY CLAY - Brown, moist, firm, intermediate plasticity, some fine grained sand, trace rootlets.
229	2			
				- Trace medium grained sand below 2.4 m.
228	3	10		
227	4			- Increased silt and fine grained sand below 3.8 m.
226.4		15		CLAYEY SILT - Brown mottled grey, moist, firm, low plasticity, with fine grained sand.
226	5			
				- Grey below 5.5 m.
225	6	20		
224	7			
223.7		25		SILT TILL - Tan, damp, dense, non-plastic, some fine to coarse grained sand, some fine to coarse grained gravel.
223	8			
222.4				POWER AUGER REFUSAL AT 8.46 m
222	9	30		
221	10			

PIEZO. LOG: VW at 3.8 / 4.0; VW at 8.4 / 8.5

DEPTH (m): 8.5

SAMPLE TYPE / NUMBER / RECOVERY %: S1; S2; S3 50; S4 & S5 100; S6 50; S7 60

SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △: 15, 22, 44

Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆: 20 40 60 80

PL MC LL %: 20 40 60 80

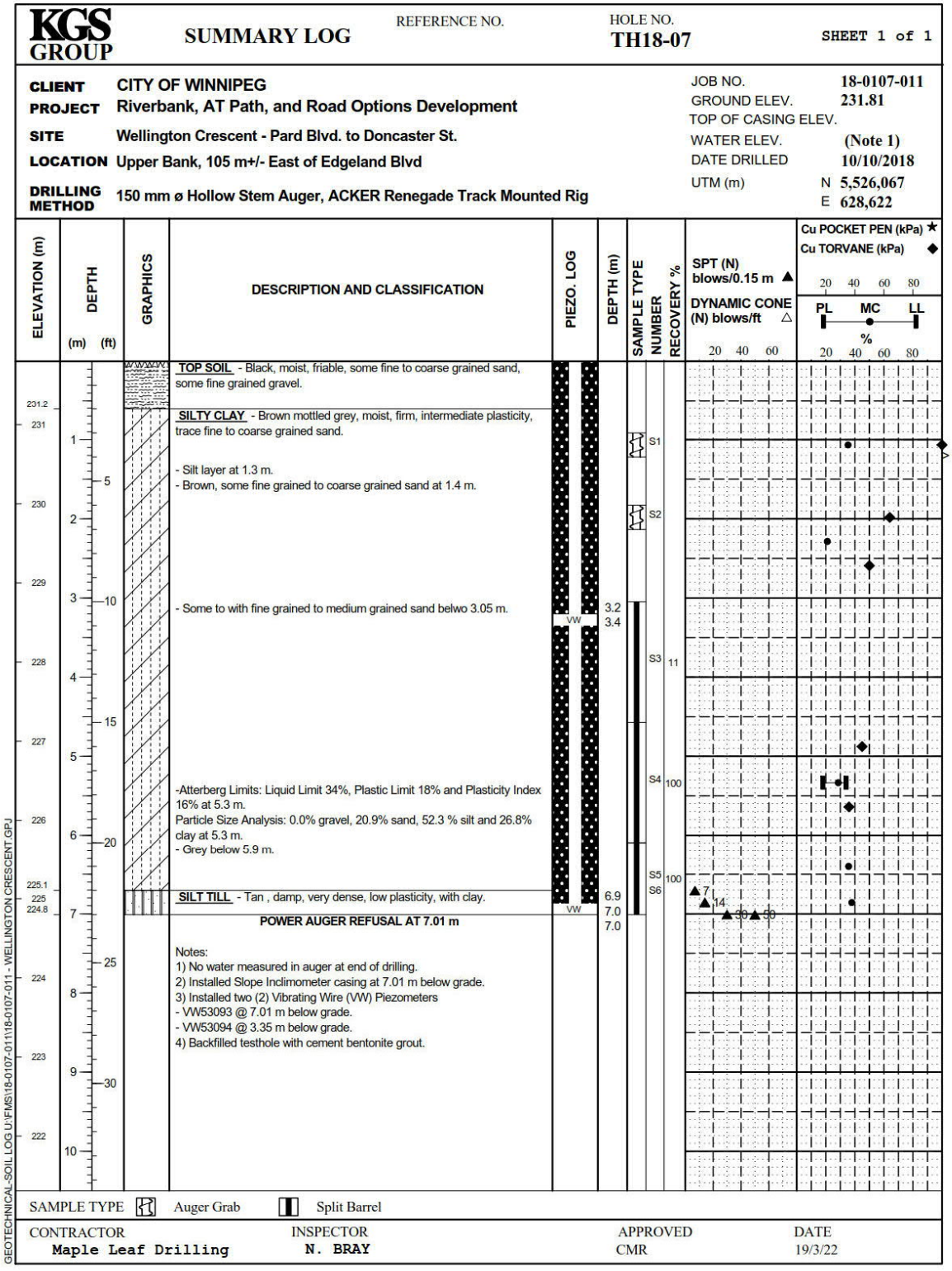
Notes:
1) No water measured in auger at end of drilling.
2) Installed Slope Inclimometer casing at 8.23 m below grade.
3) Installed two (2) Vibrating Wire (VW) Piezometers
- VW53095 @ 8.23 m below grade.
- VW53096 @ 3.96 m below grade.
4) Backfilled testhole with cement bentonite grout.

SAMPLE TYPE: Auger Grab; Split Barrel; Split Spoon

CONTRACTOR Maple Leaf Drilling
INSPECTOR N. BRAY
APPROVED CMR
DATE 19/3/22

GEOTECHNICAL-SOIL LOG U:\FMS\18-0107-011\18-0107-011 - WELLINGTON CRESCENT.GPJ

Test Hole Log for TH18-07



KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. TH18-07

SHEET 1 of 1

CLIENT CITY OF WINNIPEG
PROJECT Riverbank, AT Path, and Road Options Development
SITE Wellington Crescent - Pard Blvd. to Doncaster St.
LOCATION Upper Bank, 105 m+/- East of Edgeland Blvd
DRILLING METHOD 150 mm ø Hollow Stem Auger, ACKER Renegade Track Mounted Rig

JOB NO. 18-0107-011
GROUND ELEV. 231.81
TOP OF CASING ELEV.
WATER ELEV. (Note 1)
DATE DRILLED 10/10/2018
UTM (m) N 5,526,067
E 628,622

ELEVATION (m) | DEPTH (m) (ft) | GRAPHICS | DESCRIPTION AND CLASSIFICATION | PIEZO. LOG | DEPTH (m) | SAMPLE TYPE NUMBER | RECOVERY % | SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △ | Cu POCKET PEN (kPa) ★ Cu TORVANE (kPa) ◆ PL MC LL %

231.2 / 0 (0)

TOP SOIL - Black, moist, friable, some fine to coarse grained sand, some fine grained gravel.

231 / 1 (5)

SILTY CLAY - Brown mottled grey, moist, firm, intermediate plasticity, trace fine to coarse grained sand.

- Silt layer at 1.3 m.
- Brown, some fine grained to coarse grained sand at 1.4 m.

230 / 2

229 / 3 (10)

- Some to with fine grained to medium grained sand belwo 3.05 m.

VW — 3.2, 3.4

228 / 4

227 / 5 (15)

-Atterberg Limits: Liquid Limit 34%, Plastic Limit 18% and Plasticity Index 16% at 5.3 m.
Particle Size Analysis: 0.0% gravel, 20.9% sand, 52.3 % silt and 26.8% clay at 5.3 m.
- Grey below 5.9 m.

226 / 6 (20)

225.1 / 225 / 224.8 / 7 (23)

SILT TILL - Tan , damp, very dense, low plasticity, with clay.

VW — 6.9, 7.0, 7.0

POWER AUGER REFUSAL AT 7.01 m

Notes:
1) No water measured in auger at end of drilling.
2) Installed Slope Inclimometer casing at 7.01 m below grade.
3) Installed two (2) Vibrating Wire (VW) Piezometers
- VW53093 @ 7.01 m below grade.
- VW53094 @ 3.35 m below grade.
4) Backfilled testhole with cement bentonite grout.

224 / 8 (25)

223 / 9 (30)

222 / 10

S1, S2, S3 11, S4 100, S5 100, S6

▲7, ▲14, ▲50, ▲50

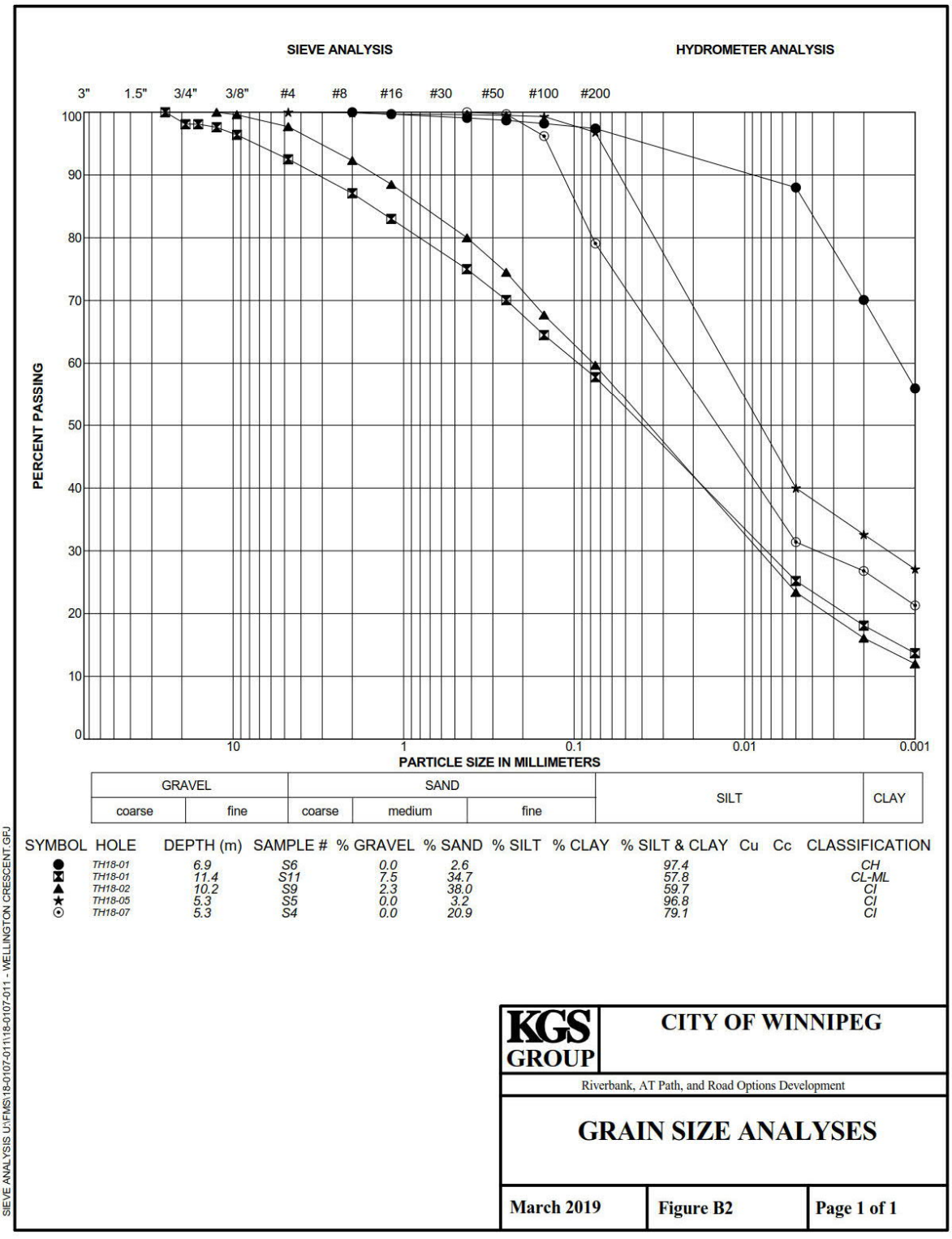
100

SAMPLE TYPE Auger Grab Split Barrel

CONTRACTOR Maple Leaf Drilling
INSPECTOR N. BRAY
APPROVED CMR
DATE 19/3/22

GEOTECHNICAL-SOIL LOG U:\FMS\18-0107-011\18-0107-011 - WELLINGTON CRESCENT.GPJ

Particle Size Analysis for TH18-01, TH18-05 and TH18-07



SYMBOL	HOLE	DEPTH (m)	SAMPLE #	% GRAVEL	% SAND	% SILT	% CLAY	% SILT & CLAY	Cu	Cc	CLASSIFICATION
●	TH18-01	6.9	S6	0.0	2.6			97.4			CH
■	TH18-01	11.4	S11	7.5	34.7			57.8			CL-ML
▲	TH18-02	10.2	S9	2.3	38.0			59.7			CI
★	TH18-05	5.3	S5	0.0	3.2			96.8			CI
⊙	TH18-07	5.3	S4	0.0	20.9			79.1			CI

SIEVE ANALYSIS U:\FMS\18-0107-01\18-0107-011 - WELLINGTON CRESCENT.GPJ

KGS GROUP

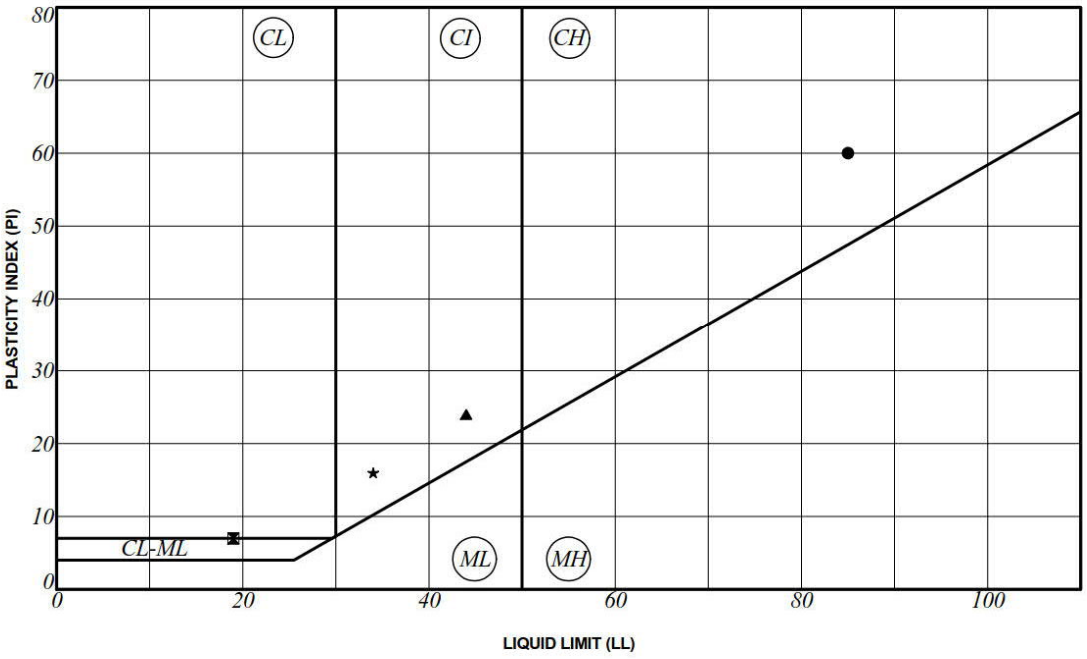
CITY OF WINNIPEG

Riverbank, AT Path, and Road Options Development

GRAIN SIZE ANALYSES

March 2019	Figure B2	Page 1 of 1

Atterberg Limits for TH18-01, TH18-05 and TH18-07



SYMBOL	HOLE	DEPTH (m)	SAMPLE #	LL	PL	PI	% SAND	% SILT	% CLAY	% MC	CLASSIFICATION
●	TH18-01	6.9	S6	85	25	60	2.6			41.7	CH
⊠	TH18-01	11.4	S11	19	12	7	34.7			13.1	CL-ML
▲	TH18-05	5.3	S5	44	20	24	3.2			30.0	CI
★	TH18-07	5.3	S4	34	18	16	20.9			28.6	CI

Notes:
ML - Low Plasticity Silt
MH - High Plasticity Silt
CL-ML - Silty Clay
CL - Low Plasticity Clay
CI - Intermediate Plasticity Clay
CH - High Plasticity Clay
LL - Liquid Limit
PL - Plastic Limit
PI - Plasticity Index
MC - Moisture Content
NP - Non-Plastic

KGS GROUP	CITY OF WINNIPEG	
Riverbank, AT Path, and Road Options Development		
A-LINE PLOT		
March 2019	Figure B1	Page 1 of 1

A-LINE PLOT U:\FMS\18-0107-01\18-0107-011 - WELLINGTON CRESCENT.GPJ

Geotechnical Report for Previous (pre-2018) Investigations

Test Hole Locations

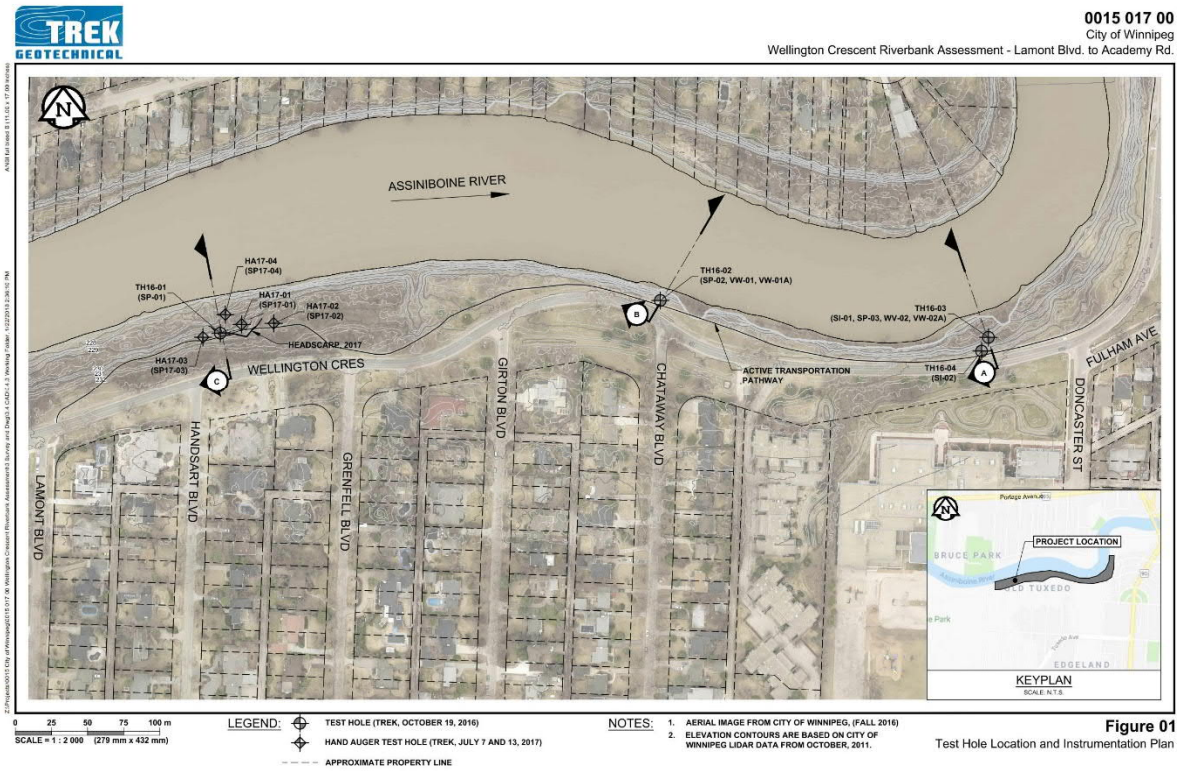


Figure 01
Test Hole Location and Instrumentation Plan

Test Hole Log for TH16-01 (Trek)

TREK GEOTECHNICAL

Sub-Surface Log

Test Hole TH16-01
1 of 2

Client:	City of Winnipeg	**Project Number:**	0015 017 00
Project Name:	Wellington Crescent (Lamont Blvd. to Academy Rd.)	**Location:**	UTM N-5526088.156, E-628157.89
Contractor:	Paddock Drilling Ltd.	**Ground Elevation:**	230.38 m Existing Ground
Method:	170 mm Hollow Stem Auger, Acker SX Track Mount	**Date Drilled:**	October 19, 2016

Sample Type: Grab (G) | Shelby Tube (T) | Split Spoon (SS) | Split Barrel (SB) | Core (C)

Particle Size Legend: Fines | Clay | Silt | Sand | Gravel | Cobbles | Boulders

Backfill Legend: Bentonite | Cement | Drill Cuttings | Filter Pack Sand | Grout | Slough

Elevation (m)	Depth (m)	Soil Symbol	Standpipe	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)
230.1	0.0			CLAY (TOPSOIL) - silty, some rootlets, trace sand - black, moist - intermediate to high plasticity, blocky/friable	G	G50	
	0.5			CLAY - silty, trace sand - brown - moist, stiff to very stiff - intermediate to high plasticity - blocky/friable	G	G51	
	1.0				SB	SB52	
	1.5				SB	SB53	
	2.0			- sand lens (~ 30 mm diam.) - trace silt, brown, dry, poorly graded, medium grained at 1.8 m - trace silt inclusions (<20 mm diam.), moist, high plasticity, varved below 1.91 m	SB	SB54	
	2.5				SB	SB55	
	3.0				SB	SB56	
	3.5			- sand lens (~ 70 mm diam.) - trace silt, brown, dry to damp, poorly graded, medium grained at 3.7 m - trace to some silt inclusions (<20 mm diam.), trace gravel below 3.7 m	SB	SB57	
	4.0			- firm below 4.0 m			
	4.5			- sand lens (~ 25 mm diam.) - trace silt, brown, dry, poorly graded, medium grained at 4.3 m	SB	SB58	
	5.0			- sand lens (~ 50 mm diam.) - trace silt, brown, dry, poorly graded, medium grained at 4.9 m	SB	SB59	

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21
Particle Size (%): 0 20 40 60 80 100
PL MC LL: 0 20 40 60 80 100
Undrained Shear Strength (kPa): 0 50 100 150 200 250
Test Type: △ Torvane △ | ✤ Pocket Pen. ✤ | ☒ Qu ☒ | ○ Field Vane ○

Logged By: Shawn Beaudry **Reviewed By:** Nelson Ferreira **Project Engineer:** Shawn Beaudry

SUB-SURFACE LOG 0015 017 00_REV1.GPJ TREK GEOTECHNICAL.GDT 1-22-18

TREK GEOTECHNICAL

Sub-Surface Log

Test Hole TH16-01
2 of 2

Elevation (m)	Depth (m)	Soil Symbol	Standpipe	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)
	5.5			- grey, soft to firm below 5.5 m			
	6.0					SB60	
223.8	6.5			SILT (TILL) - some sand, trace to some gravel, trace clay, light grey, wet, loose, low plasticity			
	7.0			- some gravel below 6.7 m		SB61	
				- moist to wet, loose to compact below 7.2 m			
	7.5			- some to with sand, some gravel, wet, loose below 7.3 m		SB62	
				- trace sand, trace gravel, moist, dense below 7.5 m			
	8.0					SS63	21
	8.5						
221.2	9.0						

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21
Particle Size (%): 0 20 40 60 80 100
PL MC LL
0 20 40 60 80 100

Undrained Shear Strength (kPa)
Test Type
△ Torvane △
✤ Pocket Pen. ✤
☒ Qu ☒
○ Field Vane ○
0 50 100 150 200 250

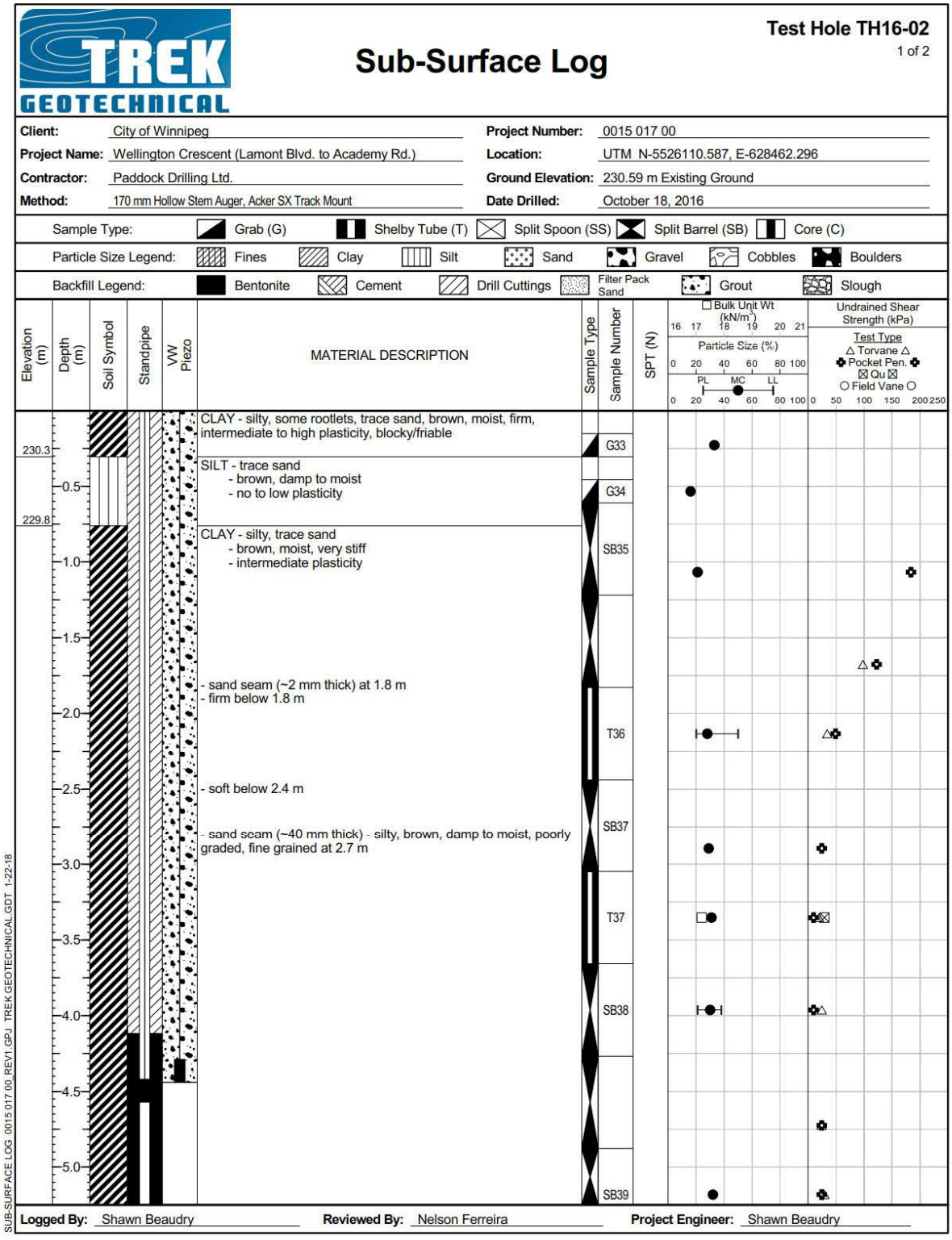
END OF TEST HOLE AT 9.1 m IN SILT (TILL)

Notes:
1. Seepage and sloughing conditions were not observed due to drilling method.
2. Standpipe piezometer SP-01 installed in TH16-01.
3. Test hole backfilled with sand to 8.4 m, bentonite from 8.4 m to 6.1 m , and auger cuttings to surface.

Logged By: Shawn Beaudry **Reviewed By:** Nelson Ferreira **Project Engineer:** Shawn Beaudry

SUB-SURFACE LOG 0015 017 00_REV1.GPJ TREK GEOTECHNICAL.GDT 1-22-18

Test Hole Log for TH16-02 (Trek)



TREK GEOTECHNICAL

Sub-Surface Log

Test Hole TH16-02
2 of 2

Elevation (m)	Depth (m)	Soil Symbol	Standpipe	VW Piezo	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)
224.8	5.5				- 25 mm thick piece of wood encountered at 5.5 m			
					SILT - trace sand, grey, wet, loose		SB40	
224.3	6.0				- sand seam (~75 mm thick) - some silt, grey, wet, poorly graded, fine grained at 5.9 m - sand and gravel seam (~280 mm thick) - silty, grey, wet, poorly graded, fine grained sand, medium to coarse grained gravel at 6.0 m		SB41	
	6.5				SILT (TILL) - some to with sand, trace gravel (<25 mm diam.) - grey, moist to wet, loose, low to non plastic			
	7.0				- some sand, dry to moist, dense below 6.7 m			32
223.0	7.5						SS42	5 / 101mm

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21
Particle Size (%): 0 20 40 60 80 100
PL MC LL: 0 20 40 60 80 100
Undrained Shear Strength (kPa): 0 50 100 150 200 250
Test Type: △ Torvane △ ✤ Pocket Pen. ✤ ☒ Qu ☒ ○ Field Vane ○

END OF TEST HOLE AT 7.6 m IN SILT (TILL)
Notes:
1. Power auger refusal encountered at 7.6 m in silt (till).
2. Seepage and sloughing conditions were not observed due to drilling method.
3. Standpipe piezometer SP-02 and vibrating wire piezometer VW-01 (tip elevation 226.02 m) installed in TH16-02. VW-01 installed on the exterior side of the standpipe casing.
4. Test hole backfilled with sand to 6.7 m, bentonite from 6.7 m to 4.1 m, and auger cuttings to surface.
5. Vibrating wire piezometer VW-01A (tip elevation 226.15 m) installed in separate test hole (TH16-02A) 0.76 m east of TH16-02 and backfilled with cement-bentonite grout.

Logged By: Shawn Beaudry **Reviewed By:** Nelson Ferreira **Project Engineer:** Shawn Beaudry

SUB-SURFACE LOG 0015 017.00_REV1.GPJ TREK GEOTECHNICAL.GDT 1-22-18

Test Hole Log for TH16-03 (Trek)

TREK GEOTECHNICAL

Sub-Surface Log

Test Hole TH16-03
1 of 2

Client:	City of Winnipeg	**Project Number:**	0015 017 00
Project Name:	Wellington Crescent (Lamont Blvd. to Academy Rd.)	**Location:**	UTM N-5526085.253, E-628689.36
Contractor:	Paddock Drilling Ltd.	**Ground Elevation:**	230.69 m Existing Ground
Method:	170 mm Hollow Stem Auger, Acker SX Track Mount	**Date Drilled:**	October 19, 2016

Sample Type: Grab (G) | Shelby Tube (T) | Split Spoon (SS) | Split Barrel (SB) | Core (C)

Particle Size Legend: Fines | Clay | Silt | Sand | Gravel | Cobbles | Boulders

Backfill Legend: Bentonite | Cement | Drill Cuttings | Filter Pack Sand | Grout | Slough

Elevation (m)	Depth (m)	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)
230.4	0	CLAY (TOPSOIL) - silty, trace to some sand, trace to some rootlets, trace gravel, black, moist, intermediate plasticity, blocky/friable	G	G01	
	0.5	CLAY - silty, trace rootlets - brown, moist, very stiff - intermediate to high plasticity	G	G02	
229.6	1.0	- trace sand, trace gravel (<20 mm diam.) below 0.8 m	SB	SB03	
		SILT - trace sand, trace clay - light brown, damp - low plasticity	SB	SB04	
229.0	1.5				
	2.0	CLAY - silty, trace sand, trace rootlets - brown, moist, stiff - intermediate to high plasticity	SB	SB05	
	2.5	- some sand, some gravel, poorly graded, fine sand to fine gravel below 2.1 m	SB	SB06	
227.9			SB	SB07	
	3.0	SAND - trace to some silt, trace gravel - brown, damp to moist - poorly graded, fine to coarse grained	SB	SB08	
227.5		CLAY - silty, trace to some silt inclusions (<15 mm diam.), trace sand, trace gravel - brown mottled grey, moist, stiff - high plasticity	SB	SB09	
226.9	3.5				
	4.0	Transition from clay to till below 3.8 m - some sand, grey, moist to wet, soft, low to intermediate plasticity.	SB	SB10	
226.3		SAND (TILL) - silty - light brown - wet, loose - poorly graded, fine to medium grained	SB	SB11	
	4.5		SS	SS12	8
	5.0				

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21
Particle Size (%): 0 20 40 60 80 100 — PL MC LL
Undrained Shear Strength (kPa): 0 50 100 150 200 250
Test Type: △ Torvane △ ✤ Pocket Pen. ✤ ☒ Qu ☒ ○ Field Vane ○

Logged By: Shawn Beaudry **Reviewed By:** Nelson Ferreira **Project Engineer:** Shawn Beaudry

SUB-SURFACE LOG 0015 017 00_REV1.GPJ TREK GEOTECHNICAL.GDT 1-22-18

TREK GEOTECHNICAL

Sub-Surface Log

Test Hole TH16-03
2 of 2

Elevation (m)	Depth (m)	Soil Symbol	Slope Inclinometer	Standpipe	VW Piezo	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)
225.1	5.5								
						SILT (TILL) - trace to some sand, trace gravel, trace clay - grey - damp to moist - compact to dense - low plasticity		SB13	
	6.0								
	6.5							SS14	45
	7.0							SS15	58 / 253mm
223.3									

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21
Particle Size (%): 0 20 40 60 80 100
PL MC LL
0 20 40 60 80 100

Undrained Shear Strength (kPa)
Test Type
△ Torvane △
✤ Pocket Pen. ✤
☒ Qu ☒
○ Field Vane ○
0 50 100 150 200 250

END OF TEST HOLE AT 7.4 m IN SILT (TILL)

Notes:
1. Seepage and sloughing conditions were not observed due to drilling method.
2. Slope inclinometer SI-01 installed in TH16-03.
3. Test hole backfilled with cement-bentonite grout to surface.
4. Standpipe piezometer SP-03 (tip elevation 223.85 m) and vibrating wire piezometer VW-02 (tip elevation 226.75 m) were installed in a seperate test hole (TH16-03A) located 2.1 m east of TH16-03. Test hole backfilled with sand to 6.2 m, bentonite from 6.2 m to 3.7 m, and cuttings to surface.
5. Vibrating wire piezometer VW-02A (tip elevation 226.81 m) was installed in a separate test hole (TH16-03B) located 3.3 m east of TH16-03. Refer to summary log TH16-03B for installation details.

Logged By: Shawn Beaudry **Reviewed By:** Nelson Ferreira **Project Engineer:** Shawn Beaudry

SUB-SURFACE LOG 0015 017.00_REV1.GPJ TREK GEOTECHNICAL.GDT 1-22-18

Test Hole Log for TH16-03B (Trek)

TREK GEOTECHNICAL

Sub-Surface Log

Test Hole TH16-03B
1 of 1

Client:	City of Winnipeg	**Project Number:**	0015 017 00
Project Name:	Wellington Crescent (Lamont Blvd. to Academy Rd.)	**Location:**	UTM N-5526086.339, E-628692.492
Contractor:	Paddock Drilling Ltd.	**Ground Elevation:**	230.77 m Existing Ground
Method:	170 mm Hollow Stem Auger, Acker SX Track Mount	**Date Drilled:**	October 19, 2016

Sample Type: Grab (G) | Shelby Tube (T) | Split Spoon (SS) | Split Barrel (SB) | Core (C)

Particle Size Legend: Fines | Clay | Silt | Sand | Gravel | Cobbles | Boulders

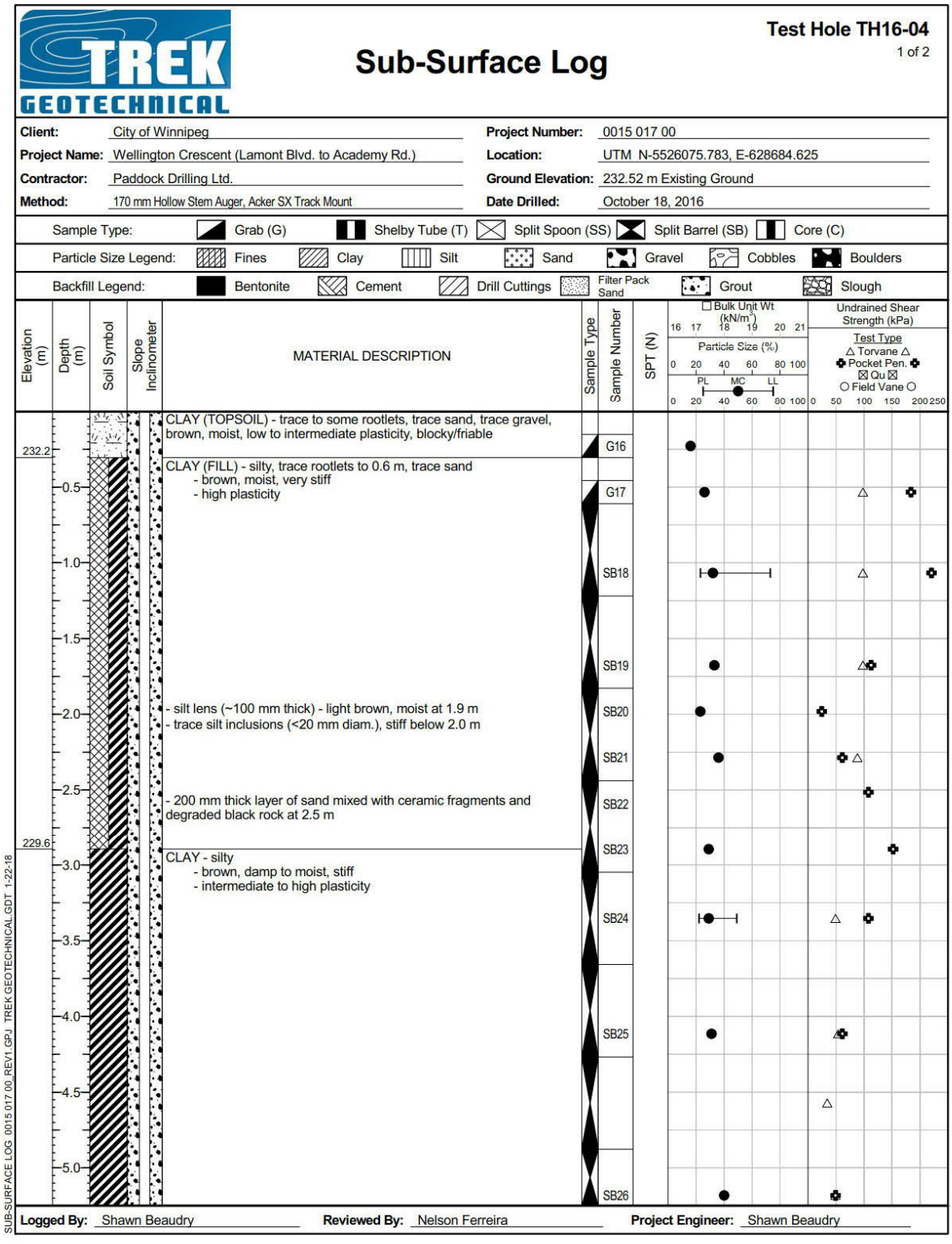
Backfill Legend: Bentonite | Cement | Drill Cuttings | Filter Pack Sand | Grout | Slough

Elevation (m)	Depth (m)	Soil Symbol	VW Piezo	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)	Bulk Unit Wt (kN/m³) 16 17 18 19 20 21	Particle Size (%) 0 20 40 60 80 100 PL MC LL 0 20 40 60 80 100	Undrained Shear Strength (kPa) Test Type △ Torvane △ ✤ Pocket Pen. ✤ ☒ Qu ☒ ○ Field Vane ○ 0 50 100 150 200 250
	0.5			Notes: 1. Refer to TH16-03 for the material description. 2. Vibrating wire piezometer VW-02A (tip elevation 226.81 m) installed in TH16-03B. 3. Test hole backfilled with cement-bentonite grout to surface.						
	1.0									
	1.5									
	2.0									
	2.5									
	3.0									
	3.5									
	4.0									

Logged By: Shawn Beaudry **Reviewed By:** Nelson Ferreira **Project Engineer:** Shawn Beaudry

SUB-SURFACE LOG 0015 017 00_REV1.GPJ TREK GEOTECHNICAL.GDT 1-22-18

Test Hole Log for TH16-04



TREK GEOTECHNICAL

Sub-Surface Log

Test Hole TH16-04
2 of 2

Elevation (m)	Depth (m)	Material Description	Sample Type	Sample Number	SPT (N)
227.0	0.0				
	5.5	Transition from clay to till below 5.5 m - trace silt inclusions, trace sand, trace gravel (<10 mm diam.), moist to wet, soft to firm.		SB27	
226.3	6.0	SILT (TILL) - trace to some sand, trace gravel (<20 mm diam.), trace clay, grey, moist to wet, loose, low plasticity		SB28	
226.0	6.5	SAND (TILL)- silty - brown - wet, loose to compact - poorly graded, fine to medium grained		SB29	
	7.0			SB30	
225.2	7.5	SILT (TILL) - trace to some sand, trace gravel (<65 mm diam.) - grey, wet, loose - moist, dense below 7.6 m		SB31	
224.1	8.0	- very dense below 7.9 m		SS32	26 / 52mm

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21
Particle Size (%): 0 20 40 60 80 100
PL MC LL
0 20 40 60 80 100

Undrained Shear Strength (kPa)
Test Type
△ Torvane △
✤ Pocket Pen. ✤
☒ Qu ☒
○ Field Vane ○
0 50 100 150 200 250

END OF TEST HOLE AT 8.4 m IN SILT (TILL)

Notes:
1. Power auger refusal encountered at 8.4 m in silt (till).
2. Seepage and sloughing conditions were not observed due to drilling method.
3. Slope inclinometer SI-02 installed in TH16-04.
4. Test hole backfilled with cement-bentonite grout to surface.

Logged By: Shawn Beaudry **Reviewed By:** Nelson Ferreira **Project Engineer:** Shawn Beaudry

SUB-SURFACE LOG 0015 017.00_REV1.GPJ TREK GEOTECHNICAL.GDT 1-22-18

Test Hole Log for HA17-01

TREK GEOTECHNICAL

Sub-Surface Log

Test Hole HA17-01
1 of 1

Client:	City of Winnipeg	**Project Number:**	0015 017 00
Project Name:	Wellington Crescent (Lamont Blvd. to Academy Rd.)	**Location:**	UTM N-5526094.171, E-628172.552
Contractor:	TREK Geotechnical Inc.	**Ground Elevation:**	230.08 m Existing Ground
Method:	50 mm Hand Auger	**Date Drilled:**	July 7, 2017

Sample Type: Grab (G) | Shelby Tube (T) | Split Spoon (SS) | Split Barrel (SB) | Core (C)

Particle Size Legend: Fines | Clay | Silt | Sand | Gravel | Cobbles | Boulders

Backfill Legend: Bentonite | Cement | Drill Cuttings | Filter Pack Sand | Grout | Slough

Elevation (m)	Depth (m)	Soil Symbol	Standpipe	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)	Bulk Unit Wt (kN/m³) 16 17 18 19 20 21	Particle Size (%) 0 20 40 60 80 100 PL MC LL	Undrained Shear Strength (kPa) Test Type △ Torvane △ ✤ Pocket Pen. ✤ ☒ Qu ☒ ○ Field Vane ○ 0 50 100 150 200 250
230.08	0.0			CLAY - silty, trace sand, trace gravel (<20 mm diam.), trace rootlets to 0.3 m, brown, damp, firm to stiff, intermediate to high plasticity, blocky, friable						
				- moist below 0.3 m		G01				
	0.5									
	1.0			- moist to wet below 1.0 m						
	1.5									
	2.0			- moist below 1.8 m		G02				
	2.5									
	3.0									
	3.5					G03				
226.1				END OF TEST HOLE AT 4.0 m IN CLAY						

Notes:
1) Seepage observed below 1.1 m during drillig.
2) No sloughing observed.
3) Test hole open to 4.0 m 15 minutes after drilling.
4) Water level at 0.8 m 15 minutes after drilling.
5) Standpipe SP17-01 installed in HA17-01.
6) Test hole backfilled with sand to 3.0 m, and bentonite to surface.

Logged By: Shawn Beaudry **Reviewed By:** Nelson Ferreira **Project Engineer:** Shawn Beaudry

SUB-SURFACE LOG 0015 017 00_REV1.GPJ TREK GEOTECHNICAL.GDT 1-22-18

Test Hole Log for HA17-02

TREK GEOTECHNICAL

Sub-Surface Log

Test Hole HA17-02
1 of 1

Client:	City of Winnipeg	**Project Number:**	0015 017 00
Project Name:	Wellington Crescent (Lamont Blvd. to Academy Rd.)	**Location:**	UTM N-5526094.876, E-628194.785
Contractor:	TREK Geotechnical Inc.	**Ground Elevation:**	231.27 m Existing Ground
Method:	50 mm Hand Auger	**Date Drilled:**	July 13, 2017

Sample Type: Grab (G) | Shelby Tube (T) | Split Spoon (SS) | Split Barrel (SB) | Core (C)

Particle Size Legend: Fines | Clay | Silt | Sand | Gravel | Cobbles | Boulders

Backfill Legend: Bentonite | Cement | Drill Cuttings | Filter Pack Sand | Grout | Slough

Elevation (m)	Depth (m)	Material Description	Sample Type	Sample Number	SPT (N)
231.27	0.0	CLAY - silty, trace rootlets to 0.3 m, brownish black, damp to moist, high plasticity			
		- brown, intermediate to high plasticity below 0.3 m			
	0.5		G	G04	
	1.0				
	1.5				
	2.0		G	G05	
	2.5	- trace silt inclusions (<5 mm diam.) below 2.5 m			
	3.0		G	G06	
227.3	3.5	- grey, moist, firm, high plasticity below 3.5 m	G	G07	
		END OF TEST HOLE AT 3.9 m IN CLAY			

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21

Particle Size (%): 0 20 40 60 80 100 — PL MC LL

Undrained Shear Strength (kPa): 0 50 100 150 200 250

Test Type: △ Torvane △ ✤ Pocket Pen. ✤ ☒ Qu ☒ ○ Field Vane ○

Notes:
1) Seepage observed below 1.5 m during drillig.
2) No sloughing observed.
3) Test hole open to 3.9 m 10 minutes after drilling.
4) Water level at 1.1 m 10 minutes after drilling.
5) Standpipe SP17-02 installed in HA17-02.
6) Test hole backfilled with sand to 3.4 m, and bentonite to surface.

Logged By: Shawn Beaudry **Reviewed By:** Nelson Ferreira **Project Engineer:** Shawn Beaudry

SUB-SURFACE LOG 0015 017 00_REV1.GPJ TREK GEOTECHNICAL.GDT 1-22-18

Test Hole Log for HA17-03

TREK GEOTECHNICAL

Sub-Surface Log

Test Hole HA17-03
1 of 1

Client:	City of Winnipeg	**Project Number:**	0015 017 00
Project Name:	Wellington Crescent (Lamont Blvd. to Academy Rd.)	**Location:**	UTM N-5526085.321, E-628145.87
Contractor:	TREK Geotechnical Inc.	**Ground Elevation:**	230.75 m Existing Ground
Method:	50 mm Hand Auger	**Date Drilled:**	July 13, 2017

Sample Type: Grab (G) | Shelby Tube (T) | Split Spoon (SS) | Split Barrel (SB) | Core (C)

Particle Size Legend: Fines | Clay | Silt | Sand | Gravel | Cobbles | Boulders

Backfill Legend: Bentonite | Cement | Drill Cuttings | Filter Pack Sand | Grout | Slough

Elevation (m)	Depth (m)	Material Description	Sample Type	Sample Number	SPT (N)
230.75	0.0	CLAY - silty, trace sand, trace gravel (<10 mm diam.), trace rootlets to 0.3 m - brown - moist - intermediate to high plasticity			
	1.0	- trace to some silt inclusions (<15 mm diam.) below 1.1 m	G	G08	
	1.5		G	G09	
	2.5				
	3.0		G	G10	
227.0	3.5	- moist, firm to stiff below 3.3 m	G	G11	
		END OF TEST HOLE AT 3.8 m IN CLAY			

Bulk Unit Wt (kN/m³): 16 17 18 19 20 21
Particle Size (%): 0 20 40 60 80 100 — PL MC LL
Undrained Shear Strength (kPa) — Test Type: △ Torvane △ ✤ Pocket Pen. ✤ ☒ Qu ☒ ○ Field Vane ○: 0 50 100 150 200 250

Notes:
1) No seepage or sloughing observed.
2) Test hole open to 3.8 m 10 minutes after drilling.
3) Water level not observed following drilling.
4) Standpipe SP17-03 installed in HA17-03.
5) Test hole backfilled with sand to 3.0 m, and bentonite to surface.

Logged By: Shawn Beaudry **Reviewed By:** Nelson Ferreira **Project Engineer:** Shawn Beaudry

SUB-SURFACE LOG 0015 017 00_REV1.GPJ TREK GEOTECHNICAL.GDT 1-22-18

Test Hole Log for HA17-04

TREK GEOTECHNICAL

Sub-Surface Log

Test Hole HA17-04
1 of 1

Client:	City of Winnipeg	**Project Number:**	0015 017 00
Project Name:	Wellington Crescent (Lamont Blvd. to Academy Rd.)	**Location:**	UTM N-5526100.925, E-628161.311
Contractor:	TREK Geotechnical Inc.	**Ground Elevation:**	229.11 m Existing Ground
Method:	50 mm Hand Auger	**Date Drilled:**	July 13, 2017

Sample Type: Grab (G) | Shelby Tube (T) | Split Spoon (SS) | Split Barrel (SB) | Core (C)

Particle Size Legend: Fines | Clay | Silt | Sand | Gravel | Cobbles | Boulders

Backfill Legend: Bentonite | Cement | Drill Cuttings | Filter Pack Sand | Grout | Slough

Elevation (m)	Depth (m)	Soil Symbol	Standpipe	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)	Bulk Unit Wt (kN/m³) 16 17 18 19 20 21 / Particle Size (%) 0 20 40 60 80 100 / PL MC LL	Undrained Shear Strength (kPa) Test Type: Torvane, Pocket Pen., Qu, Field Vane 0 50 100 150 200 250
228.3	0.5			CLAY - silty, trace rootlets - brown - moist - high plasticity		G12			
	1.0			SILT - clayey - light brown - wet, loose - low plasticity		G13			
227.3	1.5								
	2.0			CLAY - silty - brown - wet, soft - intermediate plasticity		G14			
226.4	2.5								

END OF TEST HOLE AT 2.7 m IN CLAY

Notes:
1) Seepage observed below 1.3 m during drillig.
2) Sloughing observed in silt layer from 0.75 to 1.8 m during drilling.
3) Test hole open to 1.4 m 10 minutes after drilling.
4) Water level at approximately 1.0 m immediately after drilling.
5) Standpipe SP17-04 installed in HA17-04.
6) Test hole backfilled with sand to 1.8 m, and bentonite to surface.

SUB-SURFACE LOG 0015 017 00_REV1.GPJ TREK GEOTECHNICAL.GDT 1-22-18

Logged By: Shawn Beaudry **Reviewed By:** Nelson Ferreira **Project Engineer:** Shawn Beaudry

Test Hole Locations

Test Hole Log for TH12-01 (KGS)

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH12-01** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	Chataway Outfall Repairs & Rehabilitation
SITE	Chataway Blvd Outfall
LOCATION	4 m east of Outfall, 3 m south of sidewalk (Upper bank)
DRILLING METHOD	200 mm ø Hollow Stem Auger

JOB NO.	11-0107-33
GROUND ELEV.	230.6
TOP OF PVC ELEV.	Flush Mount
WATER ELEV.	
DATE DRILLED	3/21/2012
UTM (m)	N 5,526,083
	E 628,520

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE / NUMBER
230.3	0	0	**TOPSOIL** - Black to dark brown, damp, firm.		0.3	
230	1		**CLAYEY SILT** - Brown, damp, friable, low to intermediate plasticity, trace tree rootlets.			S1
229.0		5				
229	2		**SILTY CLAY** - Brown, damp to moist, firm, intermediate to high plasticity, trace to some silt inclusions, trace fine to medium grained sand, trace roots.			S2
228	3	10	- Increase in silt content below 3.0 m.	PN	2.9 3.0	
227	4		- Grain size distribution: Gravel (0.0%), Sand (5.4%), Silt (56.2%) and Clay (38.0%) at 3.66 m.			S3
226.0		15	- Wet, trace roots below 4.4 m.			S4
226	5		**SANDY SILTY CLAY** - Grey, damp to moist, soft to firm, with fine to medium grained sand, some red coloured sandy layers throughout (oxidized), trace to some clay.			S5
225			- Increase in sand content below 5.49 m. - Grain size distribution: Gravel (0.0%), Sand (42.4%), Silt (36.9%) and Clay (20.7%) at 5.49 m.			S6
224.2	6	20	- Wet, trace cobbles below 6.08 m			
224			**SILT TILL** - Tan to light grey, wet, dense, with cobbles, with hard chunks of silt till, decrease in moisture content with depth.			S7
223	7	25	**AUGER REFUSAL at 7.62 m**		7.6	S8
	8		Notes: 1. Installed SI-1 at 7.62 m below ground surface. 2. Installed pneumatic piezometer PN-1 (SN 034749) at 3.0 m below ground surface. 3. Groundwater level at 6.4 m below grade at end of drilling. 4. Backfilled TH12-01 with grout from 7.62 m to 0.3 m and bentonite chips from 0.3 m to surface.			
222	9	30				
221						

SPT (N) blows/0.15 m ▲ — DYNAMIC CONE (N) blows/ft △ — 20 40 60

Cu POCKET PEN (kPa) ★ — Cu TORVANE (kPa) ◆ — 20 40 60 80

PL MC LL — % — 20 40 60 80

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. CANNING	AMH	3/12/12

GEOTECHNICAL-SOIL LOG P:\PROJECTS\2011\11-0107-33\DESIGN\GEOLOGS\CHATAWAY BLVD OUTFALL 11-0107-33.GPJ

Test Hole Log for TH12-02 (KGS)

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH12-02** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	Chataway Outfall Repairs & Rehabilitation
SITE	Chataway Blvd Outfall
LOCATION	5 m west of Outfall (Upper bank)
DRILLING METHOD	200 mm ø Hollow Stem Auger

JOB NO.	11-0107-33
GROUND ELEV.	230.6
TOP OF PVC ELEV.	Flush Mount
WATER ELEV.	
DATE DRILLED	3/21/2012
UTM (m)	N 5,526,087
	E 628,513

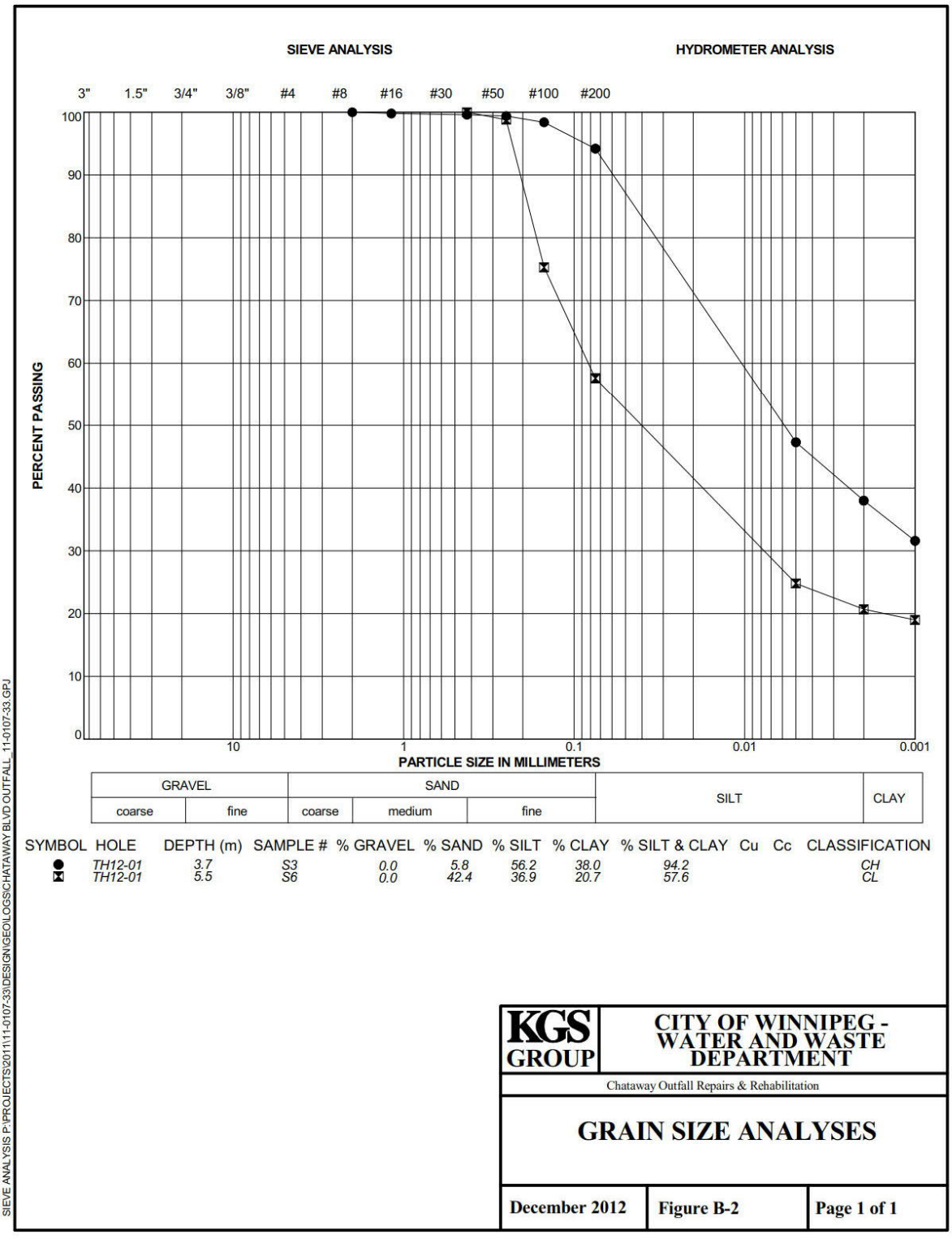
ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE / NUMBER / RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆ / PL MC LL %
230.3				**TOPSOIL** - Black to dark brown, damp, firm.					
230	1			**CLAYEY SILT** - Brown, damp, friable, low to intermediate plasticity, trace tree rootlets.					
229.0		5		**SILTY CLAY** - Brown, damp to moist, firm, intermediate to high plasticity, trace to some silt inclusions, trace fine to medium grained sand, trace roots.					
229	2								
228									
	3	10		- Increase in silt content below 3.0 m.					
227									
	4			- Grain size distribution: Gravel (0.0%), Sand (5.4%), Silt (56.2%) and Clay (38.0%) at 3.66 m.					
226.0		15		- Wet, trace roots below 4.4 m.					
226	5			**SANDY SILTY CLAY** - Grey, damp to moist, soft to firm, with fine to medium grained sand, some red coloured sandy layers throughout (oxidized), trace to some clay.					
225				- Increase in sand content below 5.49 m.					
	6	20		- Grain size distribution: Gravel (0.0%), Sand (42.4%), Silt (36.9%) and Clay (20.7%) at 5.49 m.					
224.2				- Wet, trace cobbles below 6.08 m					
224	7			**SILT TILL** - Tan to light grey, wet, dense, with cobbles, with hard chunks of silt till, decrease in moisture content with depth.					
223		25				7.6			
222.6						7.9			
	8			**AUGER REFUSAL at 7.9 m**					
222				Notes: 1. Stratigraphy for TH12-02 has been projected from TH12-01 and is assumed representative. 2. Installed Casagrande standpipe at 7.9 m below ground surface. 3. Backfilled TH12-02 with silica sand from 7.9 m to 7.6 m and bentonite chips from 7.6 m to ground surface.					
	9	30							
221									

SAMPLE TYPE

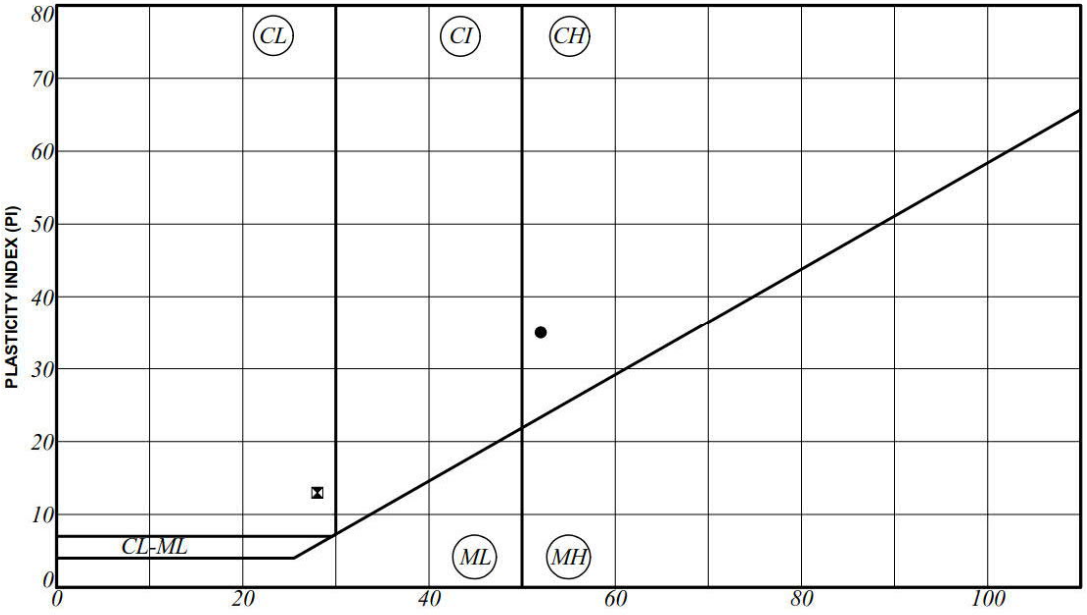
CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. CANNING	AMH	3/12/12

GEOTECHNICAL-SOIL LOG P:\PROJECTS\2011\11-0107-33\DESIGN\GEO\LOGS\CHATAWAY BLVD OUTFALL_11-0107-33.GPJ

Particle Size Analysis for TH12-01



Atterberg Limits for TH12-01



SYMBOL	HOLE	DEPTH (m)	SAMPLE #	LL	PL	PI	% SAND	% SILT	% CLAY	% MC	CLASSIFICATION
●	TH12-01	3.7	S3	52	17	35	5.8	56.2	38.0	31.9	CH
⧓	TH12-01	5.5	S6	28	15	13	42.4	36.9	20.7	28.0	CL

Notes:
ML - Low Plasticity Silt
MH - High Plasticity Silt
CL-ML - Silty Clay
CL - Low Plasticity Clay
CI - Intermediate Plasticity Clay
CH - High Plasticity Clay
LL - Liquid Limit
PL - Plastic Limit
PI - Plasticity Index
MC - Moisture Content
NP - Non-Plastic

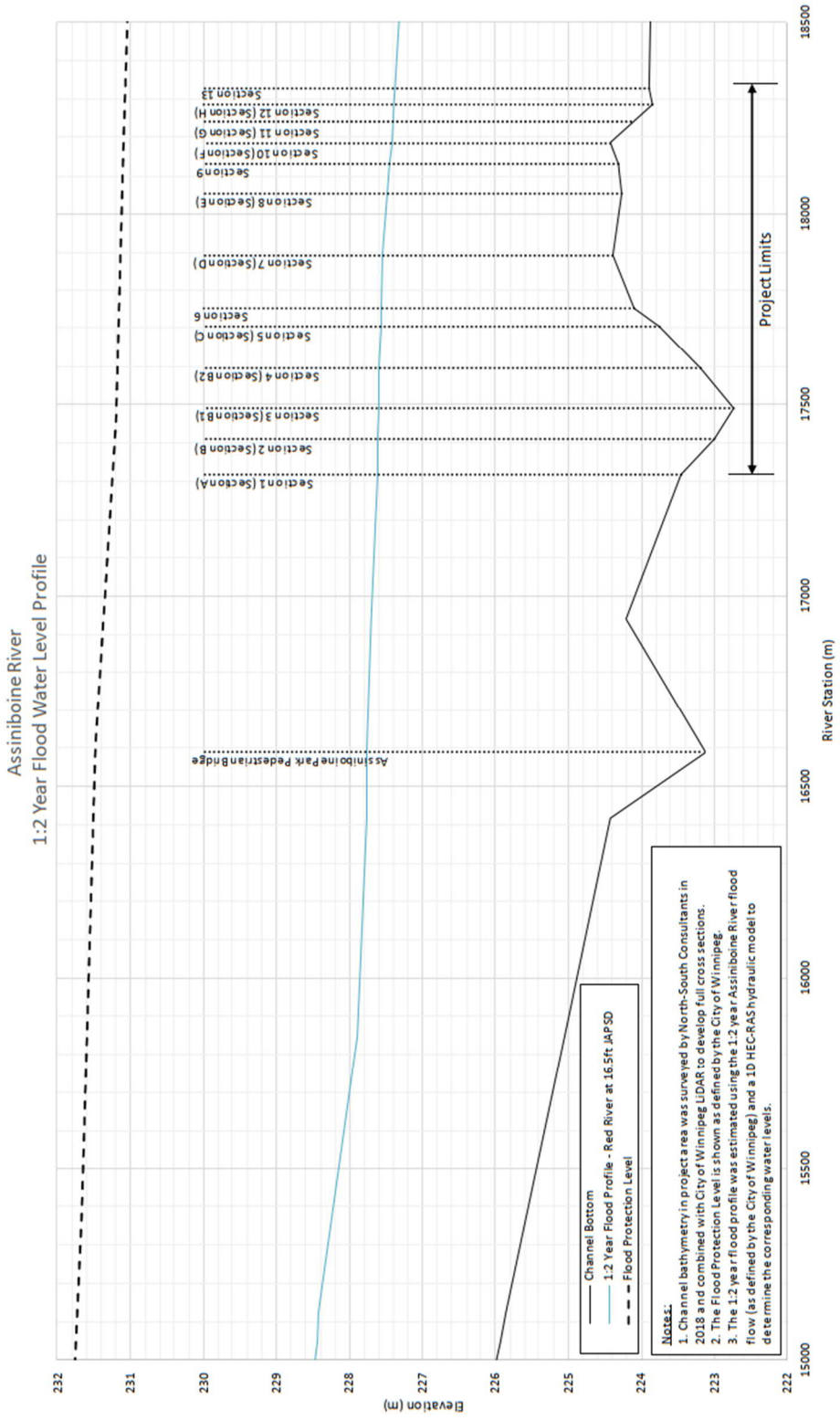
KGS GROUP	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT	
Chataway Outfall Repairs & Rehabilitation		
A-LINE PLOT		
December 2012	Figure B-1	Page 1 of 1

A-LINE PLOT P:\PROJECTS\2011\11-0107-33\DESIGN\GEO\LOGS\CHATAWAY BLVD OUTFALL_11-0107-33.GPJ

APPENDIX 'B' – RIVER LEVEL INFORMATION

This river level information is provided to aid in the Contractor's evaluation of the potential river levels that may be present at the site under a 1:2 Year Flood on the Assiniboine River that coincides with a 1:2 year flood on the Red River as well as the average winter water level which assumes a 2ft thick ice cover and an average flow corresponding to average recorded flows at Water Survey of Canada (WSC) gauge 05MJ001 between December and February over the last 50 years. Both profiles utilized a calibrated 1D HEC-RAS hydraulic model to determine the corresponding water levels. The information presented is considered to be a best estimate according to the assumptions made in the notes provided on the hydraulic profiles. Actual river levels encountered at the site during construction will vary depending on several factors that may influence the river level at any given point in time.

1:2 Year Flood River Level / Ordinary High-Water Mark (OHWM) Profile



Average Winter Ice Level (AWIL) Profile