



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 312-2016

**2016 WINNIPEG BIKE PROJECTS – MAIN STREET AND ASSINIBOINE AVENUE
CROSSING**

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 2016 Winnipeg Bike Projects – Main Street and Assiniboine Avenue Crossing

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, May 11, 2016.

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

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

B3. ENQUIRIES

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

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

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

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

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

B4. CONFIDENTIALITY

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

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

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

B5. ADDENDA

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

- B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
- B5.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>
- B5.2.2 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B5.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B6. SUBSTITUTES

- B6.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.
- B6.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B6.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.
- B6.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.
- B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.
- B6.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.
- B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

- B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B16.
- B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B7. BID COMPONENTS

- B7.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices, hard copy;
 - (c) Bid Security
 - (i) Form G1: Bid Bond and Agreement to Bond, or
Form G2: Irrevocable Standby Letter of Credit and Undertaking, or
a certified cheque or draft;
- B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.
- B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.
- B7.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.
- B7.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.
- B7.4.2 A hard copy of Form B: Prices must be submitted with the Bid. If there is any discrepancy between the Adobe PDF version of Form B: Prices and the Microsoft Excel version of Form B: Prices, the PDF version shall take precedence.
- B7.5 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.
- B7.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B16.1(a).
- B7.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B7.8 Bids shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management Division
185 King Street, Main Floor
Winnipeg MB R3B 1J1

B8. BID

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

- B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his/her own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.
- B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B8.4 Paragraph 12 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, shall be affixed;
 - (d) if the Bidder is carrying on business under a name other than his/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B8.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.
- B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B9. PRICES

- B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B9.1.1 For the convenience of Bidders, and pursuant to B7.4.2 and B16.4.2, an electronic spreadsheet Form B: Prices in Microsoft Excel (.xls) format is available along with the Adobe PDF documents for this Bid Opportunity on the Bid Opportunities page at the Materials Management Division website at <http://www.winnipeg.ca/matmgt/>
- B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.
- B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.
- B9.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B10. DISCLOSURE

- B10.1 Various Persons provided information or services with respect to this Work. In the City's opinion, this relationship or association does not create a conflict of interest because of this full

disclosure. Where applicable, additional material available as a result of contact with these Persons is listed below.

B10.2 The Persons are:

- (a) N/A
- (b) N/A

B11. QUALIFICATION

B11.1 The Bidder shall:

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

B11.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

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

B11.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

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

B11.4 Further to B11.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

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

B11.5 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B11.6 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B12. BID SECURITY

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

- (a) a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond); or
- (b) an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Bid Price, and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form included in the Bid Submission (Form G2: Irrevocable Standby Letter of Credit and Undertaking); or
- (c) a certified cheque or draft payable to "The City of Winnipeg", in the amount of at least fifty percent (50%) of the Total Bid Price, drawn on a bank or other financial institution registered to conduct business in Manitoba.

B12.1.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.

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

B12.1.3 The Bidder shall sign the Bid Bond.

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

B12.2 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly executed by the successful Bidder and the performance security furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

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

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

B12.3 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Bid Opportunity.

B13. OPENING OF BIDS AND RELEASE OF INFORMATION

B13.1 Bids will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Division, or in such other office as may be designated by the Manager of Materials.

B13.1.1 Bidders or their representatives may attend.

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

B13.2 Following the submission deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at

The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>

- B13.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>
- B13.4 The Bidder is advised that any information contained in any Bid may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B14. IRREVOCABLE BID

- B14.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.
- B14.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the performance security furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid.

B15. WITHDRAWAL OF BIDS

- B15.1 A Bidder may withdraw his/her Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.
- B15.1.1 Notwithstanding C23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.
- B15.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B15.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:
- (a) retain the Bid until after the Submission Deadline has elapsed;
 - (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid; and
 - (c) if the notice has been given by any one of the persons specified in B15.1.3(b), declare the Bid withdrawn.
- B15.2 A Bidder who withdraws his/her Bid after the Submission Deadline but before his/her Bid has been released or has lapsed as provided for in B14.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B16. EVALUATION OF BIDS

- B16.1 Award of the Contract shall be based on the following bid evaluation criteria:
- (a) compliance by the Bidder with the requirements of the Bid Opportunity, or acceptable deviation therefrom (pass/fail);
 - (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B11 (pass/fail);
 - (c) Total Bid Price;

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

B16.2 Further to B16.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities, if the interests of the City so require.

B16.3 Further to B16.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his/her Bid or in other information required to be submitted, that he/she is responsible and qualified.

B16.4 Further to B16.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.

B16.4.1 Further to B16.1(a), in the event that a unit price is not provided on Form B: Prices, the City will determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B16.4.2 The electronic Form B: Prices and the formulas imbedded in that spreadsheet are only provided for the convenience of Bidders. The City makes no representations or warranties as to the correctness of the imbedded formulas. It is the Bidder's responsibility to ensure the extensions of the unit prices and the sum of Total Bid Price performed as a function of the formulas within the electronic Form B: Prices are correct.

B17. AWARD OF CONTRACT

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

B17.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.

B17.2.1 Without limiting the generality of B17.2, the City will have no obligation to award a Contract where:

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

B17.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B16.

B17.3.1 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.

B17.4 As noted in D2, the Work on current private property will be contingent upon the City of Winnipeg obtaining an easement from the land owner. If the easement is not obtained prior to the start of construction the City shall reserve the right to temporarily delay all work on current private property until an easement is obtained from the land owner.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for Construction* (Revision 2006 12 15) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm
- C0.2 A reference in the Bid Opportunity to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. SCOPE OF WORK

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

- (a) Bike Lane Construction
 - (i) The Forks to Assiniboine Bicycle Connection
- (b) Streetscaping
 - (i) The Forks to Assiniboine Bicycle Connection

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

- (a) Bike Lane Construction
 - (i) Sidewalk removal
 - (ii) Removal of existing paving stones
 - (iii) Excavation
 - (iv) Compaction of existing sub-grade
 - (v) Placement of separation geotextile fabric
 - (vi) Adjustment of valve boxes
 - (vii) Concrete curb renewal
 - (viii) Construction of 180 mm barrier curb
 - (ix) Installation of asphalt bike lane
 - (x) Installation of 100 mm sidewalk
 - (xi) Full depth pavement patching
- (b) Streetscaping
 - (i) Excavations and removals
 - (ii) Concrete works
 - (iii) Installation of Pavers
 - (iv) Fence installation
 - (v) Planting

D2.3 The City currently does not have an easement for the work to be completed on current private property. The work on current private property is contingent upon the City obtaining an easement from the land owner and will be delayed if an easement is not obtained prior to construction commencing.

D2.3.1 If the easement is not obtained prior to construction commencing, the time periods stipulated in D17 for Substantial Performance of the Work and in D18 for Total Performance of the Work will be adjusted appropriately by the Contract Administrator acting reasonably.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is MMM Group Limited, a WSP Company, represented by:

Vilko Maroti, CET, P.Eng.
Manager (Transportation Engineering)

Telephone No. 204 943-3178

Email MarotiV@MMM.ca

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

D3.3 Bids Submissions must be submitted to the address in B7.8

D4. CONTRACTOR'S SUPERVISOR

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

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

D5. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

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

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

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

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

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

D6. NOTICES

D6.1 Except as provided for in C23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.

D6.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D6.3 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the facsimile number identified in D3.1.

- 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

- D6.4 Bids Submissions must be submitted to the address in B7.8.**

D7. FURNISHING OF DOCUMENTS

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

SUBMISSIONS

D8. AUTHORITY TO CARRY ON BUSINESS

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

D9. SAFE WORK PLAN

- D9.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.
- D9.2 The Safe Work Plan shall be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/safety/default.stm>

D10. INSURANCE

- D10.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability, broad form property damage cover and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;
 - (b) if applicable, Automobile Liability Insurance covering all motor vehicles, owned and operated and used or to be used by the Contractor directly or indirectly in the performance of the Work. The Limit of Liability shall not be less than \$2,000,000 inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence;
 - (c) an all risks Installation Floater carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.
- D10.2 Deductibles shall be borne by the Contractor.

D10.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in the C4.1 for the return of the executed Contract.

D10.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D11. PERFORMANCE SECURITY

D11.1 The Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:

- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or
- (b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or
- (c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.

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

D11.2 If the bid security provided in his/her Bid was not a certified cheque or draft pursuant to B12.1(c), the Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site and in no event later than the date specified in the C4.1 for the return of the executed Contract.

D12. SUBCONTRACTOR LIST

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

D13. DETAILED WORK SCHEDULE

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

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

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

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

SCHEDULE OF WORK

D14. COMMENCEMENT

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

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

- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence of authority to carry on business specified in D8;
 - (ii) evidence of the workers compensation coverage specified in C6.15;
 - (iii) the twenty-four (24) hour emergency response phone number specified in D4.2.
 - (iv) the Safe Work Plan specified in D9;
 - (v) evidence of the insurance specified in D10;
 - (vi) the performance security specified in D11;
 - (vii) the subcontractor list specified in D12; and
 - (viii) the detailed work schedule specified in D13.
- (b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.

D14.3 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the letter of intent.

D14.4 The City intends to award this Contract by May 26, 2016.

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

D15. RESTRICTED WORK HOURS

D15.1 Further to clause 3.10 of CW 1130, the Contractor shall require written permission forty-eight (48) hours in advance from the Contract Administrator for any work to be performed between 2000 hours and 0700 hours, or on Saturdays, Sundays, Statutory Holidays and or Civic Holidays.

D16. WORK BY OTHERS

D16.1 Work by others on or near the Site will include but not necessarily be limited to:

- (a) Winnipeg Transit. The Contractor is expected to cooperate with Winnipeg Transit to facilitate construction;
- (b) Traffic signal installation by Others. The Contractor is expected to cooperate with the Contractor of the traffic signal installation to facilitate construction;
- (c) Streetlight Relocation by Others. The Contractor is expected to cooperate with the MB Hydro to facilitate construction.

D17. SUBSTANTIAL PERFORMANCE

D17.1 The Contractor shall achieve Substantial Performance by June 30, 2016.

D17.2 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.

- D17.3 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.

D18. TOTAL PERFORMANCE

- D18.1 The Contractor shall achieve Total Performance by July 8, 2016.
- D18.2 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.
- D18.3 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.

D19. LIQUIDATED DAMAGES

- D19.1 If the Contractor fails to achieve Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:
- (a) Substantial Performance – Two Thousand dollars (\$2000.00);
 - (b) Total Performance – One Thousand dollars (\$1000.00).
- D19.2 The amounts specified for liquidated damages in D19.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve Substantial Performance or Total Performance by the days fixed herein for same.
- D19.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D20. SEQUENCE OF WORK

- D20.1 Further to C6.1, the sequence of work shall be as follows:
- D20.1.1 Construction of sidewalk and the proposed Main Street crossing shall not commence until construction of traffic signals, by others, is completed.

D21. SCHEDULED MAINTENANCE

- D21.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:
- (a) Landscape Maintenance as specified in E8;
- D21.2 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

D22. JOB MEETINGS

- D22.1 Regular weekly job meetings will be held at 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.
- D22.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

D23. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

- D23.1 Further to C6.24, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

D24. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

- D24.1 Further to B11.4, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B11.4.

MEASUREMENT AND PAYMENT

D25. PAYMENT

- D25.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D26. WARRANTY

- D26.1 Notwithstanding C13.2, the warranty period shall begin on the date of Substantial Performance and shall expire two (2) year thereafter unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.
- D26.2 Notwithstanding C13.2 or D26.1, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Substantial 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.
- D26.2.1 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.

FORM H1: PERFORMANCE BOND
(See D11)

KNOW ALL MEN BY THESE PRESENTS THAT

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

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

_____ dollars (\$_____)

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

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

BID OPPORTUNITY NO. 312-2016

2016 Winnipeg Bike Projects – Main Street and Assiniboine Avenue Crossing
which is by reference made part hereof and is hereinafter referred to as the "Contract".

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

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

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

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

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

_____ day of _____, 20____.

SIGNED AND SEALED
in the presence of:

(Witness as to Principal if no seal)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

**FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)**
(See D11)

(Date)

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

RE: PERFORMANCE SECURITY – BID OPPORTUNITY NO. 312-2016

2016 Winnipeg Bike Projects – Main Street and Assiniboine Avenue Crossing

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

(Name of Contractor)

(Address of Contractor)

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

_____ Canadian dollars.

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

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

Partial drawings are permitted.

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

(Address)

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

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

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

(Date)

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

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

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

(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

FORM J: SUBCONTRACTOR LIST
 (See D12)

2016 Winnipeg Bike Projects – Main Street and Assiniboine Avenue Crossing

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
SURFACE WORKS		
Supply of Materials:		
Concrete		
Asphalt		
Base Course & Sub-Base		
Geotextile Materials		
Paving Stone		
Top Soil/Sod/Seed		
Installation/Placement:		
Concrete		
Asphalt		
Base Course & Sub-Base		
Geotextile Materials		
Top Soil/Sod/Seed		

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

- E1.1 These Specifications shall apply to the Work.
- E1.2 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/Spec/Default.stm>
- E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.2.3 Further to C2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
5515081-C-00	Cover Sheet	A1
5515081-C-01	Main Street and Assiniboine Avenue Crossing – Proposed Bike Path and Pedestrian Crossing	A1
L.1.1	Main Street and Assiniboine Avenue – Proposed Bike Path/Sidewalk Layout	A1
5515081-S-01	Main Street and Assiniboine Avenue Crossing – Fence and Retaining Wall Details	A1

E2. WATER USED BY THE CONTRACTOR

- E2.1 Further to clause 3.7 of CW 1120, latest edition, the Contractor shall pay for all costs associated with obtaining water in accordance with the Waterworks By-Law. Sewer charges will not be assessed for water obtained from a hydrant.

E3. TREE PROTECTION

- E3.1 The Contractor shall take the following precautionary steps to prevent damage from construction activities to existing trees within the limits of the construction area. If you require further information on these specifications, please contact the City of Winnipeg Forestry Branch at 204-986-2004:
- For trees greater than 100mm in diameter, attach wood strapping material having a minimum thickness of 25mm and minimum length of 2440mm around tree trunks in a manner that will not harm the trees. Do not use nails or other fasteners that penetrate into trees. The width of strapping should suit the size of the tree being protected. Length of strapping may be reduced to suit tree being protected as approved by the Contract Administrator.
 - For trees less than 100mm in diameter, install snow fencing around the tree to a 2.0 meter radius complete with installation hardware. The 2.0 meter radius of the snow fencing may be reduced to suit the tree being protected as approved by the Contract Administrator.
 - Operation equipment within the dripline of the trees shall be kept to the minimum required to perform the work. Equipment shall not be parked, repaired, refueled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines

of the 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.

- (d) Repair replace and maintain tree protection material during construction of the Work.
 - (e) Remove snow fencing and strapping material without harming trees as soon as the construction and restoration work is completed.
- E3.2 Obtain approval from the Contract Administrator to excavate within 2.0 meters of a tree.
- E3.3 Excavate in a manner to minimize damage to root systems. Keep exposed roots in excavations and trenches moist or shaded.
- E3.4 Prune exposed roots with equipment such as trenchers, chain saws, root cutters or other methods acceptable to the Contract Administrator in a manner that will leave a neat, clean root end.
- E3.5 Take precautions to ensure tree limbs overhanging the Site are not damaged by construction equipment. Contact the Forestry Branch for consultation on pruning of overhanging or damaged limbs and branches and other unanticipated problems with trees during construction of the Works.
- E3.6 American elm trees are not to be pruned between April 1st and August 1st and Siberian elm trees between April 1st and July 1st of any year under provisions of The Dutch Elm Disease Act.
- E3.7 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 Forestry Branch. Damages must be repaired by an individual with a Manitoba Arborist licence or by the Forestry Branch.
- E3.8 The Forestry Branch will remove and replace any trees deemed to have died or that are dying due to damage from carelessness during construction. Removal and replacement costs will be determined by size, market price of the largest transplantable tree of same or different species and may include appraised value of existing tree as determined by current International Society of Arboriculture evaluation procedure presently used by Forestry Branch in conjunction with City Claims Branch. Estimated replacement cost of a 250 and 600mm diameter American elm on a boulevard based on an appraised value is approximately \$4,700.00 and \$27,000.00 respectively.
- E3.9 Measurement and Payment
- E3.9.1 Protection of existing trees, repair of trees and pruning of damaged limbs will not be measured for payment and will be included with Underground or Surface Works. Removal and replacement of existing trees by the Forestry Branch deemed to have died or that are dying due to damage from carelessness during construction will be at own costs and will be invoiced for or deducted from any payments owing.

E4. TREE WELLS

E4.1 Description

- E4.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of tree wells with thickend concrete edge and related excavation, granular drainage material, drainage pipe, geotextile, planting medium, and wood chip mulch.

E4.2 Materials

- E4.2.1 Granular drainage material in accordance with specification CW3120 - Installation of Sub Drains.
- E4.2.2 Drainage pipe: 150mm dia. perforated PVC pipe.
- E4.2.3 Non-woven geotextile to CW3120.

- E4.2.4 Concrete materials and accessories in accordance with Specification CW 3310 – Portland Cement Concrete Pavement Works, to suit loads designed by Structural Engineer.
- E4.2.5 Planting medium in accordance with Planting Medium and Finished Grading specification.
- E4.2.6 Wood mulch in accordance with Trees, Shrubs & Groundcover Plantings specification.
- E4.3 Construction Method
- E4.3.1 The Contractor must ensure that all buried utilities and services are located and if necessary, protected and exposed prior to any excavation in accordance with specification CW1120.
- E4.3.2 Soft dig around existing trees to determine extent of existing root system.
- E4.3.3 Excavate tree wells to the dimensions and depth shown on the Drawings. Soft dig / day lighting process to be used in area of existing underground utilities. Ensure base of tree pit slopes to drain toward perforated drainage pipe / roadway drainage system (min 1.0% slope).
- E4.3.4 Remove roadway base and sub base where required to achieve width indicated on the Drawings. Do not remove any base or sub-base material within 450mm of back of curb.
- E4.3.5 Clear excavation of all construction debris, trash, rubble and any foreign material. Excavate and remove oil spills and other soil contamination sufficiently to remove the harmful material. Fill over-excavations with approved fill and compact to the required subgrade compaction.
- E4.3.6 All excavated material shall be disposed of off site in accordance with specification CW1130.
- E4.3.7 Install 150mm depth granular drainage course with drainage pipe in accordance with specification CW3120, and as shown on the Drawings. Ensure pipe has minimum 25mm cover of drainage course above and below. Tie into existing catch basin or approved alternate outlet.
- E4.3.8 Cover drainage course and sides of tree pit with geotextile in accordance with specification CW3120 and as shown on the Drawings.
- E4.3.9 Install geotextile and planting medium.
- E4.3.10 After tree planting, ensure that finished soil level is 75mm below finished grade of sidewalk at trees to accommodate mulch.
- E4.4 Measurement and Payment
- E4.4.1 Construction of Tree Wells will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre. The quantity to be paid for will be the total volume constructed in accordance with this specification, accepted and measured by the Contract Administrator. Tree Well pricing includes excavation, granular drainage material, and geotextile. Over-excavation will not be paid.
- E4.4.2 Drainage pipe shall be paid for on a lineal metre basis. Price shall be payment in full for supplying materials and for performing the Work.
- E4.4.3 Drainage pipe connection to existing drainage infrastructure shall be paid for on a lump sum basis per connection. Price shall be payment in full for supplying materials and for performing the Work.

E5. UNIT PAVING

- E5.1 Description
- E5.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of concrete unit pavers in formed blockouts and through landscaped areas, as indicated on the Drawings.

E5.2 References

- E5.2.1 CW3330 – Installation of Interlocking Paving Stones
- E5.2.2 CW3335 – Installation of Interlocking Paving Stones on a Lean Concrete Base

E5.3 Materials

- E5.3.1 Concrete interlocking paving stones supplied by Barkman Concrete Ltd. ph. 204-667-3310:
 - (a) Broadway unit paver in the full range of sizes: 300 x 151 x 100mm, 300 x 300 x 100, 600 x 300 x 100; colour: Limestone.
 - (b) Holland unit pavers, 200 x 200 x 60mm, colour Mahogany.
 - (c) Holland unit pavers, 100 x 200 x 60mm, colour Ebony.
- E5.3.2 Paver Restraint: heavy-duty prefabricated aluminum paver edging, suitable for 100 mm depth paving units. Acceptable product: Stronghold Aluminum paver edging, manufactured by Snapedge Canada Ltd., 4-2300 Shirley Drive, Kitchener, ON N2B 3Y2; Phone: 1-800-720-7627.
- E5.3.3 Concrete fasteners: Tapcon screws or approved alternate.
- E5.3.4 Granular base to CW3330.
- E5.3.5 Concrete base to CW3310.
- E5.3.6 Bedding Sand: fine aggregate to the requirements of specification CW3330.
- E5.3.7 Joint Sand to CW 3330.
- E5.3.8 Non-woven geotextile per CW3120.

E5.4 Construction Method

- E5.4.1 Obtain approval of layout from Contract Administrator prior to forming of blockouts and fastening paving restraints through landscaped areas. Blockouts for the Broadway unit pavers represent historic structures and must align with existing structures at Upper Fort Garry Provincial Park and Bonnycastle Park.
- E5.4.2 Contractor to verify the exact dimensions of pavers prior to forming of blockouts in concrete sidewalk and fastening paver restraints through landscaped areas. Blockout widths and paver restraints to accommodate pavers and joint sand without cutting.
- E5.4.3 Install concrete sidewalk and blockouts as specified on Drawings.
- E5.4.4 Install concrete base in landscaped areas in accordance with CW3310. Install paver restraints with approved concrete fasteners at intervals recommended by restraint manufacturer.
- E5.4.5 Installation of Sand Base
 - (a) Install bedding sand for Broadway unit pavers in blockouts and in landscaped areas as indicated on the Drawings.
 - (b) Install bedding sand for Holland pavers to depth indicated in CW3335.
 - (c) Do not compact sand base prior to installing pavers.
- E5.4.6 Installation of Unit Pavers:
 - (a) Install concrete unit pavers in formed concrete blockouts and between paver restraints in accordance with CW3335. Spaces between joints shall be 3 mm unless otherwise indicated, and shall be uniform and consistent while maintaining true patterns as indicated on the Drawings.
 - (b) Patterns for Holland pavers to match existing.
 - (c) Commence installation of pavers against edge to obtain straightest possible course for installation.

- (d) Pavers shall be cut with saw only to obtain true even undamaged edges. Chipped pavers are unacceptable.
- (e) Crews shall work on installed pavers, not on sand layer.
- (f) Set into sand base with vibratory compactor in accordance with CW3335. Ensure pavers are firmly seated, uniformly level and flush with surrounding concrete.
- (g) Spread joint sand over paving surface and sweep into joints until they are full.
- (h) Sweep remaining sand over all paving areas and remove from site.
- (i) Replace at no extra cost all whole or cut stones marked as unacceptable.
- (j) Remove cracked, chipped, broken or otherwise damaged paving materials from Site immediately.
- (k) Upon completion, clean in accordance with manufacturers recommendations.

E5.5 Quality Assurance

- E5.5.1 All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations, from the selection and production of materials, through to final acceptance of the Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection of approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this specification.

E5.6 Measurement and Payment

The supply and installation of unit paving shall be paid for on a square metre basis for the following items of work:

- (a) Broadway unit pavers in formed blockout.
- (b) Broadway unit pavers in landscaped area.
- (c) Holland unit pavers in formed blockout.

The supply and installation of Paver Restraint shall be paid for on linear metre basis.

Price shall be payment in full for supplying paving materials and for performing the Work. Note forming of blockouts is paid for under Roadworks.

E6. PLANTING MEDIUM & FINISH GRADING

E6.1 Description

- E6.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of planting medium in tree wells and planting beds.

E6.2 References

E6.2.1 Agriculture and Agri-Food Canada

- .1 The Canadian System of Soil Classification, Third Edition, 1998.

E6.2.2 Canadian Council of Ministers of the Environment (CCME) Guidelines.

E6.2.3 The City of Winnipeg Standard Construction Specifications

- .1 CW 1130 – Site Requirements
- .2 CW 3540 – Topsoil and Finish Grading for Establishment of Turf Areas

E6.3 Submittals

E6.3.1 Submit 0.5kg sample of topsoil to National Testing Laboratory, or approved alternate, and indicate present use and intended use. Prepare and ship sample in accordance with Provincial regulations and testing laboratory requirements.

E6.3.2 Submit two (2) copies of soil analysis and recommendations for corrections to Contract Administrator.

E6.4 Quality Assurance

E6.4.1 Inform Contract Administrator of proposed source of materials to be supplied and provide a sample for review by Contract Administrator prior to installation.

E6.4.2 Testing of planting medium to be carried out and paid for by Contractor. Prepare and ship planting medium samples to approved laboratory in accordance with Provincial regulations and laboratory requirements, indicating intended use on each sample.

E6.4.3 Test planting medium for nutrients N, P, K, micronutrients, soluble salt content, pH value and OM (organic matter).

E6.4.4 Acceptance of planting medium is subject to an inspection of material and confirmation of test results. Do not commence soft landscaping work until Contract Administrator has accepted planting medium.

E6.5 Delivery, Storage and Handling

E6.5.1 Store materials in a dry area, protected from freezing, sedimentation and contamination.

E6.5.2 Deliver and store fertilizer in waterproof bags labeled with weight, analysis and name of manufacturer.

E6.6 Materials

E6.6.1 Planting Medium: In accordance with CW 3540 for topsoil except organic matter to be in the range of 5-10%.

E6.6.2 Peatmoss: deliver from partially decomposed fibrous or cellular stems and leaves of species of sphagnum mosses. Elastic and homogeneous, brown in colour. Free of wood and deleterious material that could prohibit growth. Shredded particle minimum size: 5 mm.

E6.6.3 Sand: hard fine silica sand, well washed and free of impurities, chemical or organic matter. Coarse texture, and to the following gradation:

<u>Particle Size (mm)</u>	<u>% Passing through Screen</u>
2.0	100%
1.0	95 to 100%
0.5	80 to 100%
0.25	0 to 30%
0.15	0 to 8%
0.075	0 to 1%

E6.6.4 Fertilizer: Synthetic start-up slow release fertilizer with a N-P-K analysis of 12-36-15 ratio at a rate of 4 kg per 100 m² which is 8 pounds per 100 sq ft.

E6.7 Construction Method

E6.7.1 Excavation

- (a) Excavate tree vaults and planting beds by hand unless otherwise directed by Contract Administrator. Dispose of all rock, clay soils and other deleterious materials off site.
- (b) Protect bottom of excavations against freezing.
- (c) Remove water that enters excavations and planters prior to planting. Ensure source of water is not groundwater.
- (d) Scarify bottom of planting beds to a depth of 150mm.

- (e) Cover bottom of tree pit and planting bed with bone meal fertilizer.
- (f) Verify and obtain approval by Contract Administrator of tree vaults with geotextile and planting beds prior to compacted soil mound and planting medium placement

E6.7.2 Planting Medium Placement

- (a) Place planting medium in uniform layers over approved, unfrozen sub-grade, to the depth indicated on the Drawings.

E6.7.3 Soil Amendments

- (a) Apply soil amendments at rates recommended by testing lab.
- (b) Mix soil amendment well into full depth topsoil prior to application of fertilizer.

E6.7.4 Finished Grading

- (a) Per CW3540.
- (b) Fine grade entire soil area to elevations as indicated on the drawings. Eliminate rough spots and low areas. Leave surfaces smooth, uniform and firm against foot printing with a fine loose texture.

E6.8 Surplus Material

E6.8.1 Dispose of unused planting medium off site in accordance with CW1130.

E6.9 Cleaning

E6.9.1 Perform cleaning to remove accumulated dirt from all paved surfaces of building faces. Remove surplus materials, rubbish, tools and equipment barriers.

E6.10 Measurement and Payment

E6.10.1 Planting Medium shall be paid for a cubic metre basis. Price shall be payment in full for supplying materials and for performing the Work.

E7. TREES AND SHRUBS

E7.1 Description

E7.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of trees, shrubs and black wood chip mulch.

E7.2 References

E7.2.1 Agriculture and Agri-Food Canada (AAFC)

- (a) Plant Hardiness Zones in Canada-2000.

E7.2.2 Canadian Nursery Landscape Association (CNLA)

- (a) Plant Canadian Standards for Nursery Stock-2001.

E7.2.3 Department of Justice Canada (JUS)

- (a) Plant Canadian Environmental Protection Act (CEPA), 1999, c. 33.
- (b) Transport of Dangerous Goods Act (TDGA), 1992, c.34.

E7.2.4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

- (a) Materials Safety Data Sheets (MSDS).

E7.3 Submittals

E7.3.1 Submit product data for:

- (a) Fertilizer.
- (b) Wood mulch.

- E7.3.2 Submit samples for:
- (a) Wood mulch.
- E7.4 Source Quality Control
- E7.4.1 Obtain approval from Contract Administrator of plant material at source.
- E7.4.2 Notify Contract Administrator of source of material at least seven (7) days in advance of shipment. No work under this Section is to proceed without approval.
- E7.4.3 Acceptance of plant material at source does not prevent rejection on Site prior to or after planting operations.
- E7.4.4 Plant material imported from other nations will not be accepted.
- E7.4.5 Bare root plant material will not be accepted.
- E7.5 Storage and Protection
- E7.5.1 Coordinate the shipping of plants and excavation of holes to ensure minimum time laps between digging and planting.
- E7.5.2 Protect plant material from frost, excessive heat, wind and sun during delivery.
- E7.5.3 Protect plant material from damage during transportation:
- (a) When delivery distance is less than 30 km and vehicle travels at speeds under 80 km/h, tie tarpaulins around plants or over vehicle box.
 - (b) When delivery distance exceeds 30 km or vehicle travels at speeds over 80 km/h, use enclosed vehicle where practical.
 - (c) Protect foliage and rootballs using anti-desiccants and tarpaulins, where use of enclosed vehicle is impractical due to size and weight of plant material.
- E7.5.4 Protect stored plant material from frost, wind and sun as follows:
- (a) For bare root plant material, preserve moisture around roots by heeling-in or burying roots in topsoil and watering to full depth of root zone.
 - (b) For pots and containers, maintain moisture level in containers.
 - (c) For balled and burlapped and wire basket rootballs, place to protect branches from damage. Maintain moisture level in root zones.
- E7.5.5 Remove broken and damaged roots with sharp pruning shears. Make clean cut and cover cuts over 20mm (3/4") diameter with wound dressing.
- E7.5.6 Keep roots moist and protect from sun and wind. Heel-in trees that cannot be planted immediately in shaded areas and water well.
- E7.6 Scheduling
- E7.6.1 Order plant material as soon as possible after award of contract to ensure plant availability. Request substitutes as required.
- E7.6.2 Provide Contract Administrator a written schedule fourteen (14) days in advance of shipment of plant material. Schedule to include: quantity and type of plant material, shipping dates, arrival dates on Site, and planting dates.
- E7.7 Warranty of Nursery Stock
- E7.7.1 For all plant material an eighteen (18) month warranty period is required.
- E7.7.2 During the warranty period, upon written notification from the Contract Administrator, the Contractor warrants to replace and replant any nursery stock found dead and/or in poor condition as soon as possible thereafter, without cost to The City. "Poor Condition" shall be interpreted as meaning nursery stock on which branches are dead or dying, or have not

shown satisfactory growth in leaves. Exempted is nursery stock damaged by accidental causes or vandalism, which stock shall be replaced at the cost of The City.

E7.7.3 End-of-Warranty inspection will be conducted by Contract Administrator.

E7.7.4 Contact Administrator reserves the right to extend Contractor's warranty responsibilities for an additional one (1) year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

E7.8 Replacements

E7.8.1 During warranty period, remove from Site any plant material that has died or failed to grow satisfactorily as determined by the Contract Administrator.

E7.8.2 Extend warranty on replacement plant material for a period equal to the original warranty period.

E7.8.3 All required replacements shall be by plants of at least the same size and species as specified, and shall be supplied and planted in accordance with the original Drawings and Specifications.

E7.8.4 Should the replaced plant material not survive, the Contractor will be responsible to replace it a third time and guarantee it for a period equal to the original warranty period unless it is determined that unique Site conditions or inadequate maintenance causes the death of plants

E7.9 Materials

E7.9.1 Plant Material

- (a) Type of root preparation, sizing, grading and quality: comply to Canadian Standards for Nursery Stock.
- (b) Source of plant material: grown in Zone 3 only in accordance with Plant Hardiness Zones in Canada.
- (c) Plant material must be planted in zone indicated as appropriate for its species.
- (d) Plant material free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.
- (e) Substitutions to plant material as indicated on planting plan are not permitted unless written approval has been obtained as to type, variety and size. Plant substitutions must be of similar species and of equal size as those originally specified.

E7.9.2 Plant Specification List

Botanical / Common Name	Size / Remarks
Deciduous Trees	
<i>Fraxinus pennsylvanica</i> 'Patmore' / Patmore Green Ash	70 mm (2.75") cal., 4.5-5.0 m (15'-17') ht., 13 major branches in well formed head 2.0 m (7') ht. above grade. B&B or tree mover, wire basket. Double stake.
Shrubs	
<i>Syringa meyeri</i> / Meyer Lilac	500 – 600 mm ht., min. 4 major basal branches. Well formed bushy plants. Container stock.
<i>Caragana pygmaea</i> / Pygmy Caragana	300 – 400 mm ht., min. 4 major basal branches. Well formed bushy plants. Container stock.

E7.9.3 Water

- (a) Water free of impurities that would hinder plant growth. The Contractor shall provide water, so that 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.

- (b) Further to clause 3.7 of CW 1120, the Contractor shall pay for all costs associated with obtaining water in accordance with the Waterworks By-law. Sewer charges will not be assessed for water obtained from a hydrant.

- E7.9.4 Planting Medium: backfill with planting medium as specified in Planting Medium Specification.
- E7.9.5 Stakes: 76mm dia. x 2440mm ht. wooden stakes.
- E7.9.6 Heavy duty Baler Twine: Polypropylene baler twine, UV protected.
- E7.9.7 Tree Tie: biodegradable or polyethylene fabric strapping min. 3bmm wide.
- E7.9.8 Anti-Desiccant: wax-like emulsion.
- E7.9.9 Wood Chip Mulch: wood chip mulch varying in size from 50 mm to 75 mm and 5 to 20 mm thick, free of bark. Wood chip shall be mulched locally within 80 km of the Site,
- E7.9.10 Fertilizer: synthetic start-up slow release fertilizer with a N-P-K analysis of 12-36-15 ratio at a rate of 4 kg per 100 m² which is 8 pounds per 100 sq ft.
- E7.10 Construction Method
 - E7.10.1 Pre-Planting Preparation
 - (a) Obtain approval from Contract Administrator of finish grading and planting medium installation prior to commencing Work in this section.
 - (b) Ensure plant material is acceptable to the Contract Administrator.
 - (c) Remove damaged roots and branches from plant material with sharp clean equipment treating wounds as necessary to maintain plant health.
 - (d) Apply anti-desiccant to deciduous trees in leaf in accordance with manufacturer's instructions.
 - E7.10.2 Layout
 - (a) Prepare planting beds. Refer to Planting Medium Specification.
 - (b) Lay out plants in pots on beds for Contract Administrator approval prior to installation.
 - E7.10.3 Layout for individual trees:
 - (a) Stake out locations of all trees and obtain approval from Consultant prior to excavating tree pits.
 - (b) Excavate tree pits to depths and widths indicated on the Drawings.
 - (c) Remove rocks, roots, debris and toxic material from the tree pit.
 - (d) Scarify sides of planting hole.
 - E7.10.4 Layout for shrubs:
 - (a) Lay out plants per Drawings, noting plant spacings indicated.
 - (b) Obtain Contract Administrator approval of plant layouts and make any necessary adjustments on Site.
 - E7.10.5 Dewatering excavations: Remove water that enters excavations prior to planting. Notify Contract Administrator if water source is groundwater.
 - E7.10.6 Planting
 - (a) For jute burlap rootballs, cut away top one third of wrapping and wire basket without damaging rootball. Do not pull burlap or rope from under rootball.
 - (b) For container stock or rootballs in non-degradable wrapping, remove entire container or wrapping without damaging rootball. Loosen rootball to encourage bonding with planting medium and subgrade.

- (c) Plant vertically in locations as indicated. Orient plant material to give best appearance in relation to structure, roads and walks.
- (d) Backfill soil in 150 mm (6") lifts. Tamp each lift to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has penetrated into soil, backfill to finish grade.
- (e) Form watering saucer as indicated on the Drawings.
- (f) Water plant material thoroughly. Report extreme ponding in planters indicative of malfunctioning drains to the Contract Administrator immediately.
- (g) After soil settlement has occurred, fill with soil to finish grade.
- (h) Dispose of burlap, wire and container material off Site.

E7.10.7 Tree Supports

- (a) Install tree supports as indicated on the Drawings taking care not to damage or puncture underground utilities.
- (b) Place first stake on prevailing wind side of tree trunk.
- (c) Drive stakes minimum 150mm into undisturbed soil beneath bottom of roots. Ensure stakes are secure, vertical and unsplit.
- (d) Install tree tie 1500mm above grade.

E7.10.8 Pruning: Undertake corrective pruning after planting to eliminate torn and broken branches. Do not damage lead branches or remove smaller twigs along main branches. Do not prune to compensate for root loss.

E7.10.9 Mulching

- (a) Obtain approval of planting placement from Contract Administrator before mulching material is applied.
- (b) Ensure soil settlement has been corrected prior to mulching.
- (c) Spread wood chip mulch as indicated on all planting beds. Spread mulch to minimum thickness of 75mm.

E7.10.10 Maintenance: Maintain plant material from date of planting to the end of the warranty period. Refer to Landscape Maintenance Specification.

E7.11 Measurement and Payment

E7.11.1 Trees and shrubs shall be paid for on a unit each basis. Price shall be payment in full for supplying materials and for performing the Work.

E7.11.2 Wood chip mulch shall be paid for on a cubic metre basis. Price shall be payment in full for supplying materials and for performing the Work.

E8. LANDSCAPE MAINTENANCE

E8.1 Description

E8.1.1 Provide all labour, materials, methods, equipment and accessories for the maintenance of trees and shrubs following acceptance of the plant material to start warranty.

E8.1.2 In general, the Work shall include:

- (a) Fertilizing
- (b) Watering
- (c) Weed Control
- (d) Pest and disease Control
- (e) Mulching

(f) Winter Preparation

E8.1.3 Maintenance shall be performed on an as required basis.

E8.2 Maintenance and Warranty Period

E8.2.1 Maintenance shall occur between the date of installation and up to a period of two (2) years from date landscaped areas are accepted to start warranty. The warranty period for plant materials will be coincidental to the maintenance period.

E8.2.2 Thirty days after the planting installation has been completed, the Contract Administrator shall perform an inspection of the plant material to determine if the plant material is acceptable to start warranty.

E8.3 Materials and Equipment

E8.3.1 Materials shall conform to the requirements of related Specification sections.

E8.3.2 Provide all equipment to properly execute Work. Maintain such equipment in a workable, safe condition while in use during this project.

E8.3.3 Contract Administrator shall review equipment to be used to execute Work prior to execution.

E8.4 Method

E8.4.1 General

- (a) Provide watering service within 24 hours, weeding services within 48 hours of the request by the Contract Administrator. Monitor the Site and advise the Contract Administrator of conditions that might void the Contractor's warranty responsibilities.
- (b) The Contractor shall maintain a log noting times, dates, equipment used, and quantity of materials used and areas treated for each maintenance application. Forms shall be provided by Contract Administrator. Submit log to Contract Administrator upon request. Contractor shall notify Contract Administrator of the exact time Contractor proposes to commence each application.
- (c) Schedule operations in accordance with growth, health, weather conditions, and use of Site.
- (d) Perform each operation continuously and completely within a reasonable time period.
- (e) Store equipment and materials off Site.
- (f) Collect and dispose of debris or excess material on the day the maintenance is undertaken.

E8.4.2 Maintenance of Trees and Shrubs:

- (a) Fertilizing: Apply fertilizer only at frequency, ratio and rates as recommended by manufacturer. Water immediately after fertilizing. Apply fertilizer no later than May 30th of each maintenance year.
- (b) Watering: Apply water as required to supplement rainfall and to maintain optimum growing conditions. In general, water once a week to achieve rates as indicated. Allow soil to adequately dry between watering to prevent over saturation without creating water stress. Subject to the above-noted requirements, the Contractor must water at least once a week between May 1st and October 15th inclusive. A complete record is to be kept of each series of waterings for all planted trees noting location and date of watering. This record is to be given to the Contract Administrator when requested. Apply 40 litres of water per 25 mm calliper per application using a deep root feeder or low pressure open flow nozzle and hose. The water stream must not gouge the soil and mulch.
- (c) Weed Control: Inspect and undertake weed control weekly during the first year of maintenance and monthly during the second year. By hand, remove all weeds with

their roots from tree pits and tree beds and dispose of off Site. When weeding operation is complete, replace and rake displaced mulch to its original condition.

- (d) Pests and Diseases: Obtain written approval of Contract Administrator prior to using any pesticide. Control pests and disease through pruning or application of pesticides. Use species specific pesticides where possible. Use only pesticides of low mammalian toxicity. Strictly follow manufacturer's written instructions.
- (e) Pruning: The Contractor shall provide a person with a Manitoba Arborists Certificate for each work crew or Work Site. Prune as required to remove dead, broken or damaged limbs. Prune back to healthy growth while maintaining balanced crown shape. Employ clean sharp tools. Make cuts smooth and flush with outer edge of branch collar near the main stem or branch. Cuts must be smooth and sloping to prevent accumulation of water on cut. Do not leave little stumps ("horns") on trunks or main branches. Prune according to accepted horticultural practices as outline in "The Pruning Manual", Publication No. 1505-1977 by Agriculture Canada.
- (f) Mulching: add mulch as required to maintain original thickness. Contractor is to provide replacement mulch material.
- (g) Winter Preparation: Ensure adequate moisture in tree root zones prior to freeze-up.

E8.5 Measurement and Payment

E8.5.1 Landscape maintenance shall be paid for on a lump sum basis for the items of work listed below. Price shall be payment in full for supplying all material and performing all operations herein described and all other items incidental to the Work included in this Specification.

Items of Work:

- (i) Landscape Maintenance Year 1
- (ii) Landscape Maintenance Year 2

E9. EXTERIOR METAL FABRICATION

E9.1 Description

E9.1.1 Provide all labour, materials, methods, equipment and accessories for the fabrication and installation of the fence hardware and brackets.

E9.2 References

E9.2.1 American Society for Testing and Materials International, (ASTM)

- (a) ASTM A53/A53M-02, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- (b) ASTM A269-02, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- (c) ASTM A307-02, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

E9.2.2 Canadian Standards Association (CSA International).

- (a) CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.
- (b) CAN/CSA-G164-M93 (R1998), Hot Dip Galvanized or Irregularly Shaped Articles, or latest.
- (c) CAN/CSA-S16.1-14, Limit States Design of Steel Structures.
- (d) CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
- (e) CSA W59 R2013, Welded Steel Construction, Metal Arc Welding, Imperial Version.

E9.3 Materials

- E9.3.1 As specified on drawings.
- E9.4 Submittals
 - E9.4.1 Submit product data, samples and shop drawings of the following to the Contract Administrator: fence hardware and brackets.
 - E9.4.2 Clearly indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number and size of anchors, supports, reinforcement, details and accessories.
 - E9.4.3 Indicate and list hardware and miscellaneous items.
 - E9.4.4 Provide templates, patterns, fixing diagrams as required.
 - E9.4.5 Indicate related, adjacent materials, and connections.
- E9.5 Delivery, Storage and Handling
 - E9.5.1 Deliver materials to site, suitably packaged, clearly marked indicating manufacturer name and any other identifying symbols or information. Do not deliver materials long before they are required on site. Cause no delays to scheduling.
 - E9.5.2 Cover exposed stainless steel and tempered glass surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
 - E9.5.3 Leave protective covering in place until final cleaning of site. Provide instructions for removal of protective covering.
 - E9.5.4 Store materials in a dry location off the ground, and prevent damage.
 - E9.5.5 Materials that have been damaged or deemed unfit for use during delivery or storage shall be immediately replaced at no cost.
- E9.6 Site Conditions
 - E9.6.1 Make a careful examination of the site and structures and investigate all matters relating to the nature of the work to be undertaken, the means of access and egress, the rights and interests which may be interfered with during the construction of the Work.
 - E9.6.2 Report any discrepancies or omissions to the Contract Administrator, who will issue written clarification. Oral interpretations or instructions are not acceptable.
- E9.7 Construction Method
 - E9.7.1 Obtain approval of shop drawings prior to ordering materials and commencing fabrication.
 - E9.7.2 Fabricate work square, true, straight and accurate to required sizes, with joints closely fitted and properly secured.
 - E9.7.3 Use self-tapping, shake-proof, counter-sunk or hidden screws on items requiring assembly by screws.
 - E9.7.4 Where possible, fit and shop assemble work, ready for erection.
 - E9.7.5 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
 - E9.7.6 De-grease and de-bur all sharp edges in the shop left behind after fabrication is complete.
- E9.8 Installation
 - E9.8.1 Erect metalwork square, plumb, straight and true, accurately fitted, with tight joints and intersections.
 - E9.8.2 Provide suitable and acceptable means of anchorage, such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
 - E9.8.3 Fence hardware and brackets to be mounted to cast-in-place retaining wall.

E9.8.4 Exposed fastening devices to match finish and be compatible with material through which they pass, as per the drawings.

E9.8.5 Do welding work in accordance with CSA W59, unless specified otherwise.

E9.8.6 Make field connections with high tensile bolts, or weld to CSA S16.1-M (latest).

E9.8.7 Touch up rivets, field welds, bolts and burnt or scratched surfaces after erection.

E9.9 Acceptance

E9.9.1 Work will be accepted only if it is erected true to the design intent in conformation with shop drawings and site instructions.

E9.10 Measurement and Payment

E9.10.1 Supply and Installation of fence hardware and brackets will be measured on a linear metre basis and paid for at the Contract Unit Price for "Supply and Install of Wood Fence (Matching Existing Salvaged Fence)" and "Re-install Salvaged Wood Fence". If Contractor cannot match new wood fence dimensions and colour to existing wood fence dimensions and colour, the Contract Administrator may consider that all proposed fence be new, the Supply and Installation of fence hardware and brackets will be measured on a linear metre basis and paid for at the Contract Unit Price for Provisional Item "Supply and Install of New Wood Fence". The length to be paid for shall be the total number of metres supplied and placed in accordance with this Specification and as measured and accepted by the Contract Administrator.

E10. EXTERIOR SITE CARPENTRY

E10.1 Description

E10.1.1 Provide labour, materials, methods, equipment and accessories for the fabrication and installation of the wood fence.

E10.2 References

E10.2.1 American Wood-Preservers' Association (AWPA)

(a) AWPA M2, Standard for Inspection of Treated Wood Products.

(b) AWPA M4, Standard for the Care of Preservative-Treated Wood Products

E10.2.2 American Society for Testing and Materials International, (ASTM)

(a) ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

(b) ASTM A269, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service

(c) ASTM Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

E10.2.3 Canadian Standards Association (CSA International)

(a) CSA B111, Wire Nails, Spikes and Staples

(b) CSA O141 Softwood Lumber

(c) CSA O80, Wood Preservation

(d) CSA O80.20, fire-retardant treatment of lumber by pressure processes

(e) CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel

(f) CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles

(g) CAN/CSA-S16.1-14, Limit States Design of Steel Structures.

E10.3 Materials

E10.3.1 Pressure Treated Wood

- (a) Material: to be pressure treated wood, no. 1 grade, colour: match existing fence, moisture content 19% or less in accordance with following standards: CAN/CSA-O141; NLGA Standard Grading Rules for Canadian Lumber; Forest Stewardship Council (FSC) certified.
- (b) Preservative for above ground use: to CSA-O80 Series, ACQ-C treatment, clear finish. Minimum net retention: 4.0 kg/m³.
- (c) Preservative for ground contact: to CSA-O80 Series, ACQ-C treatment, clear finish. Minimum net retention: 6.4 kg/m³.

E10.3.2 Hardware

- (a) Nails and spikes: to CAS B111, galvanized, for exterior works and for treated lumber. Use spiral thread nails.
- (b) Bolts nuts, washers, lag screws to be hot dipped galvanized, sizes to suit application.
- (c) Lag screws: hot dipped, galvanized, sizes to suit application.

E10.4 Submittals

E10.4.1 Submit product data and samples of the following to Contract Administrator: pressure treated wood.

E10.4.2 Shop Drawings

- (a) Submit shop drawings of the wood fence.
- (b) Indicate dimensions, sizes, assembly, anchorage and installation details. Use construction drawings as reference. Confirm existing conditions on site by taking as-built field measurements to prepare shop drawings.
- (c) Clearly indicate materials, core thickness, finishes, connections, joints, method of anchorage, number and size of anchors, supports, reinforcement, details and accessories.

E10.5 Quality Assurance

E10.5.1 Carpentry shall be performed by trained and qualified craftspeople with demonstrable experience sourcing and work.

E10.5.2 Conduct a pre-installation meeting with the Contract Administrator to verify requirements.

E10.5.3 Lumber Identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

E10.5.4 For products treated with preservative by pressure impregnation, submit following information certified by authorized signing officer of treatment plant:

- (a) Information listed in AWPA.M2 and revisions specified in CAN/CSA-080 Series, Supplementary Requirement to AWPA Standard M2 applicable to specified treatment.
- (b) Moisture content after drying following treatment with water-borne preservative.

E10.5.5 All wood to be free of defects. Any warped, checked or bent materials will be rejected.

E10.5.6 If Contractor cannot match new wood fence dimensions and colour to existing wood fence dimensions and colour, the Contract Administrator may consider that all proposed fence be new.

E10.6 Construction Method

E10.6.1 Handle and use treated and non-treated wood in a manner which will avoid damage or field fabrication causing alteration in original treatment.

E10.6.2 Re-treat pressure treated wood surfaces exposed by cutting, trimming or boring with liberal brush application of clear preservative and fire retardant before installation. Ensure that

damaged areas such as abrasions, nail and spike holes, area thoroughly saturated with field treatment solutions as per CSA-O80 and CSA-O80.20

- E10.6.3 Construct all work as indicated on the drawings using adequate fastening methods to ensure solid durable finished work suitable for the purpose intended.
- E10.6.4 Do all nailing and fastening neatly, evenly and thoroughly.
- E10.6.5 Frame anchor, fasten, tie and brace members to provide necessary strength and rigidity. Install all members true to line, levels and elevations.
- E10.6.6 Set plumb and space uniformly. Countersink bolts where necessary to provide clearance for other work.

E10.7 Measurement and Payment

- E10.7.1 Supply and Installation of wood fence will be measured on a linear metre basis and paid for at the Contract Unit Price for "Supply and Install of Wood Fence (Matching Existing Salvaged Fence) and "Re-install Salvaged Wood Fence". The length to be paid for shall be the total number of metres supplied and placed in accordance with this Specification and as measured and accepted by the Contract Administrator. If Contractor cannot match new wood fence dimensions and colour to existing wood fence dimensions and colour, the Contract Administrator may consider that all proposed fence be new, and be paid for at the Provisional Item Unit Price for "Supply and Install of New Wood Fence".

E11. CAST-IN-PLACE CONCRETE

E11.1 Description

- (a) The Work covered under this Item shall include all concreting operations related to construction of cast-in-place concrete in accordance with this Specification and as shown on the Drawings.
- (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 Works as hereinafter specified.

E11.2 Materials

E11.2.1 General

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

E11.2.2 Handling and Storage of Materials

- (a) All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with CSA Standard A23.1-14.

E11.2.3 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 taken by the Contract Administrator for testing purposes.
- (b) All materials shall be approved by the Contract Administrator at least seven (7) days before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials in whole or in part, do not conform to the Specifications detailed herein or are found to be defective in manufacture or have become damaged in transit, storage, or handling operations, then such materials shall be rejected by the Contract Administrator and replaced by the Contractor at his own expense.

E11.2.4 Patching Mortar

- (a) The patching mortar shall be made of the same cementitious material and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than 1 part cement to 2 parts sand by damp loose volume. White Portland Cement shall be substituted for a part of the grey Portland Cement on exposed concrete in order to produce a colour matching the colour of the surrounding concrete, as determined by a trial patch. The quantity of mixing water shall be no more than necessary for handling and placing.

E11.2.5 Cement

- (a) Cement shall be Type HS or HSb, high-sulphate-resistant hydraulic cement, conforming to the requirements of CSA Standard A23.1-14.

E11.2.6 Concrete

(a) General

- (i) Concrete repair material shall be compatible with the concrete substrate.

- (b) The Contractor shall be responsible for the design and performance of all concrete mixes supplied under this specification. Either ready mix concrete or proprietary repair mortars, where applicable, may be used having the following minimum properties in accordance with CSA A23.1-14:

- (i) Class of Exposure: S-1
- (ii) Compressive Strength @ 28 days = 32 MPa
- (iii) Water / Cementing Materials Ratio = 0.45
- (iv) Air Content: Category 2 per Table 4 of CSA A23.1-14 (4-7%)
- (v) Cement Type – HS

- (c) Mix design for ready mix concrete shall be submitted to Contract Administrator at least two weeks prior to concrete placing operations.
- (d) The workability of each concrete mix shall be consistent with the Contractor's placement operations. Self-compacting concrete may be used for the foundations.
- (e) Any proposed proprietary repair mortar shall be subject to the approval of the Contract Administrator and must meet or exceed the properties of the ready mix concrete.
- (f) The temperature of all types of concrete shall be between 15°C and 25°C at discharge. Temperature requirements for concrete containing silica fume shall be between 10°C and 18°C at discharge unless otherwise approved by the Contract Administrator.
- (g) Concrete materials susceptible to frost damage shall be protected from freezing.

E11.2.7 Aggregate

- (a) The Contractor shall be responsible for testing the fine and coarse aggregates to establish conformance to these specifications, and the results of these tests shall be provided to the Contract Administrator if requested. All aggregates shall comply with CSA A23.1-14.
- (b) Coarse Aggregate
 - (i) The maximum nominal size of coarse aggregate shall be sized to suit the Contractor's mix design. Gradation shall be in accordance with CSA A23.1, Table 11, Group 1. The coarse aggregate shall satisfy the Standard Requirements specified in CSA A23.1-14, Table 12, "Concrete Exposed to Freezing and Thawing".
 - (ii) Coarse aggregate shall consist of crushed stone or gravel or a combination thereof, having hard, strong, durable particles free from elongation, dust, shale, earth, vegetable matter or other injurious substances. Coarse aggregate shall be clean and free from alkali, organic or other deleterious matter; and shall have an absorption not exceeding 2.25%.

- (iii) The aggregate retained on the 5 mm sieve shall consist of clean, hard, tough, durable, angular particles with a rough surface texture, and shall be free from organic material, adherent coatings of clay, clay balls, and excess of thin particles or any other extraneous material.
 - (iv) Coarse aggregate when tested for abrasion in accordance with ASTM C131 shall not have a loss greater than 30%.
 - (v) Tests of the coarse aggregate shall not exceed the limits for standard for requirements prescribed in CSA A23.1-14, Table 12, for concrete exposed to freezing and thawing.
- (c) Fine Aggregate
- (i) Fine aggregate shall meet the grading requirements of CSA A23.1-14, Table 10, Gradation FA1.
 - (ii) Fine aggregate shall consist of sand, stone, screenings, other inert materials with similar characteristics or a combination thereof, having clean, hard, strong, durable, uncoated grains free from injurious amounts of dust, lumps, shale, alkali, organic matter, loam, or other deleterious substances.
 - (iii) Tests of the fine aggregate shall not exceed the limits for standard requirements prescribed in CSA A23.1-14, Table 12.

E11.2.8 Cementing Materials

- (a) Cementing materials shall conform to the requirements of CSA A3001.
- (b) Silica Fume
 - (i) Should the Contractor choose to include silica fume in the concrete mix design, it shall not exceed 8% by mass of cement.
- (c) Fly Ash
 - (i) Fly ash shall be Type C1 or Type F and shall not exceed 25% by mass of cement.
- (d) Cementitious materials shall be stored in a suitable weather-tight building that shall protect these materials from dampness and other destructive agents. Cementitious materials that have been stored for a length of time resulting in the hardening or formation of lumps shall not be used in the Work.

E11.2.9 Admixtures

- (a) Air entraining admixtures shall conform to the requirements of ASTM C260.
- (b) Chemical admixtures shall conform to the requirements of ASTM C494 or C1017 for flowing concrete.
- (c) All admixtures shall be compatible with all other constituents. The addition of calcium chloride, accelerators, and air-reducing agents will not be permitted, unless otherwise approved by the Contract Administrator.
- (d) Appropriate low range water reducing and/or superplasticizing admixtures shall be used in concrete containing silica fume. Approved retarders or set controlling admixtures may be used for concrete containing silica fume.
- (e) An aminocarboxylate based migrating corrosion inhibitor admixture shall be used in concrete that will be used as a repair material that will either be in contact with or adjacent to reinforcing steel in existing concrete. Proposed admixtures shall be subject to the approval of the Contract Administrator.

E11.2.10 Water

- (a) Water used for mixing concrete shall be clean and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances. It shall be equal to potable water in physical and chemical properties.

E11.2.11 Concrete Supply

- (a) Concrete shall be proportioned, mixed, and delivered in accordance with the requirements of CSA A23.1-14, except that the transporting of ready mixed concrete in non-agitating equipment will not be permitted unless prior written approval is received from the Contract Administrator.
- (b) Unless otherwise directed by the Contract Administrator, the discharge of ready mixed concrete shall be completed within 90 minutes after the introduction of the mixing water to the cementing materials and aggregates.
- (c) The Contractor shall maintain all equipment used for handling and transporting the concrete in a clean condition and proper working order.

E11.2.12 Reinforcing Steel

- (a) Reinforcing steel shall be deemed to include all reinforcing bars, tie-bars, and dowels.
- (b) All reinforcing steel shall conform to the requirements of CSA Standard G30.18, Grade 400W, Billet-Steel Bars for Concrete Reinforcement. All reinforcing steel shall be new deformed billet steel bars. Reinforcing steel supply and installation will be incidental to construction of concrete foundation and no separate payment will be made.

E11.2.13 Anchor Rods, Nuts, and Washers

- (a) All anchor rods shall be threaded-type.
- (b) Anchor rods, nuts and washers shall be in accordance with ASTM F1554 and shall be hot-dip galvanized in accordance with CSA Standard G164 for a minimum net retention of 600 g/m². Supply and installation will be incidental to construction of concrete foundation and no separate payment will be made.
- (c) It is the Contractor's responsibility to ensure that the threaded rods are not in direct contact with the foundation reinforcing steel.

E11.2.14 Anchor Rod Templates

- (a) Anchor rod templates shall be CSA G40.21 Grade 300W, minimum 10 mm thick, and will be incidental to construction of new concrete foundation and no separate payment will be made.

E11.2.15 Fibre Joint Filler

- (a) Fibre joint filler shall be rot-proof and of the preformed, non-extruding, resilient-type, made with a bituminous fibre such as "Flexcell," and shall conform to the requirements of ASTM Standard D1751, or approved equal in accordance with B6.

E11.2.16 Waterproofing Membrane

- (a) Waterproofing membrane shall be "Sonoshield HLM 5000 R" or approved equivalent by the Contract Administrator.

E11.2.17 Miscellaneous Materials

- (a) Miscellaneous materials shall be of the type specified on the Drawings or approved by the Contract Administrator.

E11.3 Construction Methods

E11.3.1 Location and Alignment of Foundations

- (a) Foundation construction shall not commence until the Contractor has obtained clearance from the appropriate Utility Authorities.
- (b) Foundations shall be placed in the positions shown on the Drawings and as directed by the Contract Administrator in the field.
- (c) The deviation of the axis of any finished foundation shall not differ by more than 1 percent from the vertical.

E11.3.2 Buried Utilities

- (a) The Contractor shall exercise extreme caution when constructing the foundations in the vicinity of existing buried utilities and buildings. The Drawings show the approximate locations of existing buried utilities. The Contractor shall be responsible for obtaining the exact location of the buried utilities from the appropriate Utility Authorities prior to installing the foundations.
- (b) The proposed locations of the foundations may be changed by the Contract Administrator if they interfere with the buried utilities.
- (c) The Contractor shall be responsible for all costs that may be incurred for repair/rectification of any damage caused to the existing buried utilities as a result of the Contractor's operations in constructing cast-in-place concrete foundations, as determined by the Contract Administrator.

E11.3.3 Excavation

- (a) The Contractor is responsible for determining the excavation method at each foundation location.
- (b) Excavations for foundations shall be made with equipment designed to remove a core of the diameter shown on the Drawings, or hydro-jet excavation to a depth to bypass and/or expose adjacent utilities.
- (c) Upon reaching the required elevation, the bottom of the excavation shall be cleaned as directed by the Contract Administrator in the field.
- (d) All excavated material from the foundations shall be promptly hauled away from the Site to an approved disposal area as located by the Contractor.
- (e) Upon completion of the cleaning out of the bottom to the satisfaction of the Contract Administrator, the reinforcement and anchor bolts shall be set in place and the concrete poured immediately. Under no circumstances shall a hole be left to stand open after boring has been completed.

E11.3.4 Sleeving

- (a) Timber or steel sleeving shall be used to temporarily line the bore to prevent bulging or caving of the walls and to protect men at work in the bore.
- (b) The sleeving shall be designed by the Contractor and constructed to resist all forces that may tend to distort it.
- (c) The sleeving shall be withdrawn as the concrete is placed in the bore. The sleeving shall extend at least 1 m below the top of the freshly deposited concrete at all times.
- (d) The clearance between the face of the bore hole and the sleeving shall not exceed 75 mm.

E11.3.5 Inspection of Bores

- (a) Concrete shall not be placed in a bore until the bore has been inspected and approved by the Contract Administrator.
- (b) The Contractor shall have available suitable light for the inspection of each bore throughout its entire length.
- (c) All improperly set sleeving, bore, or bottom shall be corrected to the satisfaction of the Contract Administrator.

E11.3.6 Placing Reinforcing Steel

- (a) Reinforcement shall be:
 - (i) placed in accordance with the details shown on the Drawings
 - (ii) rigidly fastened together, and
 - (iii) lowered into the bore intact before concrete is placed.
- (b) Spacers shall be utilized to properly locate the reinforcing steel cage in the bore.

E11.3.7 Placing Metal Bases

- (a) Contractor to install metal bases as supplied by the Contract Administrator following curing of concrete foundations.
- (b) Metal bases are to be installed plumb, level, and flush to the concrete foundation. Contractor to use stainless steel washers to level bases as required.

E11.3.8 Forms

- (a) Forms for exposed surfaces that require an "ordinary surface finish" shall be made of good quality plywood, or an approved equivalent, or uniform thickness, with or without a form liner.
- (b) Architectural concrete form liner shall be as specified on the Plans or equivalent as approved by the Engineer.
- (c) Permeable formwork liner shall be Drainoform, Zemdrail II, or equivalent as approved by the Engineer.
- (d) Formwork materials shall conform to CSA Standard CAN/CSA-A23.1, and American Concrete Publication SP:4, "Formwork for Concrete".
- (e) No "stay-in-place" formwork or falsework is permitted.
- (f) Form sheeting plywood to be covered with form liner or to be directly in contact with soil shall be exterior Douglas Fir, concrete form grade, conforming to CSA Standard O121-M1978, a minimum of 20 mm thick.
- (g) Where form liner is not being used, form sheeting shall be Douglas Fir, overlay form liner type conforming to CSA Standard O121-M1978. Approved manufacturers are "Evans" and "C-Z".
- (h) Boards used for formwork shall be fully seasoned and free from defects such as knots, warps, cracks, etc., which may mark the concrete surface.
- (i) No formwork accessories will be allowed to be left in place within 50 mm of the surface following form removal. Items to be left in place, must be made from a nonrusting material or galvanized steel; and they shall not stain, blemish, or spall the concrete surface for the life of the concrete.
- (j) Forms for exposed concrete surfaces that do not require a form liner may be either new plywood or steel as authorized by the Contract Administrator.
- (k) Studding shall be spruce or pine and shall have such dimensions and spacing that they shall withstand distortion from all the forces to which the forms will be subjected. Minimum dimensions shall be 50 mm x 150 mm.
- (l) Walers shall be spruce or pine, with minimum dimensions of 100 mm x 150 mm.
- (m) All forms are incidental to these Works and must be removed by the Contractor once adequate strength and curing of the concrete has been achieved.
- (n) The forms shall be sufficiently rigid to prevent lateral or vertical distortions from the loading environment to which they shall be subjected. Forms shall be set to the design grades, lines, and dimensions, as shown on the Drawings.
- (o) For piles foundation, the top of the piles shall be formed with tubular forms (Sonotube) to the depth shown on the Drawings.

E11.3.9 Placing Concrete

- (a) Concrete shall not have a free fall of more than 2.0 m and shall be placed so that the aggregates will not separate or segregate. The slump of the concrete shall not exceed 110 mm. The concrete shall be vibrated throughout the entire length of the foundation.
- (b) Concrete shall be placed to the elevations as shown on the Drawings. The top surface of the foundation shall be finished smooth and even with a hand float.
- (c) The shaft shall be free of water prior to placing of concrete. Concrete shall not be placed in or through water unless authorized by the Contract Administrator.

E11.3.10 Protection of Newly Placed Concrete

- (a) Newly laid concrete threatened with damage by rain, snow, fog, or mist shall be protected with a tarpaulin or other approved means.

E11.3.11 Construction Joints

- (a) Construction joints shall be located only where shown on the Drawings or as otherwise approved in writing by the Contract Administrator. Construction joints shall be at right angles to the direction of the main reinforcing steel. All reinforcing steel shall be continuous across the joints. Bevelled shear keys, as shown on the Drawings or approved by the Contract Administrator, shall be provided at all joints.
- (b) In lieu of shear keys, the Contractor may roughen the surface as follows. The surface shall be rough, with a minimum amplitude of 6 mm. Acceptable procedures to obtain this rough surface are as follows:
 - (i) By removing the mortar from between the larger aggregate particles with a water jet and soft brush when the concrete is in a semi-hardened state (greencut).
 - (ii) By first applying a chemical retarder to the surface and then removing the mortar from the larger aggregate particles with a water jet and brush.
- (c) The face of joints shall be cleaned of all laitance and dirt, after which the cementitious grout or an approved bonding agent shall be applied. Forms shall be retightened, and all reinforcing steel shall be thoroughly cleaned at the joint prior to concreting.

E11.3.12 Curing Concrete

- (a) The top of the freshly finished concrete foundations shall be covered and kept moist by means of wet polyester blankets immediately following finishing operations and shall be maintained at above 10°C for at least seven (7) consecutive days thereafter.
- (b) After the finishing is completed, the surface shall be promptly covered with a minimum of a single layer of clean, damp polyester blanket.
- (c) Concrete shall be protected from the harmful effects of sunshine, drying winds, surface dripping or running water, vibration, and mechanical shock. Concrete shall be protected from freezing until at least twenty-four hours after the end of the curing period.
- (d) Changes in temperature of the concrete shall be uniform and gradual and shall not exceed 3° in one hour or 20° in twenty-four hours.

E11.3.13 Form Removal

- (a) Forms shall not be removed for a period of at least 24 hours after the concrete has been placed. Removal of forms shall be done in a manner to avoid damage to, or spalling of, the concrete.
- (b) The minimum strength of concrete in place for safe removal of forms shall be 20 MPa.
- (c) Field-cured test specimens, representative of the in-place concrete being stripped, will be tested to verify the concrete strength.

E11.3.14 Patching of Formed Surfaces

- (a) Immediately after forms around top of foundation have been removed, but before any repairing or surface finishing is started, the concrete surface shall be inspected by the Contract Administrator. Any repair of surface finishing started before this inspection may be rejected and required to be removed.
- (b) All formed concrete surfaces shall have bolts, ties, struts, and all other timber or metal parts not specifically required for construction purposes cut back fifty (50) mm from the surface before patching.
- (c) Minor surface defects caused by honeycomb, air pockets greater than 5 mm in diameter, and voids left by strutting, and tie holes shall be repaired by removing the defective concrete to sound concrete, dampening the area to be patched and then applying patching mortar. A slurry grout consisting of water and cement, shall be wellbrushed onto the area to be patched. When the slurry grout begins to lose the

water sheen, the patching mortar shall be applied. It shall be struck-off slightly higher than the surface and left for one hour before final finishing to permit initial shrinkage of the patching mortar and it shall be touched up until it is satisfactory to the Contract Administrator. The patch shall be cured as specified in this Specification, and the final colour shall match the surrounding concrete.

E11.3.15 Cold Weather Concreting

- (a) Protection of concrete shall be considered incidental to its placement. The temperature of the concrete shall be maintained at or above 10°C for a minimum of three (3) days or till the concrete has reached a minimum compressive strength of 20 MPa, by whatever means are necessary. Concrete damaged as a result of inadequate protection against weather conditions shall be removed and replaced by the Contractor at his own expense. Also, concrete allowed to freeze prior to the three (3) days will not be accepted for payment.

E11.3.16 Drilling Anchor Rods

- (a) The anchor rods shall be aligned with a steel template to match the steel plates/angles holes as per Drawings. Extreme care shall be used in this operation to ensure rods are aligned properly and avoid direct contact with internal reinforcing steel.
- (b) Size and embedment of the anchor rods shall be as per Drawings.
- (c) Anchor rods doweling shall be performed using SIKA AnchorFix-3 / SIKA AnchorFix-4 epoxy adhesive or equivalent product. Installation of the anchor rods shall be done in accordance with manufacturer's instructions or recommendation.

E11.3.17 Quality Control

- (a) All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator, including all operations from the selection and production of materials, through to final acceptance of the 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. The Contract Administrator reserves the right to reject any materials or Works that are not in accordance with the requirements of this Specification.
- (b) The Contractor shall be responsible for making a thorough inspection of materials to be supplied under this Contract. All material shall be free of surface imperfections and other defects.

E11.4 Measurement and Payment

E11.4.1 Construction of Cast-in-Place Concrete

- (a) Construction of cast-in-place concrete will be measured on a linear metre basis and will be paid for at the Contract Price per unit for the "Items of Work" listed here below for Cast-in-Place Concrete constructed in accordance with this Specification and accepted by the Contract Administrator.

Items of Work:

- (i) Supply and Install CIP Retaining Wall (incl. Footings, and Base Course)

E12. PROVISIONAL ITEMS

- E12.1.1 If Contractor cannot match new wood fence dimensions and colour to existing wood fence dimensions and colour, the Contract Administrator may consider that all proposed fence be new. Removal of Existing Wood Fence will be measured on a linear metre basis and paid for at the Contract Unit Price for Provisional Item "Removal of Existing Wood Fence". Supply and Installation of New Wood Fence will be measured on a linear metre basis and paid for at the Contract Unit Price for Provisional Item "Supply and Install of New Wood Fence". The length to be paid for shall be the total number of metres supplied and placed

in accordance with this Specification and as measured and accepted by the Contract Administrator.

E13. PARKING LOT LINE PAINTING

E13.1 General

(a) REFERENCES

- (i) CGSB 1-GP-5M, Thinner, Petroleum Spirits, Low Flash.
- (ii) CGSB 1-GP-12c, Standard Paint Colours.
- (iii) CGSB 1-GP-71, Method of Testing Paints and Pigments.
- (iv) CGSB 1-GP-74M, Paint, Traffic, Alkyd.

E13.2 Products

(a) Paint:

- (i) To CGSB 1-GP-74M, Alkyd Traffic Paint.
- (ii) Colour No. 1: to CGSB 1-GP-12c, yellow 505-308.
- (iii) Upon request, Consultant will supply a qualified product list of paints applicable to Work. Qualified paints may be used but DCC Representative reserves right to perform further tests.

(b) Thinner: to CGSB 1-GP-5M.

E13.3 Execution

(a) EQUIPMENT REQUIREMENTS

- (i) Paint applicator to be an approved pressure type mobile distributor. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off.

(b) CONDITION OF SURFACE

- (i) Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

(c) APPLICATION

- (i) Layout pavement markings as indicated in the drawing plan.
- (ii) Unless otherwise approved by DCC Representative, apply paint only when air temperature is above 10°C, wind speed is less than 60 km/h and no rain is forecast within next 4 hr.
- (iii) Apply traffic paint evenly at rate of 3 m²/L.
- (iv) Do not thin paint unless approved by DCC Representative.
- (v) Paint lines to be of uniform colour and density with sharp edges.
- (vi) Thoroughly clean distributor tank before refilling with paint of different colour.

E13.4 PROTECTION OF COMPLETED WORK

- (a) Protect pavement markings until it is dry.

E14. HYDRO-EXCAVATION

Description

- E14.1 This specification shall cover the removal of earthen material immediately adjacent to underground utilities infrastructure by means of high pressure water spray, and the recovery of excavated material by vacuum type means or equivalent method as approved by the Contract Administrator.

Equipment

E14.2 Hydro-Excavation equipment shall be capable of maintaining a minimum working pressure of 10,000 psi, at a rate of flow of 10 to 12 gallons per minute. The unit should be adjustable, so as to provide adequate pressure to remove earthen material identified by the Contract Administrator.

E14.3 Spray head shall be equipped with a rotating type nozzle in order to provide a wider path of cut.

Construction Methods

E14.4 Hydro-Removal of Earthen Material

E14.4.1 Earthen material adjacent to utility entity shall be sprayed with high pressure water so as to remove all such material identified by the Contract Administrator.

E14.5 Recovery of Excavated Material

E14.5.1 The recovery of excavated material shall be done using a vacuum type method, or other type method as approved by the Contract Administrator.

E14.5.2 The recovery of material shall follow immediately behind the excavation, to avoid excavated areas from filling with excavated material.

E14.5.3 The use of mechanical sweepers will not be allowed.

E14.5.4 Dispose of material in accordance with Section 3.4 of CW 1130-R2.

Measurement and Payment

E14.6 Hydro-Excavation

E14.6.1 Hydro-Excavation of earthen material and its recovery and disposal will be measured on an hourly basis and paid for at the Contract Unit Price per hour for "Hydro Excavation". The hours to be paid for will be the total number of hours of Hydro Excavation in accordance with this specification, accept and measured by the Contract Administrator. Travel to and from the Site will be considered incidental to "Hydro Excavation".

E15. SAW CUTTING PAVEMENT

E15.1 At the limits of excavation as directed by the Contract Administrator, the Contractor shall saw cut the existing pavement to produce a clean straight edge when excavated. The edge must be clean and straight prior to pouring new concrete pavement.

E15.2 Measurement and Payment

E15.2.1 Sawcutting pavement and disposal of surplus material will be considered incidental to Clause 4.1 of CW 3110 "Pavement Removal." No measurement and payment will be made within this section.

E16. TRAFFIC CONTROL

E16.1 Further to clauses 3.6, 3.7 and 3.8 of CW 1130:

(a) Where directed by the Contract Administrator, the Contractor shall construct and maintain temporary asphalt ramps to alleviate vertical pavement obstructions such as manholes and planing drop-offs to the satisfaction of the Contract Administrator. Payment shall be in accordance with CW3410.

(b) In accordance with the Manual of Temporary Traffic Control on City Streets (MTTC), the Contractor ("Construction Agency" in the manual) shall be responsible for placing, maintaining and removing the appropriate temporary traffic control devices as specified by the MTTC or by the Traffic Management Branch of the City of Winnipeg Public Works Department. The Contractor shall bear all costs associated with the placement of temporary traffic control devices by their own forces or subcontractor.

- E16.2 Notwithstanding E16.1, 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.
- E16.2.1 An exception to E16.2 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.
- E16.2.2 Further to E16.2, 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.

E17. TRAFFIC MANAGEMENT

- E17.1 Further to clause 3.7 of CW 1130:
- E17.1.1 The Contractor may close no more than one lane of traffic southbound and one lane of traffic northbound at a time. Further, the Contractor may not perform lane closure in the northbound direction from 7:00 am to 9:00 am, and the southbound direction from 3:30 pm to 5:30 pm. For lane closures required on Main Street, the Contractor shall contact Lane Closures via webform at: <http://winnipeg.ca/publicworks/departmentsinfo/contact.stm> ;
 - E17.1.2 Where left turn lanes exist, an additional lane to accommodate the left turn storage lane shall be maintained at all times.
 - E17.1.3 Intersecting street and private approach access shall be maintained at all times.
 - E17.1.4 Pedestrian and ambulance/emergency vehicle access must be maintained at all times.

E18. PEDESTRIAN SAFETY

- E18.1 During the project, on Assiniboine Avenue and on Main Street, a temporary snow fence shall be installed where open excavation for underground and road works. The Contractor shall be responsible for maintaining the snow fence in a proper working condition. No measurement for payment shall be made for this work.
- E18.2 Construction of accessible walkway corridors will be properly fenced off and/or barricaded to prevent access from pedestrian traffic as directed by the contract administrator. No measurement for payment shall be made for this work.
- E18.3 The Contractor shall coordinate with the City of Winnipeg Traffic Signals to minimize the closure of pedestrian crossing during construction.

E19. SURFACE RESTORATIONS

- E19.1 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.

E20. INFRASTRUCTURE SIGNS

- E20.1 The Contractor shall obtain infrastructure signs from the Traffic Services Sign Shop at 421 Osborne Street. The Contractor shall mount each sign securely to a rigid backing material approved by the Contract Administrator. The Contractor shall fasten each sign to a suitable support and erect and maintain one sign at each street as directed by the Contract Administrator. When the Contract Administrator considers the Work on the street complete, the Contractor shall remove and dispose of the signs and supports. No measurement for payment will be made for performing all operations herein described and all other items incidental to the work described.

E21. TREE REMOVAL

- E21.1 Further to CW 3010 – Clearing and Grubbing, tree removal including the roots shall be measured on a unit basis for the number of trees removed in accordance with CW 3010. Payment shall be at the Contract Unit Price bid for “Removal and Disposal of Trees and Shrubs in Paving Area” measured as specified herein for the total number of trees or shrubs removed in accordance with this Specification, accepted and measured by the Contract Administrator.