



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 231-2013

**WAVERLEY WEST ARTERIAL ROADS PROJECT (WWARP) – PART 3 –
CONTRACT 3 – KENASTON BOULEVARD EXTENSION AND WAVERLEY STREET
EXTENSION NEW ROAD CONSTRUCTION AND ASSOCIATED WORKS**

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

- B1.1 Waverley West Arterial Roads Project (WWARP) – Part 3 – Contract 3 – Kenaston Boulevard Extension and Waverley Street Extension New Road Construction and Associated Works

B2. SUBMISSION DEADLINE

- B2.1 The Submission Deadline is 12:00 noon Winnipeg time, April 30, 2013.
- 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. SITE INVESTIGATION

- B3.1 Further to C3.1, the Bidder may view the Site without making an appointment.
- B3.2 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.

B4. ENQUIRIES

- B4.1 All enquiries shall be directed to the Contract Administrator identified in D4.1.
- B4.2 If the Bidder finds errors, discrepancies or omissions in the 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.
- B4.3 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.
- B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.
- B4.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.

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, only to the Bidder who requested approval of the substitute.

B6.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely 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 B15.

- 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.
- B6.10 Notwithstanding B6.2 to B6.9, in accordance with B7.6, deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B15.1(a).

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
 - (ii) Form G2: Irrevocable Standby Letter of Credit and Undertaking, or
 - (iii) 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 B15.1(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 B15.4.2, 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. QUALIFICATION

B10.1 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.

B10.2 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>

B10.3 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);

B10.4 Further to B10.3(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 valid COR certification number 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 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/>

B10.5 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.

B10.6 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.

B11. BID SECURITY

B11.1 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.
- B11.1.1 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.
- B11.1.2 All signatures on bid securities shall be original.
- B11.1.3 The Bidder shall sign the Bid Bond.
- B11.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.
- B11.2 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.
- B11.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B11.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.
- B11.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.
- B11.3 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.
- B12. OPENING OF BIDS AND RELEASE OF INFORMATION**
- B12.1 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.
- B12.1.1 Bidders or their representatives may attend.
- B12.1.2 Bids determined by the Manager of Materials, or his/her designate, to not include the bid security specified in B11 will not be read out.
- B12.2 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/>
- B12.3 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/>
- B12.4 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.

B13. IRREVOCABLE BID

- B13.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.
- B13.2 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.

B14. WITHDRAWAL OF BIDS

- B14.1 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.
- B14.1.1 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.
- B14.1.2 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.
- B14.1.3 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 B14.1.3(b), declare the Bid withdrawn.
- B14.2 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 B13.2 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.

B15. EVALUATION OF BIDS

- B15.1 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 B10 (pass/fail);
 - (c) Total Bid Price;
 - (d) economic analysis of any approved alternative pursuant to B6.
- B15.2 Further to B15.1(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.
- B15.2.1 Any Bid with an apparent imbalance between the unit prices in Part 1 and Part 2 as defined in D3 may be determined to be non-responsive and rejected by the Award Authority in its sole discretion, acting reasonably.

- B15.3 Further to B15.1(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.
- B15.4 Further to B15.1(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.
- B15.4.1 Further to B15.1(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.
- B15.4.2 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.

B16. AWARD OF CONTRACT

- B16.1 The City will give notice of the award of the Contract or will give notice that no award will be made.
- B16.2 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.
- B16.2.1 Without limiting the generality of B16.2, 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.
- B16.3 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 B15.
- B16.3.1 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.

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) Construction of two new northbound and two new southbound lanes of asphalt pavement for Kenaston Boulevard from Sta. 1+450.000 to Sta. 2+922.400;
- (b) Construction of two new westbound and two new eastbound lanes and adjacent turning lanes of asphalt pavement for Waverley Street from Sta. 0+436.400 to Sta. 0+605.850;
- (c) Construction of two turning lanes of concrete pavement for westbound Waverley Street from 0+605.850 to Sta. 0+780.000; and,
- (d) Installation of Overhead Sign Support Structures

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

- (a) Construction of two new northbound and two new southbound lanes of asphalt pavement for Kenaston Boulevard from Sta. 1+450.000 to Sta. 2+922.400:
 - (i) Clearing and Grubbing;
 - (ii) Topsoil Excavation;
 - (iii) Preparation of Existing Ground Surface;
 - (iv) Excavation/Placing suitable Site material;
 - (v) Installation of catch pits;
 - (vi) Sub-grade compaction;
 - (vii) Installation of CSP culverts;
 - (viii) Placement of separation geotextile fabric;
 - (ix) Placement of geogrid were necessary;
 - (x) Placement of sub-base and base course materials;
 - (xi) Construction of French drains;
 - (xii) Construction of mountable, modified barrier, safety, and ramp curb and gutter;
 - (xiii) Construction of 170 mm of asphalt pavement (50 mm Type 1A, 120 mm Type III)
 - (xiv) Construction of 100 mm asphalt shoulder;
 - (xv) Construction multi-use pathway and sidewalk;
 - (xvi) Ditch grading and sloping;
 - (xvii) Boulevard grading;
 - (xviii) Construction of Grouted Stone Rip Rap;
 - (xix) Placement of topsoil;
 - (xx) Landscaping (Sodding and seeding);
 - (xxi) Reflective Crack Maintenance; and,
 - (xxii) Crack Sealing of Curb and Gutter/Asphalt Pavement Interface.
- (b) Construction of two new westbound and two new eastbound lanes and adjacent turning lanes of asphalt pavement for Waverley Street from Sta. 0+436.400 to Sta. 0+605.850;
 - (i) Clearing and Grubbing;
 - (ii) Topsoil Excavation;

- (iii) Preparation of Existing Ground Surface;
 - (iv) Excavation/Placing suitable Site material;
 - (v) Installation of catch pit;
 - (vi) Sub-grade compaction;
 - (vii) Installation of CSP culverts;
 - (viii) Placement of separation geotextile fabric;
 - (ix) Placement of geogrid were necessary;
 - (x) Placement of sub-base and base course materials;
 - (xi) Construction of mountable, modified barrier, safety, and ramp curb and gutter;
 - (xii) Construction of separate splash strip;
 - (xiii) Construction of 170 mm of asphalt pavement (50 mm Type 1A, 120 mm Type III);
 - (xiv) Ditch grading and sloping;
 - (xv) Boulevard grading;
 - (xvi) Construction of Grouted Stone Rip Rap;
 - (xvii) Placement of topsoil;
 - (xviii) Landscaping (Sodding and seeding);
 - (xix) Reflective Crack Maintenance; and,
 - (xx) Crack Sealing of Curb and Gutter/Asphalt Pavement Interface.
- (c) Construction of two turning lanes of concrete pavement for westbound Waverley Street from 0+605.850 to Sta. 0+780.000
- (i) Clearing and Grubbing;
 - (ii) Topsoil Excavation;
 - (iii) Excavation/Placing suitable Site material;
 - (iv) Excavation of ditches;
 - (v) Sub-grade compaction;
 - (vi) Placement of separation geotextile fabric;
 - (vii) Placement of geogrid were necessary;
 - (viii) Placement of sub-base and base course materials;
 - (ix) Construction of 250 plain dowelled concrete with integral modified barrier curb;
 - (x) Construction of separate splash strip;
 - (xi) Concrete joint sealing;
 - (xii) Ditch grading and sloping;
 - (xiii) Boulevard grading;
 - (xiv) Placement of topsoil;
 - (xv) Landscaping (Sodding and seeding).
- (d) Installation of Overhead Sign Support Structures
- (i) Installation of cast-in-place pile using bored excavation;
 - (ii) Supply and installation of overhead sign support structures; and,
 - (iii) Supply and installation of guardrail complete with FLEAT 350 End Treatment.

D3. DEFINITIONS

D3.1 When used in this Bid Opportunity:

- (a) **"Part 1"** is defined as Kenaston Boulevard Northbound and Southbound Mainline Pavement and Associated Works;
- (b) **"Part 2"** is defined as Kenaston Boulevard Northbound and Southbound Auxiliary Lanes, Side Streets Tie-ins, and Associated Works.;

D4. CONTRACT ADMINISTRATOR

D4.1 The Contract Administrator is Dillon Consulting Limited, represented by:

David Wiebe, P.Eng., PTOE
Project Manager
1558 Willson Place, Winnipeg, Manitoba, R3T 0Y4
Telephone No. 204 453-2301
Facsimile No. 204 452-4412

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

D4.3 Bids Submissions must be submitted to the address in B7.8

D5. CONTRACTOR'S SUPERVISOR

D5.1 At the pre-construction meeting, the Contractor shall identify his/her designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D5.2 At least two (2) business days prior to the commencement of any Work on the Site, the Contractor shall provide the Contract Administrator with a phone number where the supervisor identified in D5.1 or an alternate can be contacted twenty-four (24) hours a day to respond to an emergency.

D6. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

D6.1 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.

D6.2 The Contractor shall not make any public announcements or press releases regarding the Contract, without the prior written authorization of the Contract Administrator.

D6.3 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.

D6.4 A Contractor who violates any provision of D6 may be determined to be in breach of Contract.

D7. NOTICES

D7.1 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.

D7.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D7.3 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the facsimile number identified in D4.1.

- D7.3 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

D8. FURNISHING OF DOCUMENTS

- D8.1 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

D9. AUTHORITY TO CARRY ON BUSINESS

- D9.1 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.

D10. SAFE WORK PLAN

- D10.1 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.
- D10.2 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>

D11. INSURANCE

- D11.1 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.
- D11.2 Deductibles shall be borne by the Contractor.

- D11.3 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.
- D11.4 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.
- D11.5 All policies shall be taken out with insurers duly licensed to carry on business in the Province of Manitoba or as determined to be acceptable by the Contract Administrator in consultation with the City Solicitor of the City of Winnipeg.

D12. PERFORMANCE SECURITY

- D12.1 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.
- D12.1.1 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.
- D12.2 If the bid security provided in his/her Bid was not a certified cheque or draft pursuant to B11.1(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.

D13. SUBCONTRACTOR LIST

- D13.1 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.

D14. EQUIPMENT LIST

- D14.1 The Contractor shall provide the Contract Administrator with a complete list of the equipment which the Contractor proposes to utilize (Form K: Equipment List) at or prior to a pre-construction meeting, or at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the C4.1 for the return of the executed Contract.

D15. DETAILED WORK SCHEDULE

- D15.1 The Contractor shall provide the Contract Administrator with a detailed Work schedule at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the General Conditions for the return of the executed Contract.

D15.2 The detailed Work schedule shall consist of the following:

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

D15.3 Further to D15.2(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

D16. COMMENCEMENT

D16.1 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.

D16.2 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 D9;
 - (ii) evidence of the workers compensation coverage specified in C6.15;
 - (iii) the twenty-four (24) hour emergency response phone number specified in D5.2.
 - (iv) the Safe Work Plan specified in D10;
 - (v) evidence of the insurance specified in D11;
 - (vi) the performance security specified in D12;
 - (vii) the subcontractor list specified in D13;
 - (viii) the equipment list specified in D14; and
 - (ix) the detailed Work schedule specified in D15.
- (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.

D16.3 The Contractor shall not commence the Work on the Site before May 21, 2013, and shall commence the Work on Site no later than June 14, 2013, as directed by the Contract Administrator and weather permitting.

D16.4 The City intends to award this Contract by May 17, 2013.

D16.4.1 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.

D17. WORKING DAYS

D17.1 Further to C1.1(gg);

D17.1.1 The Contract Administrator will determine daily if a Working Day has elapsed and will record his/her assessment. On a weekly basis the Contract Administrator will provide the Contractor with a record of the Working Days assessed for the preceding week. The Contractor shall sign each report signifying that he/she agrees with the Contract Administrator's determination of the Working Days assessed for the report period.

D17.1.2 Work done to restore the Site to a condition suitable for Work, shall not be considered "work" as defined in the definition of a Working Day.

D17.1.3 When the Work includes two or more major types of Work that can be performed under different atmospheric conditions, the Contract Administrator shall consider all major types of Work in determining whether the Contractor was able to Work in assessing Working Days.

D18. RESTRICTED WORK HOURS

D18.1 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 1900 hours and 0700 hours, or on Saturdays, Sundays, Statutory Holidays and or Civic Holidays.

D19. WORK BY OTHERS

D19.1 Work by others on or near the Site will include but not necessarily be limited to:

- (a) Manitoba Hydro – Installation of new street lighting adjacent to the new road construction. The Contractor is expected to coordinate with Manitoba Hydro to facilitate construction;
- (b) City of Winnipeg Water and Waste Department – Installation of a new feedermain on the east side of Kenaston Boulevard northbound from Waverley Street to Bison Drive. The Contractor shall not commence works adjacent the installation of the feedermain, unless otherwise instructed by the Contract Administrator. The Contractor is expected to coordinate with the City of Winnipeg Water and Waste Department to facilitate construction.
- (c) City of Winnipeg Traffic Signals – Installation of traffic signals at Waverley Street intersection. The Contractor is expected to coordinate with the City of Winnipeg Traffic Signals to facilitate construction.
- (d) City of Winnipeg Traffic Services – The Contractor shall adhere to the City of Winnipeg Manual of Temporary Traffic Control, and notify and cooperate with the City of Winnipeg Traffic Services regarding any disruption to traffic during construction.
- (e) Ladco Company Ltd. Contracts – It is anticipated that there will be contract Work occurring adjacent to this project. The Contractor is expected to coordinate with any other Contractor(s) working adjacent to the Contract.
- (f) WWARP Part 2(B) – Construction of Waverley Street from the Waverley Street/John Angus Drive/ Tim Sale Drive Intersection to WWARP Part 3 Contract 3 Limits is expected to be completed by the end of June, 2013. The Contractor will not be permitted to enter the Site of the WWARP Part 2(B) Contract until these works are completed.
- (g) WWARP Part 3 Contract 1 – Construction of Kenaston Boulevard will take place to the north of the north limit of construction for this contract. The Contractor is expected to coordinate with any other Contractor(s) working adjacent this contract.

D20. SITE ACCESS

D20.1 Construction Site access is limited. There are currently no adjoining roadways connecting to the Contract 3 limits. The WWARP Part 2(B) construction of the Waverley Street extension is not anticipated to be complete until late June, 2013.

D20.2 The Contractor may not enter the WWARP Part 2(B) project Site until that Work is complete.

D20.3 The Contractor may not cross the feedermain pipe being installed along the east side of Kenaston, installed by the City of Winnipeg Water and Waste Department (see D19.1(b)), until it has been pressure tested and the City of Winnipeg Water and Waste Department and/or the Contract Administrator have notified the Contractor. This is expected to be completed by July 2, 2013.

D20.4 The Contract Administrator has contacted the landowners in proximity to the Site to inquire as to the feasibility of potential access points across property not owned by the City of Winnipeg. This information is provided for the benefit of the Contractor. However, it is the responsibility of the Contractor to determine optimal Site access and coordinate and finalize any agreements required to gain access across property not owned by the City of Winnipeg. The Contractor may pursue other options for Site access.

- D20.5 Ladco Company Ltd. is amenable in principle to allow access to the Contract 3 Site through their property on the south side of Waverley Street. See Figure D20.5.

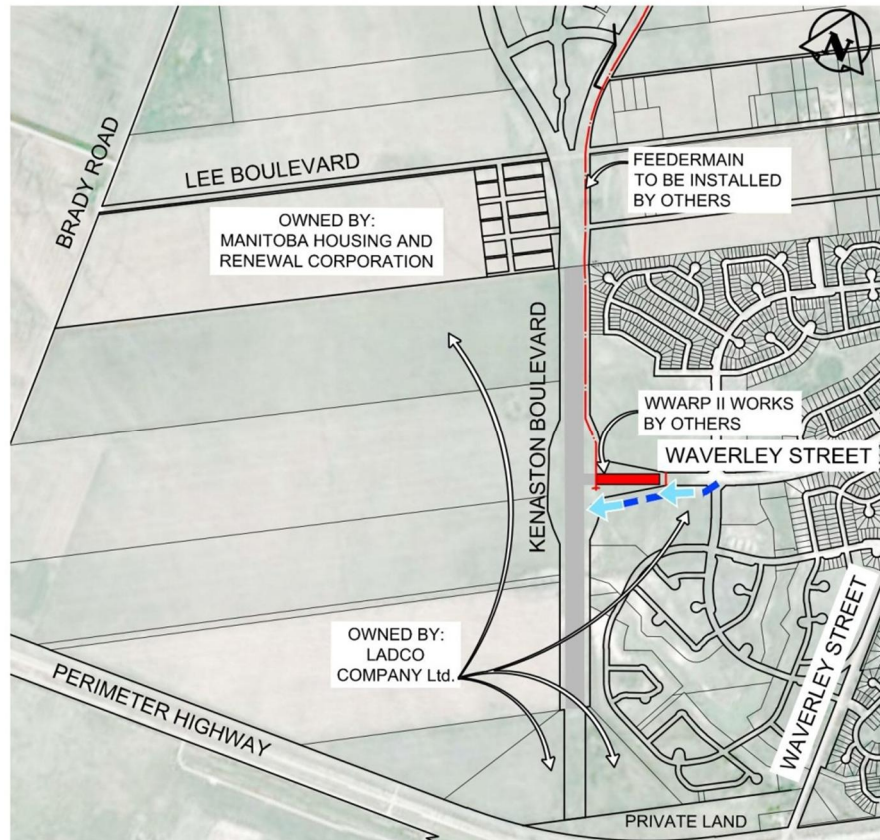


Figure D20.5

- D20.6 The Perimeter Highway is a limited access highway and is under the jurisdiction of the Highway Traffic Board. Permits are required from the Highway Traffic Board to change the use of an existing access/modify an access/build a new access from the Perimeter, or the service road on the north side of the Perimeter. Note the City of Winnipeg is currently responsible for the maintenance of the north side service road.
- D20.7 The Contractor shall provide all Site access roads required to facilitate construction of the Work and these roads shall have dimensions, geometry, slope, drainage and base material designed and constructed by the Contractor for the size and weights of the construction traffic.
- D20.8 The Contractor shall undertake all measures necessary to prevent any construction Site mud and/or debris from being deposited upon any part of public roads. If mud is deposited on public roads the Contractor shall promptly remove the mud using a motor grader and sweeper as required.
- D20.9 The Contractor shall ensure that the existing temporary construction accesses are suitable for the work, and provide modifications if required.
- D20.10 The Contractor is responsible for restoration of all areas utilized for Site access back to existing condition as directed by the Contract Administrator. This may include removal of temporary roads, restoration of boulevards and ditches, and restoration of pavement or curb.
- D20.11 All costs associated with the construction and restoration of any temporary roadway are to be borne by the Contractor.

D21. SEQUENCE OF WORK

D21.1 Further to C6.1, the sequence of Work shall be as follows:

D21.1.1 Construction activity on Kenaston Boulevard between the east edge of the northbound pavement structure and the east property line from station 2+155.000 to station 2+922.400 shall not commence until the construction of the feedermain, by the City of Winnipeg Water and Waste Department, is completed, unless directed by the Contract Administrator. At the Waverley Street intersection, the east edge of the northbound pavement structure shall be taken to mean a straight line segment from the edge of pavement of the turning lanes at station 2+155.000 and station 2+307.000. This Work is expected to be completed by July 2, 2013.

D21.1.2 Construction activity on Kenaston Boulevard between Station 1+800.000 and Station 1+830.000 shall not commence until construction of the land drainage sewer, by Ladco Company Limited, crossing Kenaston at Station 1+815.570 is completed, unless otherwise directed by the Contract Administrator. This Work is expected to be completed by the end of June, 2013.

D22. BUILDING CANADA FUND CONDITIONS

D22.1 In accordance with the Building Canada Fund, the Contractor will:

D22.1.1 Maintain proper and accurate accounts and records, including but not limited to contracts, invoices, statements, receipts, and vouchers, in respect of the Project, for at least six (6) years after the construction contract's Substantial Completion Date. The City of Winnipeg has the contractual right to audit the records;

D22.1.2 Respect all applicable labour, environmental, and human rights legislation; and,

D22.1.3 Permit Canada, the Auditor General of Canada, and/or their designated representatives, to the extent permitted by law, at all times, to inspect the terms of the Contract and any records and accounts respecting the Project, and to have free access to the Project Sites and any documentation relevant for the purpose of audit.

D23. SUBSTANTIAL PERFORMANCE

D23.1 The Contractor shall achieve Substantial Performance within eighty (80) consecutive Working Days of the commencement of the Work as specified in D16.

D23.2 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.

D23.3 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.

D24. TOTAL PERFORMANCE

D24.1 The Contractor shall achieve Total Performance within ninety (90) consecutive Working Days of the commencement of the Work as specified in D16.

D24.2 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.

D24.3 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.

D25. LIQUIDATED DAMAGES

D25.1 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 – three thousand five hundred dollars (\$3,500);
- (b) Total Performance – two thousand one hundred dollars (\$2,100).

D25.2 The amounts specified for liquidated damages in D25.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve critical stages, Substantial Performance or Total Performance by the days fixed herein for same.

D25.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D26. SCHEDULED MAINTENANCE

D26.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

- (a) Reflective Crack Maintenance During Two Year Maintenance Warranty Period as specified in CW 3250-R7;
- (b) Crack Sealing the interface of Curb and Gutter and Asphalt Pavement shall be completed as per E27 one year after Substantial Performance has been achieved, unless directed by the Contract Administrator.
- (c) Maintenance of Seeded Area will commence immediately after the completion of the seeding operation, to the satisfaction of the Contract Administrator, and will continue until the criteria specified for Termination of the Maintenance Period has been met as specified in CW 3520-R7.

D26.2 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

D27. JOB MEETINGS

D27.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City and the Contractor respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.

D27.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

D28. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D28.1 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).

D29. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D29.1 Further to B10.4, 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 B10.4.

MEASUREMENT AND PAYMENT

D30. PAYMENT

D30.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D31. WARRANTY

D31.1 Notwithstanding C13.2, the warranty period shall begin on the date of Substantial Performance and shall expire one (2) year thereafter unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

D31.2 Notwithstanding C13.2, 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.

D31.2.1 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 D12)

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. 231-2013

Waverley West Arterial Roads Project (WWARP) – Part 3 – Contract 3 – Kenaston Boulevard Extension and Waverley Street Extension New Road Construction and Associated Works which is by reference made part hereof and is hereinafter referred to as the "Contract".

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

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

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

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

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

_____ day of _____, 20____ .

SIGNED AND SEALED
in the presence of:

(Witness as to Principal if no seal)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

**FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)**
(See D12)

(Date)

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

RE: PERFORMANCE SECURITY – BID OPPORTUNITY NO. 231-2013

Waverley West Arterial Roads Project (WWARP) – Part 3 – Contract 3 – Kenaston Boulevard
Extension and Waverley Street Extension New Road Construction and Associated Works

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

(Name of Contractor)

(Address of Contractor)

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

_____ Canadian dollars.

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

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

Partial drawings are permitted.

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

(Address)

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

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

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

(Date)

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

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

This credit is subject to the Uniform Customs and Practice for Documentary Credit (1993 Revision), International Chamber of Commerce Publication Number 500.

(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

FORM J: SUBCONTRACTOR LIST
 (See D13)

Waverley West Arterial Roads Project (WWARP) – Part 3 – Contract 3 – Kenaston Boulevard Extension
 and Waverley Street Extension New Road Construction and Associated Works

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
SURFACE WORKS		
<i>Supply of Materials</i>		
<i>Concrete</i>		
<i>Asphalt</i>		
<i>Base Course & Sub-Base</i>		
<i>Geotextile Materials</i>		
<i>Culverts</i>		
<i>Topsoil/Seed/Sod</i>		
<i>Installation/Placement</i>		
<i>Concrete</i>		
<i>Asphalt</i>		
<i>Base Course & Sub-Base</i>		
<i>Geotextile Materials</i>		
<i>Culverts</i>		
<i>Topsoil/Seed/Sod</i>		
<u>UNDERGROUND WORKS:</u>		
<u>Supply of Materials:</u>		
<i>Catch Pits/Ring Sections/ Ditch Inlet Grates</i>		
<i>Culvert Safety Grates</i>		
<u>Installation/Placement:</u>		
<i>Catch Basins/Ring Sections/ Ditch Inlet Grates</i>		
<i>Culvert Safety Grates</i>		

FORM K: EQUIPMENT
(See D14)

Waverley West Arterial Roads Project (WWARP) – Part 3 – Contract 3 – Kenaston Boulevard Extension
and Waverley Street Extension New Road Construction and Associated Works

<p>1. Category/type: Earth Moving / Excavation</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>2. Category/type: Base Placement, Compaction and Grading</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>3. Category/type: Curb and Gutter (Slipform)</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>

FORM K: EQUIPMENT
(See D14)

Waverley West Arterial Roads Project (WWARP) – Part 3 – Contract 3 – Kenaston Boulevard Extension
and Waverley Street Extension New Road Construction and Associated Works

4. Category/type: Asphalt Paving

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

5. Category/type: Miscellaneous

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

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

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
P-3344-00	Cover Sheet	A1
P-3344-01	General Arrangement Sta. 1+450 to 2+922.4	A1
P-3344-02	Horizontal Geometry Sta: 1+450 to Sta: 2+095	A1
P-3344-03	Horizontal Geometry Waverley Intersection	A1
P-3344-04	Horizontal Geometry Sta: 2+360 to Sta: 2+922.4	A1
P-3344-05	Plan Profile Kenaston Sta: 1+450 to Sta: 1+770	A1
P-3344-06	Plan Profile Kenaston Sta: 1+770 to Sta: 2+100	A1
P-3344-07	Plan Profile Kenaston Sta: 2+100 to Sta: 2+430	A1
P-3344-08	Plan Profile Kenaston Sta: 2+430 to Sta: 2+690	A1
P-3344-09	Plan Profile Kenaston Sta: 2+690 to Sta: 2+922.4	A1
P-3344-10	Plan Profile Kenaston Sta: 0+436 to Sta: 0+818	A1
P-3344-11	Waverley Intersection Right Turn Plan & Profiles	A1
P-3344-12	Waverley Intersection Grading Plan	A1
P-3344-13	Cross Sections	A1
P-3344-14	Cross Sections	A1
P-3344-15	Details	A1
P-3344-16	Details	A1
S769-2013-01	S769 – Kenaston Blvd. S.B. North of Waverley St. OHSS and Guardrail Location	A1
S769-2013-02	S769 – Elevation and Pile Details	A1
S769-2013-03	S769 – Fabrication Details	A1
S769-2013-04	S769 – Guardrail Details	A1
S769-2013-05	S769 – FLEAT 350 Details	A1
S770-2013-01	S770 – Waverley St. E.B. West of Kenaston Blvd. Location and Details	A1
S770-2013-02	S770 – Fabrication Details	A1

E2. GEOTECHNICAL REPORT

- E2.1 Further to C3.1, the geotechnical report is provided to aid the Contractor's evaluation of the existing soil conditions. The geotechnical report is contained in Appendix 'A'.

E3. OFFICE FACILITIES

- E3.1 The Contractor shall supply office facilities meeting the following requirements:
- (a) The field office shall be for the exclusive use of the Contract Administrator.
 - (b) The building shall be conveniently located near the site of the Work.
 - (c) The building shall have a minimum floor area of 25 square metres, a height of 2.4 m with two windows for cross ventilation and a door entrance with a suitable lock.
 - (d) The building shall be suitable for all weather use. It shall be equipped with an electric heater and air conditioner so that the room temperature can be maintained between either 16-18°C or 24-25°C.
 - (e) The building shall be adequately lighted with fluorescent fixtures and have a minimum of three wall outlets.
 - (f) The building shall be furnished with two desks, two tables 3 m x 1.2 m, one four drawer legal size filing cabinet, and a minimum of 15 chairs.
 - (g) Appliances shall include a medium sized fridge, microwave, and coffee maker.
 - (h) A portable toilet shall be located near the field office building. The toilet shall have a locking door and be for the exclusive use of the Contract Administrator and other personnel from the City.
 - (i) The field office building and the portable toilet shall be cleaned on a weekly basis immediately prior to each Site meeting. The Contract Administrator may request additional cleaning when he/she deems it necessary.
- E3.2 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.
- E3.3 The office facilities will be provided from the date of the commencement of the Work to the date of Total Performance.
- E3.4 On a one time basis, where directed by the Contract Administrator, the Contractor shall relocate the office facilities to a location more convenient for the remaining Work.

E4. TRAFFIC CONTROL

- E4.1 Further to clauses 3.6 and 3.7 of CW 1130:
- (a) Where directed, 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 in Work Areas on City Streets, the Contractor ("Agency" in the manual) shall make arrangements with the Traffic Services Branch of the City of Winnipeg to place all temporary regulatory signs. The Contractor shall bear all 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.

E5. TRAFFIC MANAGEMENT

- E5.1 Notwithstanding clause E5.3.1, and providing access to Work by Others in D19, the Contractor will not be required to provide general traffic access to the Site, nor provide access for general traffic on Waverley Street west of the Tim Sale Drive/ John Angus Drive intersection.
- E5.2 The Contractor shall place barricades at Waverley Street at Tim Sale Drive/John Angus Drive intersection indicating "Road Closed" once access to the Site from Waverley Street is available after WWARP Part 2(B) Works are complete as directed by the Contract Administrator. The Contractor shall be responsible for maintaining the barricades until Total Performance is reached or as directed by the Contract Administrator. No measurement for payment will be

made for performing all operations described herein and all other items incidental to the Work described.

E5.3 Further to clause 3.7 of CW 1130:

E5.3.1 Ambulance/emergency vehicle access must be maintained at all times.

E6. PEDESTRIAN SAFETY

E6.1 During the project, a temporary snow fence shall be installed at open excavations. 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.

E6.2 If any pedestrian traffic is disrupted or rerouted at the Site, the Contractor shall be responsible for supplying and installing all necessary signs and protection to the satisfaction of the Contract Administrator.

E6.3 If during construction the Multi Use Path is completed prior to Substantial Performance, the Contractor shall place barricades indicating "Sidewalk Closed" at all access points to the Multi-Use Path. The Contractor shall be responsible for maintaining the barricades until Substantial Performance is reached. No measurement for payment will be made for performing all operations herein described and all other items incidental to the Work described.

E7. WATER OBTAINED FROM THE CITY

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

E8. SURFACE RESTORATIONS

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

E9. OPERATING CONSTRAINTS FOR WORK IN CLOSE PROXIMITY TO FEEDERMAINS

DESCRIPTION

E9.1 This Section details operating constraints for all Work to be carried out in close proximity to the Kenaston Boulevard Feedermain. Close proximity shall be deemed to be any construction activity within a 5 m offset from the centreline of the feedermain.

GENERAL

E9.2 General Considerations for Work in Close Proximity to Feeder mains

E9.2.1 Feeder mains are a critical component of the City of Winnipeg Regional Water Supply System and Work in close proximity to the pipeline shall be undertaken with an abundance of caution. The pipe cannot be taken out of service for extended periods to facilitate construction and inadvertent damage caused to the pipe would likely have catastrophic consequences.

E9.2.2 Work around feeder mains shall be planned and implemented to minimize the time period that Work is carried out in close proximity to the pipe and to ensure that the pipeline is not subjected to excessive construction related loads, including excessive vibrations and/or concentrated or asymmetrical lateral loads during backfill placement.

- E9.2.3 The Kenaston Boulevard Feedermain will be constructed (by the City of Winnipeg Water and Waste Department) of either 750 Polyvinyl Chloride in accordance with AWWA Standard C-905 or 750 Pre-stressed Concrete Cylinder Pipe in accordance with AWWA Standard C-301.
- E9.2.4 Further to D21, Work adjacent to the Feedermain alignment will not be permitted until installation and successful testing of each block of the Feedermain is completed (by the City of Winnipeg Water and Waste Department) and authorized in writing by the City of Winnipeg Water and Waste Department.
- E9.2.5 The Contract Administrator will mark out the approximate alignment of the feedermain prior to commencement of construction with stakes or paint. The Contractor is responsible for maintaining markers onsite (eg. stakes or posts) that can be used by all construction personnel to delineate the feedermain during construction.
- E9.2.6 Large diameter pressure pipe generally has limited ability to withstand increased earth and live loading. Therefore, every precaution must be undertaken to ensure that applied loading during all phases of construction is within accepted loading parameters. Pre-stressed pipe typically fails in a non-ductile mode and has the potential to cause extensive consequential damage to infrastructure if failure should occur.

SUBMITTALS

- E9.2.7 Submit a Construction Method Statement with proposed construction plan including haul routes, excavation equipment locations, loading positioning and base construction sequencing, to the Contract Administrator for review seven (7) days prior to construction. Do not commence construction until the Construction Method Statement has been reviewed and accepted by the Contract Administrator.

CONSTRUCTION METHODS

- E9.3 Protection of Feedermain During Construction
- E9.3.1 The sections of the feedermain affected by construction:
- (a) Kenaston Boulevard Feedermain
 - (i) Valve Chambers in the south east quadrant of the Waverley Street and Kenaston Boulevard intersection and the south east quadrant of the Kenaston Boulevard Northbound and Bison Drive Intersection as shown on the Contract drawings.
 - (ii) The 750mm Feedermain that runs from south of Waverley Street to Bison Drive between Kenaston Boulevard northbound lanes and the east property line as shown on the Contract drawings.
- E9.3.2 Contractors carrying out repair Work or working in close proximity to feedermain shall meet the following conditions and technical requirements:
- (a) Pre-Work, Planning and General Execution
 - (i) No Work shall commence at the Site until the Equipment Specifications and Construction Method Statement have been submitted and accepted, and feedermain locations have been clearly delineated in the field. Work over feedermain shall only be carried out with equipment that has been reviewed and quantified in terms of its loading implications on the pipe.
 - (ii) Where Work is in close proximity to a feedermain, utilize construction practices and procedures that do not impart excessive vibration loads on the feedermain or that would cause settlement of the subgrade below the feedermain.
 - (iii) Crossing feedermain is prohibited until the completion of granular base construction. At all times prior to completion of final paving; reduce equipment speeds to levels that minimize the effects of impact loading to the pipe.
 - (iv) For construction Work activities either longitudinally or transverse to the alignment of a feedermain, Work only with equipment and in the manner

- stipulated in the accepted Construction Method Statement and the supplemental requirements noted herein.
- (v) Where Work is in proximity to a feedermain, utilize construction practices and procedures that do not impart excessive vibration loads on the feedermain or that would cause settlement of the subgrade below the feedermain.
 - (vi) The pipeline elevation datum relative to the proposed roadway shall be adequately verified. Deviations from the elevations noted herein shall be reported to Contract Administrator for review prior to construction of the subgrade.
 - (vii) Construction operations should be staged in such a manner as to limit multiple construction loads at one time, (e.g. offset crossings sufficiently from each other, rollers should remain a sufficient distance behind spreaders to limit loads. A reasonable offset distance is 3 m between loads).
 - (viii) No vehicular traffic shall be allowed to cross or operate over the valve chamber in the southeast corner of Waverley Street and Kenaston Boulevard. The valve chamber shall be staked and flagged off before commencement of construction activities. Any equipment working within 5 m of the chamber is required to be approved by the Contract Administrator as per above requirements. Notwithstanding all restrictions on working near feedermain noted herein equipment will not be allowed to operate within 3 m of the valve chamber walls.
 - (ix) The Contractor and all Site supervisory personnel and equipment operators have to be formally briefed to ensure that they are fully cognizant of the associated restrictions, constraints, and risks associated with working adjacent to and over this pipeline. New personnel introduced after commencement of the project need to be formally orientated as to the significance and constraints associated with working over the feedermain.
- (b) Demolition and Excavation
- (i) Use of pneumatic concrete breakers within 3 metres of a feedermain is prohibited. Pavement shall be full depth sawcut and carefully removed. Use of hand held jackhammers for pavement removal will be allowed.
 - (ii) Where there is less than 1.6 metres of earth cover over a feedermain and further excavation is required either adjacent to or over the feedermain, utilize only smooth edged excavation buckets, soft excavation or hand excavation techniques. Where there is less than 1 metre of cover over the feedermain, carefully expose the feedermain by hand excavation to delineate the location and depth of the main, and provide full time supervision of the excavation.
 - (iii) Where there is less than 2.5 m of earth cover over a feedermain, offset backhoe or excavation equipment from the feedermain, a minimum of 3 m from centerline, to carry out excavation.
 - (iv) Equipment should not be allowed to operate while positioned directly over a feedermain.
 - (v) Where excavation is required over existing thrust blocks, arrange for a shutdown of the feedermain through the Contract Administrator prior to proceeding with excavation. Expose top of thrust blocks by hand excavation or soft excavation methods to determine limits and elevation of thrust blocks prior to mass excavation. Extreme caution is to be exercised when excavating to avoid displacement of the thrust blocks
- (c) Subgrade Construction
- (i) Subgrade compaction shall be prohibited within 2 metres of a feedermain. Subgrade compaction within 3 metres of a feedermain shall be limited to non vibratory methods only.
 - (ii) Subgrade, sub-base and base course construction shall be kept in a rut free condition at all times. Construction equipment is prohibited from crossing pipelines if the grade is insufficient to support the equipment without rutting.

- (iii) Subgrade conditions should be inspected by personnel with competent geotechnical experience (e.g. ability to adequately visually classify soils and competency of subgrade, subbase, and base course materials). In the event of encountering unsuitable subgrade materials above the feedermain, proposed design revisions shall be submitted to this office for review to obtain approval from the Water and Waste Department relative to any change in conditions.
 - (iv) Construction operations shall be staged to minimize the time period between excavation to subgrade and placement of granular subbase materials. Should bare subgrade be left overnight, measures shall be implemented to protect the subgrade against inadvertent travel over it and to minimize the impact of wet weather.
- (d) Subbase and Base Course Construction
- (i) Granular material, construction material, soil or other material shall not be stockpiled on the pipelines or within 5 metres of the pipe centerline.
 - (ii) Subbase or base course materials shall not be dumped directly on pipelines but shall be stockpiled outside limits noted in these recommendations and shall be carefully bladed in-place.
 - (iii) Subbase compaction within 3 metres of the centreline of a feedermain shall be either carried out by static methods (without vibration) or with smaller approved equipment such as hand held plate packers or smaller roller equipment.
 - (iv) Place subbase and base materials over thrust blocks prior to returning feedermain to service

MEASUREMENT AND PAYMENT

E9.4 No measurement or payment will be made for the Works listed in this specification.

E10. SALT TOLERANT GRASS SEEDING

DESCRIPTION

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

MATERIALS

E10.2 Salt Tolerant Grass Seed

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

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

EQUIPMENT

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

CONSTRUCTION METHODS

E10.4 Preparation of Existing Grade

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

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

E10.5 Salt Tolerant Grass Seeding

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

MEASUREMENT AND PAYMENT

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

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

E11. INSTALLATION OF STRAW WATTLES

DESCRIPTION

E11.1 Straw wattles are required to be installed as erosion control measures to mitigate any deleterious materials from entering the existing Land Drainage System around Station 1+810 and the catchpits in the centre median of Kenaston Boulevard.

MATERIALS

E11.2 The straw wattles shall be Stenlog or other biodegradable straw wattles.

CONSTRUCTION METHODS

E11.3 Install 300mm Stenlog or other straw wattle sediment control material in accordance with the manufacturer's specifications around all riprap areas related to drainage inlets and outlets, and catch basins within seeded areas.

E11.4 Install straw wattles so that no gaps exist between the soil and the bottom of the wattle, and the ends of adjacent wattles are overlapped 150mm minimum to prevent water and sediment passing. Achieve a tight seal between the wattle segments.

E11.5 Dogleg terminal ends of straw wattle up the slope to prevent channelling of sedimentation.

E11.6 Use 300mm wooden stakes to fasten straw wattle to the soil. Place stakes on each side of the straw wattle, lying across the natural fibre twine, spaced 1200mm on centre. Leave 30 to 50mm of wood stake exposed above the wattle.

E11.7 Avoid damage to wattles. Damaged areas of wattles should be cut and tied off, then treated as terminal ends.

E11.8 At the direction of the Contract Administrator, the straw wattles shall be removed after seeding has established and before the end of the warranty period.

MEASUREMENT AND PAYMENT

E11.9 Installation of straw wattles will be considered incidental to the Contract and no separate measurement for payment will be made.

E12. SOFT EXCAVATION TO EXPOSE UNDERGROUND UTILITIES

DESCRIPTION

- E12.1 This specification covers the soft excavation to expose underground utilities to determine the depth of the underground utility and whether it will interfere with the installation of proposed Works on Site.

METHOD

- E12.2 Prior to commencement of any construction works adjacent to underground utilities, the Contractor shall use soft digging or hand excavation to expose the underground utilities.

MEASUREMENT AND PAYMENT

- E12.3 No separate measurement or payment will be made for any soft excavation operations or any items incidental to those operations

E13. DAMAGE TO EXISTING STRUCTURES AND PROPERTY

- E13.1 Further to Section 3.13 of CW 1130 of the General Requirements, special care shall be taken to avoid damage to existing adjacent structures and properties during the course of Work.
- E13.2 Any damage caused by the Contractor or his Subcontractors to the adjacent structures of properties shall be promptly repaired by the Contractor at his own expense to the satisfaction of the Contract Administrator.

E14. NEW CAST-IN-PLACE CONCRETE PILE FOUNDATIONS

E14.1 Description

- E14.1.1 The Work covered under this Item shall include all concreting operations related to construction of cast-in-place concrete pile foundations in accordance with this Specification and as shown on the Drawings.
- E14.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Works as hereinafter specified.

E14.2 Materials

E14.2.1 General

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

E14.2.2 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 A23.1-09.

E14.2.3 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.

E14.2.4 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.

E14.2.5 Cement

- (a) Cement shall be Type HS or HSb, high-sulphate-resistant hydraulic cement, conforming to the requirements of CSA A23.1-09.

E14.2.6 Concrete

(a) General

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 A23.1-09:

Class of Exposure: S-1

Compressive Strength @ 56 days = 35 MPa

Water / Cementing Materials Ratio = 0.4

Air Content: Category 2 per Table 4 of CSA A23.1-09 (4-7%)

Cement – shall be as specified in E14.2.5.

- (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 pile 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.

E14.2.7 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.

(b) Coarse Aggregate

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, Table 12, "Concrete Exposed to Freezing and Thawing".

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%.

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.

Coarse aggregate when tested for abrasion in accordance with ASTM C131 shall not have a loss greater than 30%.

Tests of the coarse aggregate shall not exceed the limits for standard requirements prescribed in CSA A23.1, Table 12, for concrete exposed to freezing and thawing.

(c) Fine Aggregate

Fine aggregate shall meet the grading requirements of CSA A23.1, Table 10, Gradation FA1.

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.

Tests of the fine aggregate shall not exceed the limits for standard requirements prescribed in CSA A23.1, Table 12.

E14.2.8 Cementing Materials

(a) Cementing materials shall conform to the requirements of CSA A3001.

(b) Silica Fume

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

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.

E14.2.9 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.

E14.2.10 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.

E14.2.11 Concrete Supply

- (a) Concrete shall be proportioned, mixed, and delivered in accordance with the requirements of CSA A23.1, 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.

E14.2.12 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 400 W, Billet-Steel Bars for Concrete Reinforcement. All reinforcing steel shall be new deformed billet steel bars. All bars, including ties, shall be hot-dip galvanized in accordance with ASTM A767 for a minimum net retention of 610 g/m². Reinforcing steel supply and installation will be incidental to construction of concrete pile foundation and no separate payment will be made.

E14.2.13 Anchor Bolts, Nuts, and Washers

- (a) Anchor bolts, nuts, and washers shall be in accordance with ASTM F1554, and shall be hot-dip galvanized full length in accordance with ASTM F2329 for a minimum net retention of 610 g/m², for the entire length of the anchor bolts. The threaded portion of the anchor bolts shall be 300 mm long. Anchor bolt supply and installation will be incidental to construction of concrete pile foundation and no separate payment will be made.

E14.2.14 Anchor Bolt Templates

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

E14.2.15 Miscellaneous Materials

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

E14.3 Construction Methods

E14.3.1 Location and Alignment of Piles

- (a) Pile construction shall not commence until the Contractor has obtained clearance from the appropriate Utility Authorities including but not limited to Manitoba Hydro, MTS and City of Winnipeg Water and Waste.
- (b) Piles 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 pile shall not differ by more than 1 percent from the vertical.

E14.3.2 Buried Utilities

- (a) The Contractor shall exercise extreme caution when constructing the pile 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 piles.
- (b) The proposed locations of the pile 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 piles, as determined by the Contract Administrator.

E14.3.3 Excavation

- (a) Pile excavation shall be accomplished by hydro-jet and/or boring for the full depth of all piles.
- (b) It may be necessary to hydro-jet excavate utilities adjacent to a pile location to adequately ascertain the location or provide enough "slack" in conduits to move them slightly to avoid interference with the pile locations. The Contract Administrator may elect to alter the location of a pile if hydro-jet excavation shows that utilities cannot be avoided. If the pile location must be altered, the Contractor will be paid for the abandonment of the pile due to utility interference.
- (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 piles 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 excavation has been completed.
- (f) If any hole is condemned because of caving, it shall be filled with lean-mix concrete and a new hole excavated as near as possible to the location shown on the Drawings. In locations where underground utilities have been exposed, the underground utilities shall be covered with clean sand to 300 mm minimum cover around the utility. Payment will not be made for condemned piles.

E14.3.4 Sleeving

- (a) Steel or corrugated metal pipe sleeving shall be used to temporarily line the excavation to prevent bulging or caving of the walls and to protect men at work in the excavation.
- (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 excavation. 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 excavation and the sleeving shall not exceed 75 mm.
- (e) The sleeving may remain cast in place if required to protect nearby utilities at the direction of the Contract Administrator. The top of sleeving shall be 300 mm below the top of sidewalk.

E14.3.5 Inspection of Excavations

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

E14.3.6 Placing Reinforcing Steel

- (a) Reinforcement shall be:
 - placed in accordance with the details shown on the Drawings

rigidly fastened together, and
lowered into the excavation intact before concrete is placed.

- (b) Spacers shall be utilized to properly locate the reinforcing steel cage in the excavation.

E14.3.7 Placing Anchor Bolts

- (a) The anchor bolts shall be aligned with a steel template matching the bolt holes in the sign structure base plate. The setting template shall be held in place by the top and bottom nuts of the anchor bolts. The anchor bolts shall be plumb. Extreme care shall be used in this operation. Placement of anchor bolts without the steel template will not be permitted.
- (b) The threaded portion of the anchor bolts projecting above the top surface of pile shall be coated with oil, before the concrete is poured, to minimize the fouling of threads splattered by concrete residue.

E14.3.8 Forms

- (a) For hydro-jet excavated piles the top of the piles shall be formed with tubular forms (Sonotube) to a minimum depth of 1500 mm below final grade.
- (b) For bored piles the top of the piles shall be formed with tubular forms (Sonotube) to a minimum depth of 1000 mm below final grade.
- (c) In locations of caving, the tubular form (Sonotube) should extend a minimum of 500 mm below where the shaft becomes uniform.
- (d) 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.

E14.3.9 Placing Concrete

- (a) Care shall be taken to ensure that anchor bolts are vertically aligned and that anchor bolts and conduits are properly positioned prior to placement of concrete.
- (b) 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 pile.
- (c) Concrete shall be placed to the elevations as shown on the Drawings. The top surface of the pile shall be finished smooth and even with a hand float.
- (d) 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. In the event that tremie concrete is allowed by the Contract Administrator, the concrete shall be placed as specified herein.
- (e) All concrete, during and immediately after deposition, shall be consolidated by mechanical vibrations so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into the corners of forms; eliminating all air or stone pockets that may cause honeycombing, pitting, or planes of weakness.

E14.3.10 Tremie Concrete

- (a) The shaft of the pile shall be pumped clear of water so that the bottom can be cleaned. Pumping shall then be stopped and water shall be allowed to come into the excavation until a state of equilibrium is reached. Concrete shall then be placed by means of a tremie pipe. The tremie pipe shall have a suitable gate in the bottom to prevent water from entering the pipe. The bottom of the pipe shall be maintained below the surface of the freshly placed concrete. The pipe shall be capable of being raised or lowered quickly in order to control the flow of concrete.
- (b) Tremie concrete shall be poured up to a depth of 600 mm or as the Contract Administrator directs. Pumps shall then be lowered into the excavation and the

excess water pumped out. The laitance that forms on top of the tremie shall then be removed and the remainder of the concrete shall be placed in the dry excavation.

E14.3.11 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.

E14.3.12 Curing Concrete

- (a) The top of the freshly finished concrete piles 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.

E14.3.13 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.

E14.3.14 Patching of Formed Surfaces

- (a) Immediately after forms around top of pile 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 well-brushed 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.

E14.3.15 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 until 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.

E14.3.16 Removal and Restoration of Adjacent Surface Treatments

- (a) If the new pile being constructed is located in a concrete sidewalk/median slab, the existing slab shall be removed to the nearest existing joints. If the nearest existing joint is more than 600 mm beyond the perimeter of the pile, the Contractor shall remove a square section of the existing slab that is 300 mm beyond the pile perimeter. The surface of the slab shall be saw-cut to a depth of 50 mm around the perimeter of the square section. Care shall be taken to ensure that the saw-cut edge of the section is not chipped or broken during the removal of the concrete. Concrete slabs damaged beyond the specified limits shall be replaced at the Contractor's cost to the satisfaction of the Contract Administrator. After the pile has been constructed, the concrete sidewalk/median slab shall be restored flush with the adjacent surface level.
- (b) If the pile being constructed is located in grass boulevard/median, following pile construction disturbed areas shall be backfilled and restored with sod around the new pile as directed by the Contract Administrator
- (c) If the pile being constructed is located in a paving stone surface, the paving stones shall be temporarily removed to the extent required for new pile construction and appropriately stored by the Contractor. Following pile construction, the Contractor shall cut as required and re-set the salvaged paving stones around the new pile flush with the adjacent surface level, as directed by the Contract Administrator.
- (d) The removal and restoration of surface treatments will be considered incidental to pile construction works at each Site and no separate payment will be made.

E14.4 Quality Control

E14.4.1 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 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.

E14.4.2 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.

E14.5 Measurement and Payment

E14.5.1 Construction of New Cast-in-Place Concrete Pile Foundations

- (a) Construction of new cast-in-place concrete pile foundations including supply and installation of anchor bolts and steel template will be measured on a unit basis and paid for at the Contract Unit Price per foundation for "Construction of Cast-in-Place Concrete Pile Foundations" in accordance with this Specification and accepted by the Contract Administrator.
- (b) Abandonment of piles due to utility interference will be measured on a unit basis and paid for at the Contract Unit Price per pile per Site for the "Abandonment of Piles due to Utility Interference" for abandoned piles in accordance with this Specification and accepted by the Contract Administrator.

E15. SUPPLY AND INSTALLATION OF NEW STEEL OVERHEAD SIGN SUPPORT STRUCTURES

E15.1 Description

- (a) The Work covered under this item shall include all operations related to the supply, fabrication, delivery, and erection of new steel overhead sign support structures.

- (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 the Work as hereinafter specified.

E15.2 Materials

E15.2.1 General

- (a) The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification.
- (b) All materials used for fabrication of overhead sign support structures shall be new, previously unused material.

E15.2.2 Handling and Storage of Materials

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

E15.2.3 Structural Steel

- (a) Structural steel for all components of the overhead sign support structures shall be in accordance with CSA Standard G40.21 M, to the grades indicated on the Drawings. For purposes of hot-dip galvanizing, the silicon content in the steel shall be controlled within 0 to 0.03% or 0.15 to 0.22% for monotubular shafts and arms, and to less than 0.3% for all other steel components.
- (b) The Contractor is advised that copies of mill test certificates showing the chemical and physical properties of all structural steel to be supplied under this Specification must be supplied to the Contract Administrator and be found acceptable prior to commencement of fabrication.
- (c) Steel shall not be acceptable unless the mill test certificate states the grade to be as indicated on the Drawings. Lower grade steel shall not be acceptable (despite favourable published mill test results). Items fabricated without steel certification shall be rejected.

E15.2.4 Flange Bolts, Nuts, and Washers

- (a) Flange bolts, nuts, and washers shall be in accordance with ASTM A325, Type 1, hot-dip galvanized in accordance with ASTM F2329.

E15.2.5 Fasteners for Handhole Covers

- (a) Fasteners for handhole covers shall be in accordance with ASTM A276 Type 316 stainless steel.

E15.2.6 Hot-Dip Galvanizing

- (a) Hot-dip galvanizing of structural steel shall be in accordance with ASTM A123 for a minimum net retention of 610 g/m².

E15.2.7 Galvanizing Touch-up and Field-Applied Galvanizing

- (a) Only approved products listed below shall be used for field-applied galvanizing, to touch-up damaged hot-dip galvanizing on-site and to galvanize field welds.
- (b) Approved products for self-fluxing, low temperature, zinc-based alloy rods in accordance with ASTM A780-80 for "Repair of Damaged Hot-Dip Galvanized Coatings" are as follows:
 - (i) Galvalloy as manufactured by Metalloy Products Company, P.O. Box No. 3093, Terminal Annex, Los Angeles, California, available from Welder Supplies Limited, 150 McPhillips Street, Winnipeg, and
 - (ii) Welco Gal-Viz Galvanizing Alloy, as manufactured by Thermocote Welco, Highway 161, York Road, Kings Mountain, North Carolina, available from Welder Supplies Limited, 150 McPhillips Street, Winnipeg.

E15.2.8 Approved cold-applied galvanic anti-corrosion system is as follows:

- (a) ZINGA, as manufactured by ZINGAMETALL, Ghent, Belgium, available from Pacific Evergreen Industries Ltd. Vancouver, BC, Ph. (604) 926-5564, and Centennial Mine & Industrial Supply, Saskatoon, Sask., Ph. (306) 975-1944.

E15.2.9 Anchor Bolts

- (a) Anchor bolts including nuts and washers shall be in accordance with ASTM F1554 Grade 55 ksi (380 MPa), hot-dip galvanized in accordance with ASTM 2329. Anchor bolts, nuts, and washers, shall be supplied and paid for under, "New Cast-in-Place Concrete Pile Foundations", specified herein.

E15.2.10 Setting Template

- (a) Setting template shall be in accordance with CSA G40.21 Grade 300 W, hot-dip galvanized. Setting template shall be supplied and paid for under, "New Cast-in-Place Concrete Pile Foundations", specified herein.

E15.2.11 Non-Shrink Grout

- (a) Grout as specified hereinafter shall be used for the construction of grout pads under sign structure base plates. Grout shall consist of a pre-mixed, non-metallic non-shrink grout. Approved products are:
 - (i) M-Bed Standard grout by Sternson Ltd.
 - (ii) CPD Non-shrink grout by Master Builders
 - (iii) Set Non-shrink grout by Master Builders
 - (iv) Sikadur VPC grout by Sika Canada Inc. for cold weather construction (0 C to -20 C)
- (b) The grout shall be of a consistency suitable for the application intended, as approved by the Contract Administrator.

E15.2.12 Sign Plates

- (a) Sign plates will be supplied and installed by the City of Winnipeg Traffic Services Branch.

E15.2.13 Welding Consumables

- (a) Welding consumables for all processes shall be certified by the manufacturer to be complying with the requirements of CSA Standard W59-03 (R2008) and the following Specifications:
 - (i) Manual shielded metal arc welding (SMAW): All electrodes shall be basic-type electrodes conforming to CSA W48-06 (R2011), classification E480XX, or imperial equivalent.
 - (ii) Gas metal arc welding (GMAW): All electrodes shall conform to CSA W48-06 (R2011), classification ER480S-X, or imperial equivalent.
 - (iii) Flux cored arc welding (FCAW): All electrodes shall conform to CSA W48-06 (R2011), classification E480XT-X or imperial equivalent. Electrodes shall be controlled by hydrogen (CH) designation.
 - (iv) Submerged arc welding (SAW): All electrodes shall conform to CSA W48-06 (R2011), classification F480X-EXXX or imperial equivalent.
 - (v) Shielding gas shall be welding grade carbon-dioxide with a guaranteed dew point of -46°C.
 - (vi) All electrodes, wires, and fluxes used shall be of a classification requiring a minimum impact of 27 joules at -18°C.
- (b) The proposed welding procedures and welding consumable certificates shall be submitted to the Contract Administrator for his approval at least two (2) days prior to the scheduled commencement of any fabrication.

E15.2.14 Miscellaneous Materials

- (a) Miscellaneous material incidental to this Work shall be as approved by the Contract Administrator.

E15.2.15 Equipment

- (a) All equipment shall be of a type approved by the Contract Administrator and shall be kept in good working order.

E15.3 Construction Methods

E15.3.1 General Requirements

- (a) Holes in the base plates shall be sized as shown on the Drawings, and provisions made for field erection must be accurate within plus or minus 13 mm between supports, without affecting final installation and load capacity.
- (b) The base plates for the sign support structures shall be constructed to be fully compatible and mountable on the anchor bolts, provided in the foundations by the Contractor.
- (c) Sufficient reinforced handholes and wiring holes shall be provided for lighting of the signs as shown on the Drawings. All wiring holes shall have threaded couplings. All unused coupling holes shall be capped with a threaded galvanized plug.
- (d) The sign support structure shall be so fabricated that erection can be achieved by means of bolted connections.
- (e) Each sign structure shall be provided with a "raised" structure identification number with a welding electrode in accordance with the details shown on the Drawings. The sign structure identification number shall be placed before hot-dip galvanizing.
- (f) Adequate venting and drainage holes shall be provided in enclosed sections for hot-dip galvanizing. The galvanizing facilities shall be consulted regarding the size and location of these holes.
- (g) Prior to fabrication, the dimensional limitations on the size and shape imposed by the galvanizing facilities shall be determined for hot-dip galvanizing the sign structures.

E15.3.2 Fabrication

- (a) All fabrication shall be carried out in accordance with this Specification and the Contract Drawings, as well as AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals - 2009 - 5th Edition, plus all subsequent revisions.
- (b) The punching of identification marks on the members will not be allowed, except for the structure identification number.
- (c) Any damage to members during fabrication shall be drawn to the attention of the Contract Administrator in order that the Contract Administrator may approve remedial measures.
- (d) Dimensions and fabrication details that control the field matching of parts shall receive very careful attention in order to avoid field adjustment.
- (e) All portions of the Work shall be neatly finished. Shearing, cutting, clipping, and machining shall be done neatly and accurately. Finished members shall be true to line, free from twists, bends, sharp corners, and edges.
- (f) Cut edges shall be true and smooth and free from excessive burrs or ragged breaks. Re-entrant cuts shall be avoided wherever possible. If used, they shall be filleted by drilling prior to cutting.
- (g) All holes shall be free of burrs and rough edges.

E15.3.3 Welding

- (a) Welding of steel structures shall be in accordance with CSA W59, "Welded Steel Construction."

- (b) All seams shall be continuously welded and free from any slag and splatter. Longitudinal welds shall be a minimum of 60% penetration, except those within 200 mm of baseplates, flanges, and circumferential welds, which shall be 100% penetration. All circumferential groove welds shall be 100% penetration, and where circumferential welds are used at a butt joint, an internal backup strip shall be provided.
- (c) Longitudinal seam welds in horizontal supports shall be located at the top of the horizontal members.
- (d) All welds shall be ground smooth and flush with the adjacent surface prior to hot-dip galvanizing.

E15.3.4 Surface Preparation and Cleaning

- (a) Surface preparation and cleaning of materials prior to hot-dip galvanizing shall be in accordance with ASTM A123 and SSPC Specification SP:6, "Commercial Blast Cleaning," unless otherwise specified herein. The Contractor shall ensure that all exterior and interior surfaces of vertical support members of sign structures are blast cleaned prior to pickling to achieve the minimum zinc coating mass of 610 g/m². All welding and provision of holes is to be completed prior to surface preparation and cleaning, except where shown on the Drawings.
- (b) The sandblasting and cleaning of sign structures shall be done in the shop.
- (c) After the structures have been sandblasted they shall be thoroughly cleaned of all sandblasting abrasive and debris, with special attention paid to areas of the structure where sand and debris collect, including but not limited to behind the gusset plates, handholes and base plate.
- (d) After the sign structures have been sandblasted and cleaned, the Contract Administrator will carry out a visual inspection of the structures in the shop before they are shipped to the galvanizing plant.

E15.3.5 Hot-Dip Galvanizing

- (a) The hot-dip galvanizing plant shall be a Regular Member of the American Galvanizers Association, Inc.
- (b) All outside surfaces of the overhead sign support structures shall be hot-dip galvanized in accordance with ASTM A123 to a minimum net retention of 610 g/m².
- (c) Adequate venting and drainage holes shall be provided in enclosed sections for hot-dip galvanizing. The galvanizing facility shall be consulted regarding the size and location of these holes. Holes shall be provided by drilling not burning.
- (d) The galvanizing coating on outside surfaces of overhead sign support structures shall be generally smooth and free of blisters, lumpiness and runs. In particular, the outside surfaces of the bottom 2.5 m of the vertical support members shall have a smooth finish equal to the finish on hot-dipped galvanized handrails.
- (e) In addition to the provision of corrosion protection by the galvanized coating, the aesthetic appearance of the structure after hot-dip galvanizing will also be a criterion in the acceptance or rejection of the galvanized coating. The galvanized coating on the entire structure shall have a uniform "silver" colour and lustre. Galvanizing with parts of the structure having dull grey coating or streaks or mottled appearance will not be acceptable. If the galvanizing is rejected for aesthetic reasons, the Contractor shall rectify the appearance by applying spray-on molten zinc metallizing with 85/15 zinc/aluminum alloy. The metallizing shall be carried out in the shop before the structure is installed.
- (f) Minor defects in the galvanizing coating shall be repaired as specified here below for "Field-Applied Touch-Up Galvanizing". The Contract Administrator shall be consulted before repairs are made.

- (g) Other defects and contaminants in the galvanizing coating, such as heavy dross protrusions, flux inclusions and ash inclusions shall be grounds for rejection of the galvanizing coating system.
- (h) The Contractor shall verify the thickness of galvanized coatings as part of their own quality control testing and make their results available to the Contract Administrator.
- (i) All threaded couplings shall be rethreaded after the sign structures have been hot-dip galvanized.
- (j) The sign structures shall be stored on timber blocking after hot-dip galvanizing.

E15.3.6 Delivery and Erection

- (a) The Contractor shall notify the Contract Administrator at least two (2) Working Days in advance of the anticipated delivery to the Site and erection of the overhead sign support structures.
- (b) The sign structures shall be lifted and secured with nylon ropes or other approved methods. Use of steel chains and steel hooks against hot-dip galvanized or powder coated surfaces will not be permitted. The structure components (shaft and arm etc.) shall be placed on timber blocking and secured with nylon ropes during their transportation to the Site.

E15.3.7 Anchor Bolt Installation

- (a) Each anchor bolt shall be provided with two galvanized nuts: one nut below the base plate for levelling the structure, and one nut above the base plate for anchoring the structure. The anchor bolts shall have a minimum projection of 25 mm above the anchoring nuts. There shall be provision for maximum 50 mm thick grout pad under the base plate.
- (b) The Contractor shall plumb the shaft by adjusting the leveling and anchor nuts.
- (c) Leveling nuts and anchor nuts shall be tightened to a snug tight condition, defined as the full effort of an ironworker using an ordinary wrench, or a few impacts of an impact wrench.
- (d) The Contractor shall tighten the top anchoring nuts in an alternating "star" type pattern as follows:
 - (i) For anchor bolts less than or equal to 38 mm diameter: 1/3 of a turn (+20°, -0°) past a snug tight condition.
 - (ii) For anchor bolts greater than 38 mm diameter: 1/6 of a turn (+20°, -0°) past a snug tight condition.

E15.3.8 Structural Bolt Installation

- (a) Structural bolts for flange and splice connections shall be tightened in accordance with the turn-of-nut method as follows:
 - (i) Alternately tighten all bolts to achieve a snug tight condition. The mating surfaces shall be in firm contact.
 - (ii) Tighten all bolts in accordance with Table 1.
 - (iii) Following tightening, check all bolts in the joint by hand using an ordinary wrench.

Table 1: Required Turns Past Snug Tight for Turn-of-Nut Method

Bolt Diameter <i>D</i> (inches)	Bolt Length up to 4 <i>D</i>		Bolt Length over 4 <i>D</i> to 8 <i>D</i>		Bolt Length over 8 <i>D</i> to 12 <i>D</i>	
	Length up to	Required Turns	Length Range	Required Turns	Length Range	Required Turns
1/2"	2"	1/3 ± 30°	2 to 4"	1/2 ± 30°	4 to 6"	2/3 ± 45°
5/8"	2.5"	1/3 ± 30°	2.5 to 5"	1/2 ± 30°	5 to 7.5"	2/3 ± 45°
3/4"	3"	1/3 ± 30°	3 to 6"	1/2 ± 30°	6 to 9"	2/3 ± 45°
7/8"	3.5"	1/3 ± 30°	3.5 to 7"	1/2 ± 30°	7 to 10.5"	2/3 ± 45°
1"	4"	1/3 ± 30°	4 to 8"	1/2 ± 30°	9 to 13.5"	2/3 ± 45°
1 1/8"	4.5"	1/3 ± 30°	4.5 to 9"	1/2 ± 30°	10 to 15"	2/3 ± 45°
1 1/4"	5"	1/3 ± 30°	5 to 10"	1/2 ± 30°	11 to 16.5"	2/3 ± 45°

E15.3.9 Installation of Sign Plates

- (a) The City of Winnipeg will be responsible for installation of sign plates.

E15.3.10 Grout Pads

- (a) New grout pads shall be constructed under sign structure bases after erection has been completed to the satisfaction of the Contract Administrator incidental to the Work of this item.

E15.3.11 Field-Applied Touch-up Galvanizing

- (a) Any areas of damaged galvanizing on the sign structures shall receive field-applied touch-up galvanizing.
- (b) Surfaces to receive touch-up galvanizing shall be cleaned using a wire brush, a light grinding action, or mild blasting to remove loose, scale, rust, paint, grease, dirt, or other contaminants.
- (c) For self-fluxing, low temperature, zinc based alloy rods, preheat the surface to 315°C and wire brush the surface during preheating. Rub the cleaned preheated area with the repair stick to deposit an evenly distributed layer of zinc alloy. Spread the alloy with a wire brush, spatula, or similar tool. Field-applied galvanizing shall be blended into existing galvanizing of surrounding surfaces and shall be buffed and polished if required to match the surrounding surfaces. Care shall be taken to not overheat surfaces beyond 400°C and to not apply direct flame to the alloy rods.
- (d) For pure zinc paint or spray on systems, the approved product Zinga shall be applied by either a brush or roller. The Zinga shall be applied in 3 coats, with each coat having a dry film thickness of 60 µm (2.36 mils). Each coat shall be left to dry for a minimum of one (1) hour before the application of the next coat.

E15.4 Quality Control

E15.4.1 General

- (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 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.

E15.4.2 Welding Qualifications

- (a) The Contractor shall produce evidence that the plant has recently been fully approved by the C.W.B. to the requirements of CSA W47.1 Division 2.1 for welding of steel structures.
- (b) Approved welding procedures shall be submitted to the Contract Administrator prior to fabrication of any steel items.

E15.4.3 Testing

- (a) In addition to the Contractor's own quality control testing of all materials, welding procedures and steel fabrication including hot-dip galvanizing will be inspected and tested by the Contract Administrator to ascertain compliance with the Specifications and Drawings.
- (b) The Contract Administrator will hire a testing agency certified by the Canadian Welding Bureau to carry out shop fabrication inspection and testing before the overhead sign support structures are approved ready for installation of coating system. The inspector shall have access to all of the fabricator's normal quality control records for this Contract, specified herein. Inspection and testing will include:
 - (i) Visual inspection of 100 percent of welds.
 - (ii) Ultrasonic testing of 100 percent of full penetration sections of longitudinal seam welds and circumferential butt welds.
 - (iii) Magnetic particle testing of a random 10 percent of partial penetration sections of longitudinal seam welds.
 - (iv) Ultrasonic testing of 25 percent of base plate and flange plate welds.
 - (v) Inspection of hot-dip galvanizing and coating thickness.
- (c) Welds that are found by any of the inspection and testing methods to be inadequate and unsatisfactory shall be repaired in accordance with CSA W59 and then retested. The cost of the repairs and the cost of the retest shall be paid for by the Contractor.
- (d) No repair shall be made until agreed to by the Contract Administrator.
- (e) Defects in hot-dip galvanizing shall be rectified as directed by the Contract Administrator.

E15.4.4 Unacceptable Work

- (a) Any Work found to be unacceptable shall be corrected in accordance with CSA W59.
- (b) No repair shall be made until agreed to by the Contract Administrator.

E15.5 Measurement and Payment

E15.5.1 Supply and Installation of Steel Overhead Sign Support Structures

- (a) Supply and installation of new steel overhead sign support structures will be measured on a unit basis and paid for at the Contract Unit Price per steel overhead sign support structure as "Supply and Installation of Steel Overhead Sign Support Structures" in accordance with this Specification and accepted by the Contract Administrator.

E16. SIGN SUPPORT CLAMPS

- E16.1 The Contractor shall install all new sign support clamps at the locations shown on the drawings or as directed by the Contract Administrator. The City shall supply all sign support clamps.
- E16.2 All costs in connection with the installation of sign support clamps are incidental to the Contract.

E17. FRENCH DRAINS

DESCRIPTION

- E17.1 This specification pertains to the construction of French Drains adjacent to the road structure as shown on the Contract drawings.

MATERIALS

- E17.2 Drainage material will consist of natural gravel, crushed stone or other materials of similar characteristics having clean, hard, strong, durable, uncoated particles free from injurious amounts of soft, friable, thin, elongated or laminated pieces, alkali, organic or other deleterious matter.

- E17.2.1 Drainage material will meet the follow requirements:

Drainage Material Grading Requirements

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

- E17.2.2 Soundness – Drainage material when subject to five cycles of soundness test will have a weighted loss of not more than 13% in accordance with ASTM Standard C88, test for soundness of Aggregates by Use of Magnesium Sulphate.
- E17.2.3 Abrasion – Drainage material when subject to abrasion test will have a loss of not more than 30% when tested in accordance with grading A of ASTM C131, Test for Resistance to Degradation of Small-Size Aggregate by Abrasion and Impact in the Los Angeles Machine.
- E17.3 Drainage Fabric will be non-woven and meet or exceed the requirements of Separation Geotextile Fabric in Clause 2.5 of CW 3130.

CONSTRUCTION METHODS

- E17.4 Installation of the French Drains shall not take place until installation of the sub-base materials is complete and the ditch slopes have been backfilled and compacted adjacent to the road structure.
- E17.5 Excavate a trench to the grade and dimensions shown on the Drawings or as directed by the Contract Administrator. Excavate into the road structure as shown to ensure a physical connection between the sub-grade and the French drain.
- E17.6 Dispose of trench excavation material in accordance with Section 3.4 of CW 1130 or as directed by the Contract Administrator.
- E17.7 Repair any non-conforming trenches as directed by the Contract Administrator.
- E17.8 Compact sub-grade in the base of the trench to a minimum standard proctor of 90%.
- E17.9 Place separation geotextile fabric such that it overlaps above the geotextile fabric in the road structure a minimum of 300 millimetres. Ensure adequate geotextile fabric is placed to allow for wrapping the drainage material, including overlap joints above and at the ends of the French Drain.

- E17.10 Overlap joints in the geotextile fabric a minimum of 500 millimetres.
- E17.11 Backfill the trench with the drainage material in 300 millimetre lifts and compact to the satisfaction of the Contract Administrator. Place drainage material to the grade and dimensions shown on the Drawings or as directed by the Contract Administrator.

- E17.12 Place drainage material to ensure no damage occurs to the separation geotextile fabric.

Backfill above the French Drain with suitable Site material and compact to a standard proctor of 90% to the grade and dimensions shown on the Drawings or as directed by the Contract Administrator. Ensure this material does not cover the ends as to block the flow of water into the ditch.

METHOD OF MEASUREMENT

- E17.13 Construction of French Drains will be measured on a unit basis. The Contractor will be paid according to the total number of French Drains constructed and approved by the Contract Administrator

BASIS OF PAYMENT

- E17.14 The construction of French Drains shall be paid for at the Contract Unit Price per French Drain for "Installation of French Drains", measured as specified herein, which price shall be payment in full for performing all operation herein described and other items incidental to the Work included in this Specification.

E18. CURB AND GUTTER - VARIOUS FORMATS

DESCRIPTION

- E18.1 General
- E18.1.1 This specification covers the Work related to the installation of various formats of Curb and Gutter.
- E18.1.2 Referenced Standard Construction Specifications
- (a) CW 3310 (R14) – Portland Cement Concrete Pavement Works
- E18.1.3 Referenced Standard Details and Drawings
- (a) Mountable Curb - SD-201
 - (b) Modified Barrier Curb – SD-203B
 - (c) Safety Curb – SD-206B
 - (d) All applicable Contract Drawings

MATERIALS AND EQUIPMENT

- E18.2 Materials
- E18.2.1 Materials supplied shall be as per CW 3310 Clause 5.
- E18.3 Equipment
- E18.3.1 Equipment as per CW 3310 Clause 8.

CONSTRUCTION METHODS

- E18.4 Mountable Curb and Gutter
- E18.4.1 Mountable Curb and Gutter (integral) shall be constructed where specified using the SD-201 shape for the curb, and the Contract Drawings for the gutter width and height. Unless directed by the Contract Administrator, the mountable curb and gutter shall be slip formed.

E18.5 Modified Barrier Curb and Gutter

E18.5.1 Modified Barrier Curb and Gutter (integral) shall be constructed where specified using the SD-203B for the shape for the curb, and the Drawings for the gutter width and height. Unless directed by the Contract Administrator, the curb and gutter shall be slip formed.

E18.6 Safety Curb and Gutter

E18.6.1 Safety Curb and Gutter (integral) shall be constructed where specified using the SD-206B shape for the curb, and the Contract Drawings for the gutter width and height. Unless directed by the Contract Administrator, the safety curb and gutter shall be slip formed.

E18.7 Curb Ramp and Gutter

E18.7.1 Curb Ramp and Gutter (integral) shall be constructed where specified using the Contract Drawings for the shape for the curb, gutter width and height.

E18.8 Where directed by the Contract Administrator to be hand formed, the Contractor shall use wood forms and templates to ensure the curb is shaped properly. Wood forms and templates shall be constructed to allow for the placement of curb and gutter in unison to ensure adhesion of the integral curb.

MEASUREMENT AND PAYMENT

E18.9 Curb and Gutter Various Formats

E18.9.1 Construction of various formats of curb and gutter will be measured on a length basis and will be paid for at the Contract Unit Price per metre for the "Concrete Curbs, Curb and Gutter, and Splash Strips" items below, measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in the specification.

(a) Concrete Curbs, Curb and Gutter, and Splash Strips:

- (i) Construction of Curb and Gutter (120 mm ht, Mountable Curb, Integral, 550 mm width, 170 mm Plain Concrete Pavement, Slip Form Paving)
- (ii) Construction of Curb and Gutter (180 mm ht, Modified Barrier Curb, Integral, 600 mm width, 170 mm Plain Concrete Pavement, Slip Form Paving)
- (iii) Construction of Curb and Gutter (330 mm ht, Safety Curb, Integral, 630 mm width, 170 mm Plain Concrete Pavement, Slip Form Paving)
- (iv) Construction of Curb and Gutter (8-12 mm ht, Curb Ramp, Integral, 550 mm width, 170 mm Plain Concrete Pavement)

E19. DITCH INLET GRATE

DESCRIPTION

E19.1 General

E19.1.1 This specification covers the supply and installation of ditch inlet grates, typically used in open swales or ditches as an alternative to City of Winnipeg Approved Product grated manhole cover AP-006.

MATERIALS AND EQUIPMENT

E19.2 As per Contract Drawings.

E19.3 All steel shall be supplied in accordance with details on the Contract Drawings. All steel shall be hot dip galvanized after fabrication and all hardware shall be stainless steel.

E19.4 Cover to be Shopost Iron Works MK-A1 or approved equal in accordance with B6.

CONSTRUCTION METHODS

E19.5 General

- E19.5.1 Contractor to securely affix ditch inlet grates to manhole reducer or riser utilizing stainless steel hardware.
- E19.5.2 Any galvanized surfaces that are damaged shall be coated with a galvanizing compound approved by the Contract Administrator

MEASUREMENT AND PAYMENT

- E19.6 Ditch Inlet Grates will be measured on a unit basis and paid for at the Contract Unit Price per cover as "Ditch Inlet Grate". The number to be paid for will be the total number of Ditch Inlet Grates installed in accordance with this specification and accepted by the Contract Administrator.

E20. ENVIRONMENTAL PROTECTION PLAN

- E20.1 The Contractor will plan and implement the Work of this Contract strictly in accordance with the requirements of the Federal Environmental Assessment (CEAR # 10-01-59643) and this Environmental Protection Plan as herein specified.
- E20.2 The Contractor is advised that at a minimum the following Acts, Regulations and By-laws apply to the Work and are available for viewing on line at the applicable websites (www.canlii.ca and/or <http://www.winnipeg.ca/CLKDMIS/>) or at the office of the Contract Administrator.
- E20.3 Federal
- (a) Canadian Environmental Assessment Act (CEAA), 1992 c.37 (repealed);
 - (b) Canadian Environmental Protection Act;
 - (c) Fisheries Act, 1985 c. F-14;
 - (d) Transportation of Dangerous Goods Act and Regulations, c. 34;
 - (e) Migratory Birds Convention Act and Regulations, c. 22;
 - (f) Species at Risk Act, c. 29;
 - (g) And any other applicable Acts, Regulations and By-laws;
 - (h) Applicable Fisheries and Oceans Canada Operational Statements for Manitoba for temporary stream crossings;
 - (i) *The Department of Fisheries and Oceans Freshwater Intake End-of-Pipe Fish Screen Guidelines, DFO 1995;*
 - (j) *Fisheries and Oceans Policy for the Management of Fish Habitat 1986;*
 - (k) *Federal Policy on Wetland Conservation 1991;*
 - (l) *Transportation Association of Canada's Transportation Association of Canada National Guide to Erosion and Sediment Control on Roadway Projects, 2005.*
- E20.4 Provincial
- (a) The Dangerous Goods Handling and Transportation Act, D12;
 - (b) The Endangered Species Act, c. E111;
 - (c) The Heritage Resources Act, c. H39.1;
 - (d) The Noxious Weeds Act, c. N110;
 - (e) The Nuisance Act, c. N120;
 - (f) The Pesticides Regulation, M.R. 94/88R
 - (g) The Public Health Act, c. P210;

- (h) The Water Protection Act, c. W65;
- (i) Workplace Safety and Health Act, c. W210;
- (j) And current applicable associated regulations;
- (k) And any other applicable Acts, Regulations, and By-laws;
- (l) The *Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat*, Manitoba Natural Resources and DFO, 1996.

E20.5 Municipal

- (a) The City of Winnipeg Neighbourhood Liveability By-law No. 1/2008;
- (b) The City of Winnipeg Traffic By-law No. 1573/77 and all amendments up to and including 55/2011;
- (c) And any other applicable Acts, Regulations and By-laws;
- (d) *City of Winnipeg Best Management Practices Handbook for Activities In and Around the City's Waterways and Watercourses*, City of Winnipeg, 2005;
- (e) *City of Winnipeg Motor Vehicle Noise Policies and Guidelines*.

E20.6 The Contractor is advised that the Fisheries and Oceans Canada (DFO) Letters of Advice are applicable to all Works. The materials submitted for review and Letters of Advice received are in Appendix C. A copy of the material submitted to DFO and the DFO Letter of Advice must be on Site at all times. All dates stated within the DFO submission and responses are valid.

E20.7 The Contractor is advised that the project has been determined to not likely to cause significant environmental effects) under the *Canadian Environmental Assessment Act, 1992*.

E20.8 The Contractor is advised that the Waverley West Arterial Roads Project Environmental Assessment Screening Report, dated June 2011, applies to the Work and is available for viewing at the office of the Contract Administrator. An Environmental Effects Analysis Summary is available in Appendix B.

E20.9 The Contractor is advised that both the mitigation measures contained in the Waverley West Arterial Roads Project Environmental Assessment Screening Report, dated June 2011 as well as the following environmental protection measures apply to the Work.

- (a) Materials Handling and Storage
 - (i) Storage of construction materials and equipment will be confined within a fenced area or at a location approved by the Engineer or Contract Administrator with environmental protection (e.g. silt fence) as appropriate.
 - (ii) Construction materials will not be deposited or stored on or near watercourses unless written acceptance from the Contract Administrator is received in advance.
 - (iii) Construction materials and debris will be tied down or secured if severe weather and high wind velocities are forecasted. Work shall be suspended during extreme high wind conditions.
 - (iv) Construction materials and debris will be prevented from entering watercourses. In the event that materials and/or debris inadvertently enter the land drainage system, the Contractor will be required to remove the material to an appropriate landfill or storage facility and restore the watercourse to its original condition.
- (b) Fuel Handling and Storage
 - (i) The Contractor will obtain all necessary permits from Manitoba Conservation and Water Stewardship for the handling and storage of fuel products and shall provide copies to the Contract Administrator.
 - (ii) All fuel handling and storage facilities will comply with The Dangerous Goods and Transportation Act Storage and Handling of Petroleum Products Regulation and any local land use permits.

- (iii) Fuels, lubricants and other potentially hazardous materials as defined in The Dangerous Goods and Transportation Act will be stored and handled within approved storage areas.
 - (iv) The Contractor will ensure that any temporary fuel storage areas established for construction of the project are contained by an impermeable dyke and are located a minimum distance of 100 m away from the Lot 16 Drain, Beaujolais Coulee and any other watercourse. Dykes will be designed, constructed, and maintained to retain not less than 100% of the capacity of the total number of containers or 110% of the largest container, whichever is greatest. The dykes will be constructed of clay or similar impervious material. If this type of material is not available, the dyke will be constructed of locally available material and lined with high-density polyethylene (HDPE). Furthermore, the fuel storage area(s) will be secured by a barrier such as a high fence and gate to prevent vandalism.
 - (v) The Contractor will ensure that all fuel storage containers are inspected daily for leaks and spillage.
 - (vi) Products transferred from the fuel storage area(s) to specific Work sites will not exceed the daily usage requirement.
 - (vii) When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheet of suitable material (such as HDPE) and size will be spread on the ground to catch the fluid in the event of a leak or spill.
 - (viii) Wash, refuel and service machinery and store fuel and other materials for the machinery 100 m away from watercourses to prevent deleterious substances from entering the water.
 - (ix) The area around storage sites and fuel lines will be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.
 - (x) The deposit of deleterious substances into water frequented by fish is prohibited under the Fisheries Act, 1985. The Contractor will take appropriate precautions to ensure that potentially deleterious substances (such as fuel, hydraulic fluids, oil, sediment, etc.) do not enter any water body.
 - (xi) Machinery is to arrive on Site in a clean condition and is to be maintained free of fluid leaks.
 - (xii) A sufficient supply of materials, such as absorbent material and plastic oil booms, to clean up minor spills will be stored nearby on Site. The Contractor will ensure that additional material can be made available on short notice. Additionally, appropriate staff on Site will be trained in proper handling of deleterious liquids (i.e. fueling) and trained on how to prevent and clean-up minor spills.
- (c) Waste Handling and Disposal
- (i) The construction area will be kept clean and orderly at all times and at the completion of construction.
 - (ii) At no time during construction will personnel or construction waste be permitted to accumulate for more than one day at any location on the construction Site, other than at a dedicated storage area as may be approved by the Contract Administrator.
 - (iii) The Contractor will, during and at the completion of construction, clean up the construction area and all resulting debris shall be deposited at a Waste Disposal Ground operating under the authority of Waste Disposal Grounds Regulation, Manitoba Regulation 150/91. Exceptions are liquid industrial and hazardous wastes which require special disposal methods.
 - (iv) On Site volumes of sewage and/or septage will be removed on a weekly basis.
 - (v) The Contractor will ensure sewage, septage and other liquid wastes generated on Site are handled and disposed of by a certified disposal contractor.
 - (vi) Indiscriminate dumping, littering, or abandonment will not take place.
 - (vii) No burning of waste or other materials is permitted.
 - (viii) Clearing debris will be disposed of by chipping and/or mulching with the material being used by the City of Winnipeg for future uses.

- (ix) The Contractor will use structurally suitable Site excavation material as fill within the project. Should excavated material exceed fill needs, the remainder would be stockpiled for use on other local projects.
 - (x) Structurally unsuitable site excavation material will be removed by the Contractor.
 - (xi) Waste storage areas will not be located so as to block natural drainage.
 - (xii) Runoff from a waste storage area will not be allowed to cause siltation of a watercourse.
 - (xiii) Waste storage areas will be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.
 - (xiv) Equipment will not be cleaned near watercourses; contaminated water from onshore cleaning operations will not be permitted to enter watercourses.
 - (xv) The Contractor will notify and receive written approval from the Contract Administrator prior to discharge from any dewatered areas. The discharge will be released into a well-vegetated area, filter bag, settling basin, or storm sewer system to remove suspended material and other deleterious substances from the discharge before it finds its way into any watercourse. Discharge from dewatering areas may require approved disposal via the sanitary sewer system or disposal truck in accordance with Construction Specifications, at the request of the Contract Administrator.
 - (xvi) Flows will be dissipated so that dewatering discharges minimize erosion at the discharge point.
- (d) Dangerous Goods/Hazardous Waste Handling and Disposal
- (i) Dangerous goods/hazardous waste are identified by, and will be handled according to, The Dangerous Goods Handling and Transportation Act and Regulations.
 - (ii) The Contractor will be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.
 - (iii) The Contractor will have on Site staff that is trained and certified in the handling of the dangerous/hazardous goods, when said dangerous/hazardous goods are being utilized on Site for the performance of the Work.
 - (iv) Different waste streams will not be mixed.
 - (v) Disposal of dangerous goods/hazardous wastes will be at approved hazardous waste facilities.
 - (vi) Liquid hydrocarbons will not be stored or disposed of in earthen pits on Site.
 - (vii) Used oils will be stored in appropriate drums, or tankage until shipment to waste oil recycling centres, incinerators, or secure disposal facilities approved for such wastes.
 - (viii) Used oil filters will be drained, placed in suitable storage containers, and buried or incinerated at approved hazardous waste treatment and disposal facilities.
 - (ix) Dangerous goods/hazardous waste storage areas will be located at least 100 m away from the high water line and be dyked.
 - (x) Dangerous goods/hazardous waste storage areas will not be located so as to block natural drainage.
 - (xi) Runoff from a dangerous goods/hazardous waste storage area will not be allowed to cause siltation of a watercourse.
 - (xii) Dangerous goods/hazardous waste storage areas will be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.
- (e) Emergency Response
- (i) The Contractor will ensure that due care and caution is taken to prevent spills.
 - (ii) The Contractor will report all major spills of petroleum products or other hazardous substances with significant impact on the environment and threat to human health and safety (as defined in Table 1 below) to Manitoba Conservation and Water

Stewardship, immediately after occurrence of the environmental accident, by calling the 24-hour emergency phone number (204) 945-4888.

- (iii) The Contractor will designate a qualified supervisor as the on Site emergency response coordinator for the project. The emergency response coordinator will have the authority to redirect manpower in order to respond in the event of a spill.
- (iv) The following actions will be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on Site emergency response coordinator.
 - (i) Notify emergency-response coordinator of the accident:
 - ◆ Identify exact location and time of the accident.
 - ◆ Indicate injuries, if any.
 - ◆ Request assistance as required by magnitude of accident [Manitoba Conservation and Water Stewardship 24-hour Spill Response Line (204) 945-4888, Police, Fire Department, Ambulance, company backup].
 - (ii) Attend to public safety:
 - ◆ Stop traffic, roadblock/cordon off the immediate danger area.
 - ◆ Eliminate ignition sources.
 - ◆ Initiate evacuation procedures if necessary.
 - (iii) Assess situation and gather information on the status of the situation, noting:
 - ◆ Personnel on Site.
 - ◆ Cause and effect of spill.
 - ◆ Estimated extent of damage.
 - ◆ Amount and type of material involved.
 - ◆ Proximity to waterways, sewers and manholes.
 - (iv) If safe to do so, try to stop the dispersion or flow of spill material:
 - ◆ Approach from upwind.
 - ◆ Stop or reduce leak if safe to do so.
 - ◆ Dyke spill material with dry, inert absorbent material or dry clay soil or sand.
 - ◆ Prevent spill material from entering waterways and utilities by dyking.
 - ◆ Prevent spill material from entering manholes and other openings by covering with rubber spill mats or dyking.
 - (v) Resume any effective action to contain, clean up, or stop the flow of the spilled product.
 - (vi) The emergency response coordinator will ensure that all environmental accidents involving contaminants shall be documented and reported to Manitoba Conservation and Water Stewardship according to The Dangerous Goods Handling and Transportation Act Environmental Accident Reports Regulation 439/87.
 - (vii) When dangerous goods are used on Site, materials for containment and cleanup of spill material (e.g., absorbent materials, plastic oil booms, and oversized recovery drums) shall be available on Site.
 - (viii) Minor spills of such substances that may be contained on land with no significant impact on the environment may be responded to with in-house resources without formal notification to Manitoba Conservation and Water Stewardship.
 - (ix) City emergency response, 9-1-1, shall be used if other means are not available.

Table 1 - Environmental Accident Reporting Reportable Quantities of Spills that must be Reported to Manitoba Conservation and Water Stewardship [(204) 944-4888]		
Classification	Hazard	Reportable Quantity or Level
1	Explosives	All
2.1	Compressed Gas (Flammable)	100 L*
2.2	Compressed Gas	100 L*
2.3	Compressed Gas (Toxic)	All
2.4	Compressed Gas (Corrosive)	All
3	Flammable Liquids	100 L
4	Flammable Solids	1 Kg
5.1 Packing Groups I and II	Oxidizer	1 Kg or 50 L
Packing Group III	Oxidizer	5 Kg or 50 L
5.2	Organic Peroxide	1 Kg or 1 L
6.1 Packing Group I	Acute Toxic	1 Kg or 1 L
Packing Groups II and III	Acute Toxic	5 Kg or 5 L
6.2	Infectious	All
7	Radioactive	Any discharge or level exceeding 10 m Sv/h at the package surface and 200 uSv/h at 1 m from the package surface
8	Corrosive	5 Kg or 5 L
9.1	Miscellaneous (except PCB Mixtures)	50 Kg
9.1	PCB Mixtures	500 grams
9.2	Aquatic Toxic	1 Kg or 1 L
9.3	Wastes (Chronic Toxic)	5 Kg or 5 L

* Container Capacity (refers to container water capacity)

Source: *Environmental Accident Reporting Regulation M.R. 439/87*

(f) Noise and Vibration

- (i) The Contractor will adhere to all Noise and Vibration mitigation outlined in the Waverley West Arterial Roads Project Environmental Assessment Screening Report, dated June 2011
- (ii) Noise generating activities will be limited to the hours indicated in the City of Winnipeg Neighbourhood Liveability By-law No. 1/2008. The activities will generally be restricted to 7:00 a.m. to 7:00 p.m. weekdays with written permission of the Contract Administrator and the City of Winnipeg for any after-hours or weekend work required for special cases. No extended or alternative working hours/dates will be permitted for pile driving activities.
- (iii) The Contractor will be responsible for scheduling Work to avoid potential noise problems and/or employ noise reduction measures to reduce noise to acceptable limits. The Contractor will also demonstrate to the Contract Administrator that Works to be performed during the night-time period, on Sundays, and Holidays will not exceed the approved limit.
- (iv) The Contractor will locate stationary noise generating equipment (e.g., generators) away from sensitive receptors and wildlife areas.
- (v) Construction vehicles and equipment will adhere to posted speed limits.

(g) Dust and Emissions

- (i) Construction vehicles and machinery will be kept in good working order by the Contractor through the use of inspection and maintenance.

- (ii) The Contractor will minimize construction equipment idling times and turn off machinery, when feasible.
 - (iii) Dust control practices implemented by the Contractor during construction will include regular street cleaning and dampening of construction access roads and Works areas with water or approved chemicals at an adequate frequency to prevent the creation of dust.
 - (iv) Only water or chemicals approved by the Contract Administrator will be used for dust control. The use of waste petroleum or petroleum by-products is not permitted.
 - (v) The Contractor will ensure that trucks which are used to haul excavated material and backfill material to and from the Work site utilize tarpaulin covers during transport to prevent material from falling onto the street and creating dust.
 - (vi) Stockpiled soils will be wetted down or covered with tarpaulin covers to prevent the creation of dust, when appropriate.
- (h) Erosion Control
- (i) The Contractor will develop a sediment control plan prior to beginning construction in adherence with the Transportation Association of Canada National Guide to Erosion and Sediment Control on Roadway Projects, 2005 and to the satisfaction of the Contract Administrator.
 - (ii) Sediment control will be applied to all inwater works to prevent the release or re-suspension of sediments to the watercourse. A turbidity curtain will be used to contain sediments from coffer dam construction/removal and riprap placement, if warranted. This turbidity curtain should isolate as small an area as possible to complete the works, and should be completely removed once turbidity within the isolated area has returned to background levels.
 - (iii) The Contractor will inspect all sediment control structures daily during heavy construction activity in the areas of the structures and after a heavy rainfall to ensure their continued integrity.
 - (iv) Exposure of soils along drain slopes will be kept to the minimum practical amount, acceptable to the Contract Administrator.
 - (v) Effective sediment and erosion control measures (e.g., straw mulch, erosion control blankets, interceptor ditches) will be used both during construction and until vegetation is re-established to prevent sediment-laden runoff from entering the Lot 16 Drain, wetlands and other watercourses.
 - (vi) All areas disturbed during construction will be landscaped and revegetated with native and/or introduced plant species in order to restore and enhance the Site and protect against soil erosion unless otherwise indicated.
 - (vii) The disturbed surface will be revegetated as soon as possible and done so as to create a dense root system in order to defend against soil erosion on the right-of-way and any other disturbed areas susceptible to erosion.
 - (viii) The loss of topsoil and the creation of excessive dust by wind during construction will be prevented by the addition of temporary cover crop, water or tackifier, if conditions so warrant.
 - (ix) The Contractor will routinely inspect all erosion and sediment control structures and immediately carry out any necessary maintenance. Several inspections will be performed during rainy days.
 - (x) Construction activities will be avoided during periods of high winds to prevent erosion and the creation of dust.
- (i) Runoff Control
- (i) Measures will be undertaken to ensure that runoff containing suspended soil particles is minimized from entering the land drainage system to the extent possible to the satisfaction of the Contract Administrator.
 - (ii) Areas that are heavily disturbed and vulnerable to erosion or gullyng will be dyked to redirect surface runoff around the area prior to spring runoff.

- (iii) Construction activities on erodible slopes will be avoided during spring runoff and heavy rain falls.
- (iv) Soil and fill will not be stockpiled on immediate watercourse bank areas.
- (j) Fish
 - (i) The Contractor will adhere to all of the protection measures below and the measures included in Appendix C to adhere to the DFO No Net Loss Policy for fish habitat.
 - (ii) Due to the presence of spawning fish species no culvert replacement works will occur between April 1 and June 15 of any given year.
 - (iii) If possible, culvert replacement works will be constructed during periods of no flow or very low flow. Flowing water should be diverted around the construction area using a dam and bypass pump or temporary flume (culvert). Water will be diverted in a manner that avoids sediment generation to downstream areas and does not alter the volume of flow in the watercourse. Use coffer dams made of non-earthen material such as aquadams, sand bags, sheet pile or clean granular material wrapped in poly-plastic or other suitable isolation materials. Ensure any pump inlets are appropriately screened following the DFO Freshwater Intake End-of-Pipe Fish Screen Guidelines. Ensure all isolation materials are completely removed from the watercourse once construction is complete.
 - (iv) Any fish trapped within the isolated area will be captured and returned to the watercourse unharmed. Fish includes fin fish, crayfish and mussels (clams).
 - (v) All culvert replacement works will be limited to within road's right-of-way.
 - (vi) A buffer of vegetation will be maintained when working along waterways, where possible.
 - (vii) Culverts will be installed according to the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat (Manitoba Natural Resources and DFO, 1996). The culverts will be embedded a minimum of 0.3 m or 10% of culvert vertical diameter, whichever is greater to maintain connectivity during lower flows in this forage fish stream.
 - (viii) The duration of Work and amount of disturbance to the bed and banks of the water body will be minimized.
 - (ix) Use only clean rock for armouring the inlets and outlets of the culvert, and haul it in from an appropriate land-based source. Avoid using poor quality limestone that breaks down quickly when exposed to the elements or acid generating rocks typical from metal mines. All rock will be clean and free of fine materials and of appropriate size to resist displacement during high flow events.
 - (x) The rock is placed such that it does not constrict the channel or change the hydraulics in a way that might damage the bed and/or banks of the watercourse or interfere with fish passage.
 - (xi) Where grading of stream banks is required they are sloped by pulling material back from the water's edge. Stabilize any waste materials removed from the Work site, above the ordinary high water mark, to prevent them from entering any water body. Spoil piles could be contained with silt fence, flattened, covered with biodegradable mats or tarps, and/or planted with preferably native grass or shrubs.
 - (xii) Excavation of the water body bed will be limited to within the road right of way and is the minimum required for the proper placement of the culvert crossing.
 - (xiii) Shoreline vegetation will be retained to the greatest extent possible to maximize the stability of the banks.
 - (xiv) Operate machinery from outside of the water and in a manner that minimizes disturbance to the banks of the water body.
 - (xv) The intake of any pumps used in surface waters will be screened to meet the Department of Fisheries and Oceans' Freshwater Intake End-of-Pipe Fish Screening Guidelines (1995) and water withdrawal rates will not exceed 10% of the instantaneous stream flow at the time.
- (k) Wildlife

- (i) No clearing of trees, shrubs or vegetation is permitted between May 1 and July 31st of any year to protect nesting and breeding season for migratory birds and other wildlife, unless otherwise identified by a Project Biologist.
 - (ii) No one will disturb, move or destroy migratory birds' nests.
 - (iii) If a nest is encountered, Work will cease in the immediate area and the Contract Administrator will be contacted for further direction.
 - (iv) In the event that species at risk are encountered during the project construction, all Work will cease in the immediate area, the Site will be made safe and the Contract Administrator will be contacted.
- (l) Wetlands
- (i) The Contractor will implement the following environmental protection measures to prevent the new loss of wetland functions, in accordance with the Federal Policy on Wetland Conservation:
 - (i) The Contractor will clearly mark wetland limits near the construction footprint prior to commencement of the Work and will remain marked throughout the construction period.
 - (ii) Wetlands will not be disturbed without written permission from the Contract Administrator.
 - (iii) Should additional wetlands be encountered during construction, construction in that area will halt until the area is properly marked.
 - (iv) Construction equipment will avoid the marked wetland areas as much as possible, where feasible.
 - (v) The Contractor will not discharge water into adjacent wetlands without written permission from the Contract Administrator, having confirmed the quality of the water to be discharged and the capacity of the receiving wetland.
 - (vi) Any fish located within the wetlands to be disturbed by the project will be captured and returned to a nearby watercourse unharmed.
- (m) Vegetation
- (i) The Contractor will clearly mark the disturbance limit prior to commencement of the Work and will remain marked throughout the construction period.
 - (ii) Vegetation will not be disturbed without written permission from the Contract Administrator.
 - (iii) The Contractor will limit the removal of trees and snags (standing dead trees); surface disturbance and vegetation clearing.
 - (iv) Herbicides and pesticide will not be used adjacent to any surface watercourse.
 - (v) Trees or shrubs will not be felled into watercourses.
 - (vi) Areas where vegetation is removed during clearing, construction decommissioning activities, will be revegetated as soon as possible in accordance with the landscaping plans forming part of the Contract, or as directed by the Contract Administrator.
 - (vii) Trees damaged during construction activities will be examined by bonded tree care professionals. Viable trees damaged during construction activities will be pruned according to good practices by bonded tree care professionals.
- (n) Landscaping
- (i) Construction waste (excluding common construction gravel, sand, etc.) will be removed to a minimum depth of 600mm below final grade in all areas that are to be backfilled with suitable material and revegetated in accordance with the City of Winnipeg Standard Construction Specifications.
 - (ii) Topsoil will be stripped prior to construction and salvaged for use during landscaping. Surplus topsoil will be properly stockpiled for use in other projects.
 - (iii) The Contractor will adhere to the landscaping plan for the maintenance of initial stages and development stages of the plant community.

(o) Heritage Resources

- (i) If heritage material is located during the construction and soil removal process, all Work will cease and the Contractor will immediately contact the Contract Administrator. The Historic Resource Branch, Manitoba Culture, Heritage, Tourism and Sport or the Project Archaeologist, will be contacted by the Contract Administrator to determine the nature and extent of the archaeological material and to arrange for its recovery. The archaeological remains will be recovered by salvage excavation upon authorization by the Contract Administrator, having consulted with the Historic Resources Branch, Manitoba Culture, Heritage, Tourism and Sport.
- (ii) The Contractor will be prepared to continue his Work elsewhere on the project while the Archaeologist investigates the find and determines its heritage value.
- (iii) The Contractor is advised that he may be denied access to such areas of the project until such time as a thorough archaeological investigation is conducted or the find is deemed to have no heritage value.
- (iv) Construction and excavation Work will not resume until the Contract Administrator, having consulted with the Historic Resources Branch, Manitoba Culture, Heritage, Tourism and Sport, or the Project Archaeologist, authorizes a resumption of Work.
- (v) If human remains are uncovered during the construction and soil removal process, all Work will cease and the Heritage Resources Branch, Manitoba Culture, Heritage, Tourism and Sport will be contacted by the Contract Administrator. The Historic Resources Branch will contact the City of Winnipeg Police.
- (vi) If the human remains are not considered forensic, (i.e., no foul play suspected), they will be removed by the Historic Resources Branch, Manitoba, Culture, Heritage, Tourism and Sport or the Project Archaeologist and turned over to the Province.
- (vii) If the human remains are considered forensic, the City of Winnipeg Police will be responsible for their removal.
- (viii) Additional information may be obtained by contacting: Archaeological Assessment Services, Historic Resources Branch.

(p) Construction Traffic

- (i) Workforce parking will be limited to the areas designated for such as detailed in the Contract Documents, or as otherwise may be directed by the Contract Administrator.
- (ii) Large equipment will be equipped with flashing beacons and/or an audible "back up" warning device that is audible when the transmission is in reverse.
- (iii) The Contractor will adhere to the Standard Provisions of the Standard Construction Specifications, and of the Manual of Temporary Traffic Control in Work Areas on City Streets of the City of Winnipeg Public Works Department.
- (iv) The Contractor's laydown area, construction Site and access road will be fenced and gated to secure the Site and materials and to discourage pedestrian entrance to construction areas and to control any potential hazard to the public, particularly children.
- (v) For circumstances where the Contract Administrator has accepted Site access of special equipment or material, the Contractor will provide adequate flagmen for traffic control in the vicinity of any public buildings.

(q) Access

- (i) The Contractor will maintain access to affected residential properties.
- (ii) The Contractor will provide or maintain general and off-street access to any affected business during construction.

E20.10 MEASUREMENT AND PAYMENT

- E20.10.1 The Environmental Protection Plan will be considered incidental to the Work and as such no measurement or payment will be made for this item.

E21. CLEARING AND GRUBBING

E21.1 REFERENCES

- E21.1.1 Section E20, "Environmental Protection Plan".
- E21.1.2 U.S. Environmental Protection Agency (EPA)/Office of Water
 - (a) EPA 832, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

E21.2 DEFINITIONS

- E21.2.1 Clearing consists of cutting off trees and brush vegetative growth above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
- E21.2.2 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.
- E21.2.3 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of fallen timber and surface debris.
- E21.2.4 Grubbing consists of excavation and disposal of stumps and roots, boulders and rock fragments of specified size to not less than specified depth below existing ground surface.

E21.3 QUALITY ASSURANCE

- E21.3.1 Safety Requirements: worker protection.
 - (a) Workers must wear gloves, eye protection and protective clothing when applying herbicide materials.
 - (b) Workers must not eat, drink, or smoke while applying herbicide material.
 - (c) Clean up spills of preservative materials immediately with absorbent material and safely discard to landfill.

E21.4 SUBMITTALS

- E21.4.1 Samples:
 - (a) Submit a sample of each material listed below for approval prior to delivery of materials to project site.
 - (b) Tree wound paint: one litre can with manufacturer's label.
 - (c) Herbicide: one litre can with manufacturer's label.
- E21.4.2 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- E21.4.3 Submit manufacturer's installation instructions.

E21.5 STORAGE AND PROTECTION

- E21.5.1 Prevent damage to fencing, trees, natural features, bench marks, existing buildings existing pavement, utility lines, Site appurtenances, water courses, root systems of trees which are to remain.
- E21.5.2 Repair damaged items to approval of Contract Administrator. Replace trees designated to remain, if damaged, as directed by Contract Administrator.
- E21.5.3 The Contractor shall not remove any trees or perform any clearing and grubbing that has not been clearly marked by the Contract Administrator. If the Contractor removes any tree, regardless of size or species, that was not approved by the Contract Administrator, the Contractor shall supply and install five (5) trees of a species and calliper equal to or greater than that which was removed. The replaced trees shall be installed at a location determined by the Contract Administrator, which may be in or near the Site.

E21.5.4 Protect existing trees and vegetation to remain on-site with snow fencing as indicated by the Contract Administrator.

E21.5.5 Limit Site disturbance including earthwork and clearing of vegetation to

- (a) 12 m beyond the building perimeter.
- (b) 1.5m beyond road way, walkways, ditches and main utility trenches.
- (c) 5m beyond sports fields and parking.

E21.5.6 Maintain access roads to prevent accumulation of construction related debris on roads.

E21.6 WOOD WASTE MANAGEMENT AND DISPOSAL

E21.6.1 Consider felled timber from which saw logs, pulpwood, posts, poles, ties, or fuel wood can be produced as saleable timber.

- (a) Trim limbs and tops, and saw into saleable lengths for pulpwood, for poles, for ties, and for fuel wood.
- (b) Stockpile adjacent to Site.
- (c) Owner to have first right of refusal for saleable timber.

E21.7 MATERIALS

E21.7.1 Herbicide: effective for killing annual and perennial weeds, by being absorbed through roots and foliage.

E21.7.2 Soil Material for Fill:

- (a) Excavated soil material: free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, deleterious, or objectionable materials.
- (b) Remove and store soil material for reuse.

E21.8 TEMPORARY EROSION AND SEDIMENTATION CONTROL

E21.8.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to engineering controls such as silt fence, silt traps and filter cloth placement during construction.

E21.8.2 Excavation and reuse of soil must not create fugitive dust. Contractor to cover or dampen soil to prevent blowing dust or debris under dry conditions. All stockpiled materials must be covered with 6mm poly at the end of each day.

E21.8.3 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

E21.8.4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

E21.9 PREPARATION

E21.9.1 Inspect Site and verify with Contract Administrator items designated to remain.

E21.9.2 Locate and protect utility lines: preserve in operating condition active utilities traversing Site.

E21.9.3 Notify Contract Administrator immediately of damage to or when unknown existing utility lines are encountered.

E21.9.4 Keep roads and walks free of dirt and debris.

E21.9.5 Supply and install protective strapping as per E4.1(b) and / or snow fencing around existing trees to remain as directed by the Contract Administrator.

E21.10 APPLICATION

E21.10.1 Manufacturer's instructions: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

E21.11 CLEARING

E21.11.1 Clearing includes cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, brush and rubbish occurring within cleared areas.

E21.11.2 Clear as directed by Consultant, by cutting at height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 1000 mm above ground surface.

E21.11.3 Cut off unsound branches on trees designated to remain as directed by Consultant.

E21.11.4 Apply herbicide in accordance with manufacturer's label to top surface of stumps designated to be removed.

E21.12 CLOSE CUT CLEARING

E21.12.1 Close cut clearing to ground level for gravel pathway areas as indicated.

E21.13 UNDERBRUSH CLEARING

E21.13.1 Clear underbrush from areas as indicated at ground level.

E21.14 GRUBBING

E21.14.1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas except gravel pathway areas.

E21.14.2 Grub out stumps and roots to not less than 100 mm below ground surface.

E21.14.3 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m³.

E21.14.4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.

E21.15 REMOVAL AND DISPOSAL

E21.15.1 Remove cleared and grubbed materials off site.

E21.15.2 Dispose of cleared and grubbed materials by burying or mulching.

E21.15.3 Bury to approval of Consultant by:

(a) Consolidating.

(b) Covering with minimum 500 mm of mineral soil.

(c) Finishing surface.

E21.15.4 Chip or mulch and spread cleared and grubbed vegetative material on site as directed by Consultant.

E21.16 FINISHED SURFACE

E21.16.1 Leave ground surface in condition suitable for immediate grading operations to approval of Consultant.

E21.17 CLEANING

E21.17.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

MEASUREMENT AND PAYMENT

- E21.18 Clearing and Grubbing will be measured on an area basis and paid for at the Contract Unit Price per hectare as "Clearing and Grubbing". The number to be paid for will be the total hectares of Clearing and Grubbing performed in accordance with this specification and accepted by the Contract Administrator.

E22. CONNECTING CORRUGATED STEEL PIPE CULVERT TO NEW CATCH PIT

DESCRIPTION

- E22.1 General

- E22.1.1 This specification covers the Work related to the connection of a new corrugated steel culvert to a new catch pit.

MATERIALS AND EQUIPMENT

- E22.2 Materials

- E22.2.1 Grout and Mortar shall be supplied as per CW 2160 – R7

CONSTRUCTION METHODS

- E22.3 Connect corrugated steel pipe to catch pit at invert elevations shown on the Drawings and grout in place to make a watertight connection.
- E22.4 Bench and channel catch pit floor with mortar to ensure no water is retained in the catch basin and the flow of water into the culvert as shown on the Drawings or as directed by the Contract Administrator.

MEASUREMENT AND PAYMENT

- E22.5 Connecting corrugated steel pipe culvert to new catch pit will be considered incidental to the Contract Unit Price for "Catch Pit" and no separate measurement for payment will be made.

E23. CORRUGATED STEEL PIPE (CSP) CULVERT

DESCRIPTION

- E23.1 This Specification shall supplement CW 3610 and covers the supply and installation of CSP culverts and CSP culvert bevelled ends as shown on the drawings and directed by the Contract Administrator.

MATERIALS

- E23.2 Bedding and Backfill

- E23.2.1 Bedding material under culvert to springline of pipe shall be sand as per CW 2013 Clause 2.1.

- E23.2.2 Backfill material to be Base Course Material as per CW 3110 Clause 2.2.

- E23.3 CSP Culvert

- E23.3.1 As per CW 3610 Clause 5.3.

- E23.3.2 Further to CW 3610 Clause 9, all CSP culverts shall be supplied of such a length to allow installation with no splice points under the limits of the asphalt pavement, except culverts under Waverley Street.

- E23.4 Supply of CSP Culvert Bevelled Ends

- E23.4.1 Further to CW 3610, where the CSP culvert intersects the fore slope of the ditch, the culvert shall be bevelled such that it matches the slope of the ditch. Bevelled culverts shall be stepped a 100 mm at the invert and obvert of the culvert as indicated in the drawings. The supply of CSP Culvert Bevelled Ends will be considered incidental to the Contract Unit Price for "CSP Culvert – Supply" and no separate measurement for payment will be made.

CONSTRUCTION METHODS

- E23.5 As per CW 3610 Clause 9.
- E23.6 Further to CW 3610 Clause 9.1, the limits of excavation and placement of bedding shall be tapered as shown on the Contract Drawings.
- E23.7 All CSP culverts shall be installed such that no splice in the CSP culvert shall be present under the limits of the asphalt pavement as shown on the drawings, except under Waverley Street, and as directed by the Contract Administrator.

MEASUREMENT AND PAYMENT

- E23.8 Corrugated Steel Pipe (CSP) Culvert supply and installation will be measured and paid for as per CW 3610 Clause 12.1 and 13.1.
- E23.9 The additional excavation required to install the tapered bedding and backfill material as shown will be considered incidental to the Contract Unit Price for Corrugated Steel Pipe (CSP) Culvert supply and installation and no measurement for payment will be made.
- E23.10 Bedding and backfill material will be considered incidental to the Contract Unit Price for Corrugated Steel Pipe (CSP) Culvert supply and installation and no measurement for payment will be made.

E24. SUPPLY AND INSTALLATION OF CORRUGATED STEEL PIPE (CSP) CULVERT SAFETY GRATES

DESCRIPTION

- E24.1 This Specification covers the supply and installation of CSP culvert safety grates to be installed on the bevelled inlet side of the 600 mm CSP culverts under Waverley Street as shown on the drawings and as directed by the Contract Administrator.

GENERAL

- E24.2 The CSP culvert safety grate shall consist of vertical bars attached to horizontal support bars.
- E24.3 A horizontal support bar shall be provided at the top and bottom of the culvert, and intermediate horizontal support bars shall be spaced at no less than 750 mm.
- E24.4 The top horizontal support bar shall be secured to the obvert of the CSP culvert with a minimum of six bolts.
- E24.5 The bottom and intermediate horizontal bar supports shall be secured to the sides of the CSP culvert with a minimum of one bolt on each side of the culvert.
- E24.6 The horizontal clear distance between vertical grate bars shall be 130 to 140 mm.
- E24.7 The clear distance between the culvert invert and the bottom horizontal bar shall be 140 mm.
- E24.8 Vertical bars shall be connected to and terminated at the top and bottom horizontal support bar.
- E24.9 Bends in vertical bars shall be smooth and not exceed 300 mm in radius.
- E24.10 Bends in horizontal bars shall be smooth and match the diameter of the culvert to which the grate unit is installed.

- E24.11 Bolts shall be hex head bolts. The minimum bolt diameter shall be 19 mm.
- E24.12 All bolts shall be furnished with one washer and one lock washer.
- E24.13 The grate unit shall be designed to allow for periodic removal and reinstallation for maintenance purposes.

MATERIALS

- E24.14 Fasteners shall be stainless steel in accordance with ASTM F593, Type 304 or better.
- E24.15 The vertical bars shall consist of the following:
- (a) Continuous deformed steel bar in accordance with CSA G30.18 Grade 400W, the minimum size shall be 20M.
- E24.16 The horizontal bars supporting the vertical grate bars shall consist of the following:
- (a) Continuous flat steel bar in accordance with CSA G40.21 Grade 300W.
 - (b) The top horizontal support bar shall have minimum dimensions of 75 mm x 13 mm.
 - (c) The bottom and intermediate horizontal support bars shall have a minimum dimension of 50 mm x 13 mm.
- E24.17 Hot-dip galvanizing materials shall conform to ASTM A123, to a net retention of 610 g/m².

FABRICATION

- E24.18 The grate unit shall be fabricated as a single piece.
- E24.19 Welded connections shall be provided at every intersection of vertical grate bar and horizontal support bars.
- E24.20 Welded connections shall consist of flare bevel groove welds on both sides of the vertical bars, and shall fill flush to the surface of the solid section of the vertical bar.
- E24.21 Welding shall be in accordance with CSA W59 and CSA W186 where applicable.
- E24.22 Following fabrication, the entire culvert grate shall be hot-dip galvanized in accordance with ASTM A123 to a net retention of 610 g/m².

MEASUREMENT AND PAYMENT

- E24.23 Supplying and Installation of CSP Culvert Safety Grates will be measured on a unit basis. The number to be paid for will be the total number of CSP Culvert Safety Grates installed in accordance with this specification and accepted by the Contract Administrator. This item of Work will be paid for at the Contract Unit Price per unit for "Supply and Install of CSP Culvert Safety Grates" performed in accordance with this Specification and accepted by the Contract Administrator.

E25. EROSION CONTROL BLANKET (ECB)

DESCRIPTION

- E25.1 This Specification covers the supply, installation, and maintenance of erosion control blanket to be installed around the perimeter of grouted stone rip rap as shown on the drawing and as directed by the Contract Administrator.

MATERIALS AND EQUIPMENT

- E25.2 Erosion Control Blanket(ECB)

- E25.2.1 Erosion Control Blanket shall be a machine-produced mat of 70% agricultural straw and 30% coconut blanket with a functional longevity of up to 24 months. Suitable products include SC 150 Extended Term manufactured by North American Green, or approved equivalent.
- E25.2.2 The blanket shall be of consistent thickness with the straw and coconut evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with heavyweight photodegradable polypropylene netting having ultraviolet additives to delay breakdown and a maximum 159mm x 159mm mesh and on the bottom side with a lightweight photodegradable polypropylene netting with a maximum 127mm x 127mm mesh. The blanket shall be sewn together on 381mm centres (maximum) with degradable thread
- E25.2.3 ECB shall have the following properties:
- (a) Matrix 70% Straw Fibre (0.19kg/m²) and 30% Coconut Fibre (0.08kg/ m²).
 - (b) Netting top side heavyweight photodegradable with UV additives (1.47kg/100 m²).
 - (c) Bottom side lightweight photodegradable minimum netting weight (0.73 kg/100 m²).
 - (d) Degradable thread.

SUBMITALS

- E25.3 The Contractor shall submit all manufacturers' product specifications and recommended installation methods for the proposed erosion control blankets and associated materials to the Contract Administrator a minimum of 14 days before construction.

CONSTRUCTION METHODS

- E25.4 The Contractor shall supply all ECB materials required and store them on-site. The installation and maintenance of all ECM will be as directed by the Contract Administrator. The installation will be required only if the outer coffer dam upstream of the culvert is going to be over topped.
- E25.5 Actual alignment and location of the ECB may be adjusted in the field by the Contract Administrator.
- E25.6 Erosion Control Blanket – Drainage Channel Installation
- E25.6.1 Excavation a trench 150 mm deep by 150 mm wide along the perimeter of the grouted stone rip rap. Place the ECB such that 300 mm of the blanket overlaps the grouted stone rip rap. Anchor blanket with 200 mm long staples in the trench a maximum of 300 mm apart. Backfill trench with soil and compact. Apply seed according to E10 to compacted soil and fold remaining portion of the blanket over seeded soil and secure with 200 mm long staples a maximum of 300 mm apart. Securely fasten blanket against soil surface with 200 mm long staples with a minimum of 4 staples per square metre.
- E25.6.2 Transverse joints and end seams in the ECB shall have a minimum overlap of 150 mm and secured with 200 mm staples a maximum of 300 mm apart.

MAINTENANCE

- E25.7 The areas covered with ECB shall be regularly inspected especially after severe rainfall or storm events, to check for blanket separation or breakage.
- E25.8 Any damaged or poorly performing areas as the result of storm events shall be replaced/repared immediately. Re-grading of the slope by hand methods may be required in the event of rill or gully erosion.
- E25.9 Should the Contract Administrator determine that the Contractor has not maintained the erosion control blankets properly or has damaged the blankets from construction activities resulting in sediment releases beyond the Work area, the Contractor shall retrieve all sediment that has left the construction area, to the fullest extent possible, at his own cost. As a minimum, the

Contractor shall remove all deltas and sediment deposited in drainage ways and re-grade and/or reseed the areas where sediment removal results in exposed soil. The removal and restoration shall take place within 5 working days of discovery unless precluded by legal, regulatory, or physical access restraints. If precluded, removal and restoration must take place within 5 working days of obtaining access. The Contractor is responsible for contacting all local, regional, provincial, and federal authorities before working in surface waters and for obtaining applicable permits. The Contractor's restoration Work to restore property outside of the designated Work area shall be at his own cost.

MEASUREMENT AND PAYMENT

- E25.10 Supplying and placing Erosion Control Blanket will be measured on a square metre basis. The area to be measured shall be the total number of square metres of Erosion Control Blanket supplied and placed in accordance with this Specification, acceptable to the Contract Administrator, as computed from the Drawing dimensions. This item of Work will be paid for at the Contract Unit Price per square metre for "Supply and Install Erosion Control Blanket" performed in accordance with this Specification and accepted by the Contract Administrator.

E26. STEEL BEAM GUARDRAIL SYSTEM

DESCRIPTION

- E26.1.1 The Work shall consist of:
- (a) Supply and installation of roadside hazard protection meeting the AASHTO Manual for Assessing Safety Hardware (MASH) Test Level 3 or NCHRP Report 350: Recommended Procedures for the Safety Performance Evaluation of Highway Features, including
 - (i) W-Beam guardrail (Midwest Guardrail System) with steel posts and neoprene spacer blocks; and,
 - (ii) End treatments.
 - (b) Supply, loading, hauling, unloading, storing and installing of roadside hazard protection guardrail, guardrail end treatment, posts, and all related appurtenances in accordance with the Drawings and Manufacturer's recommended installation procedures,
 - (c) Field drilling, threading and cutting bolts, as required; and,
 - (d) Supply, placing and compacting backfill material.

MATERIALS

- E26.1.2 The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this specification.
- E26.1.3 Guardrails and posts shall be stored in neat regular piles, on blocks or built up platforms, in order to avoid damage or contamination, and for ease of checking, handling, and inspection.
- E26.1.4 Testing, Inspection 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 for any materials taken by the Contract Administrator for testing purposes.
 - (b) Materials which fail to meet these specifications will be rejected, and shall be replaced or repaired at no additional cost.
- E26.1.5 Guardrails and Terminal Elements
- (a) All guardrail sections and other components shall match the design profiles and dimensions of the AASHTO/ARTBA hardware requirements.

- (b) The guardrails and terminal elements shall be manufactured from open hearth, electric furnace or basic oxygen semi-spring steel sheet, all in general accordance with the AASHTO Standard Designation M180 and shall conform to the drawings provided in the contract and in the AASHTO-AGC-ARTBA publication "A Guide to Standardized Highway Barrier Hardware".
- (c) Guardrails shall be punched for splice and post bolts in conformity with AASHTO Standard to the designated number of and centre to centre spacing of posts. If holes are punched after galvanizing, the galvanizing around the hole shall be repaired in accordance with the latest edition of CSA Standard G164-M92 (R2003) or ASTM A780/A780M-09.
- (d) Guardrails shall have minimum yield strength of 345 MPa, minimum tensile strength of 483 MPa, and minimum elongation of 12% in 50mm length.
- (e) The thickness of guardrails and terminal elements shall be manufactured according to Table 2 (Class A Type II) of AASHTO Standard M180 with nominal base metal thickness of 2.67 mm, galvanized finished thickness of 2.82 mm, with a tolerance of 0.23 mm.
- (f) Sheet width for the W-beam guardrail shall be 483 mm with a permissible tolerance of minus 3 mm.
- (g) All guardrails and terminal elements shall be hot dip galvanized according to CAN/CSA A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- (h) All welding for the fabrication of terminal elements shall conform to the requirements of CSA W59M. All welders, welding operators and tackers shall be approved by the Canadian Welding Bureau in their particular category.
- (i) A copy of the producer's certificate, conforming to Section 16 of CSA G40.20M, for each of the mechanical and chemical tests, including impact tests, shall be provided to the Contract Administrator upon request.
- (j) Terminal ends to be FLEAT 350 by Road Systems Inc or approved equal.

E26.1.6 Steel Posts

- (a) Steel posts shall be W150 x 14.
- (b) Steel for posts and hardware shall conform to CSA Standard G40.21 Grade 350W or ASTM Standard A36 and shall be hot dip galvanized after fabrication conforming to ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

E26.1.7 Neoprene Spacer

- (a) Spacers shall be King Blocks by Trinity Highway Products, LLC or approved equivalent.

E26.1.8 Bolts, nuts, washers and other appurtenances

- (a) All bolts, nuts and washers shall be according to ASTM A307 and shall be hot dip galvanized conforming to the current edition of ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

E26.1.9 Markings

- (a) Each guardrails shall be marked with the following information:
 - (i) Name, trademark, or brand of the manufacturer.
 - (ii) Identification symbols or code for heat.
 - (iii) Week number and year of production.
- (b) Markings shall be clearly and permanently stamped in the valley of the centre corrugation, placed at the location clear of the splice overlap, and shall not be obscured after installation. The height of the letters and numerals shall be within the range of 19 to 32 mm.

CONSTRUCTION METHODS

E26.1.10 Handling and Storage of Materials

- (a) All materials shall be handled in a careful and workmanlike manner and the sections and ends shall be stored on blocks or built-up platforms.
- (b) Bolts and malleable washers shall be stored separately in suitable bins for inspection, checking and handling.

E26.1.11 Site Inspection

- (a) Prior to commencing installation of the protection at a location, the Contractor shall verify that it can be installed in strict accordance with the Drawings. This shall include contacting all utilities and other owners of underground facilities in order to ensure that the proposed location of the posts is not in conflict with existing or proposed utilities and installations.
- (b) Should there be a conflict between a proposed location and any facility the Contract Administrator shall be notified immediately.

E26.1.12 Assembly and Installation

- (a) All materials and parts shall be assembled and installed in accordance with the manufacturers' requirements and recommended procedures.

E26.1.13 Post Installation

- (a) Holes for the posts shall be 300 mm in diameter and be excavated by auger.
- (b) Excavated material which is unsuitable for use as backfill shall be replaced with granular material meeting the requirements of Section 2.2 of Specification CW 3110 for base course material.
- (c) Crushed limestone base course is not allowed for use.
- (d) The posts shall rest directly and solidly on the bottom of the hole.
- (e) After the post is installed, it shall be backfilled. Backfill shall be thoroughly compacted, using pneumatic tampers, in layers not exceeding 150 mm. Unsuitable material at the bottom of the holes excavated shall be replaced with granular material at the Contractor's expense, as directed by the Contract Administrator.
- (f) The Contractor shall thoroughly compact the bottom of the holes.
- (g) Surplus excavated material and debris shall be removed from the Site.

E26.1.14 Guardrail Installation

- (a) Guardrail shall be accurately set to the required depth and alignment, in a manner resulting in a smooth continuous installation, as shown on the Drawings or as directed by the Contract Administrator. Permissible tolerance for plumb and grade of posts shall be 6 mm.
- (b) Any guardrail material requiring field modification to fit shall be reported to the Contract Administrator for its acceptance of the modification prior to the Work being carried out.
- (c) Modification by flame cutting method is prohibited.
- (d) Modification by cold cutting method with a suitable drill press is allowed.
- (e) Field guardrail modification is considered incidental to the work. Adequate edge distances of guardrail material shall be maintained during the modification process. All exposed steel areas shall be patched with two coats of zinc-rich paint.
- (f) Guardrail laps shall be in the direction of traffic flow.
- (g) Bolts shall be tightened to a torque of 100Nm.
- (h) The Contractor shall take all necessary precautions to eliminate damage to galvanizing. Minor abrasions shall be repaired by re-galvanizing. The method to be

used for repair of any damage shall be accepted by the Contract Administrator before such Work is commenced. The Contractor shall repair or replace components to the satisfaction of the Contract Administrator.

E26.1.15 FLEAT 350 End Treatment

- (a) The FLEAT 350 end treatment, or approved equal meeting MASH Test Level 3, shall be installed as indicated on the Drawings. Installation of the FLEAT 350 end treatment shall be completed in accordance with the specifications and the manufacturer's recommendations.

E26.1.16 Cleaning

- (a) After installation of the rail system has been completed, the entire rail system shall be thoroughly cleaned to the satisfaction of the Contract Administrator.

MEASUREMENT AND PAYMENT

E26.2 Supply and installation of roadside hazard protection guardrail, posts, and all related appurtenances will be measured on a length basis and paid for at the Contract Unit Price for the "Steel Beam Guardrail". The length to be paid for will be the total number of meters of Steel Beam Guardrail in accordance with this specification, accepted and measured by the Contract Administrator.

E26.3 Supply and installation of FLEAT 350 end treatments, associated posts and appurtenances will be measured on a unit basis and paid for at the Contract Unit Price for the "FLEAT 350 End Treatment". The amount to be paid for will be the total number of units installed in accordance with this specification, accepted and measured by the Contract Administrator.

E27. CRACK SEALING INTERFACE OF CURB AND GUTTER/ASPHALT PAVEMENT

DESCRIPTION

E27.1 Further to D26.1(b), the Contractor shall crack seal the interface of the curb and gutter/asphalt pavement one year after the construction of the asphalt pavement and curb and gutter is completed.

MATERIALS

E27.2 Joint sealant shall be supplied as per CW 3250.

CONSTRUCTION METHODS

E27.3 Crack sealing of the interface shall be completed using joint sealant in accordance with Clause 3 of CW 3250.

MEASUREMENT AND PAYMENT

E27.4 Crack sealing the interface of Curb and Gutter/Asphalt Pavement will be measured on a length basis and paid for at the Contract Unit Price for the "Crack Sealing" regardless of the width of the crack. The length to be paid for will be the total number of meters of cracks routed and/or cleaned and sealed in accordance with this specification, accepted and measured by the Contract Administrator.

E28. EXCAVATION

DESCRIPTION

E28.1 Further to CW 3110 and CW 3170, this specification covers stripping and stockpiling of topsoil, common excavation - suitable Site material, fill material, boulevard grading, ditch grading, and excavation.

CONSTRUCTION METHODS

E28.2 Topsoil Excavation

E28.2.1 Construction methods for Topsoil Excavation shall be as per Specification CW 3170, Clause 9.2 a).

E28.3 Common Excavation – Suitable Site Material

E28.3.1 As per Specification CW 3170, Clause 9.2(b), Common Excavation – Suitable Site Material shall consist of any excavation (including ditch excavation and boulevard excavation) which yields suitable Site material, as determined by the Contract Administrator.

E28.3.2 If necessary suitable Site material shall be stockpiled on Site until a location has been prepared for placement.

E28.4 Fill Material – Placing of Suitable Site Material

E28.4.1 Placing of suitable Site material shall include the hauling and placing of suitable Site material within the limits of work.

E28.4.2 Hauling and placing of suitable Site material includes placement of stockpiled suitable Site material and/or placement of material hauled directly from common excavation - suitable Site material operations.

E28.4.3 Construction methods for placing suitable Site material shall be as per Specification CW 3170, Clauses 9.6 and 9.7.

E28.5 Grading of Boulevards

E28.5.1 Grading of Boulevards shall be done in accordance with Specification CW 3110.

E28.5.2 Further to Specification CW 3110, Clause 3.8.4 and Clause 3.8.5, excavate and/or place and compact fill to a depth up to 150 millimetres to meet the final grade 100 millimetres below finished boulevard grade.

E28.5.3 Excavation in excess of 150 millimetres shall be treated as Common Excavation.

E28.5.4 Placement of backfill material over 150 millimetres in depth required to complete boulevard grading will be treated as Fill Material - Placing of Suitable Site Material.

E28.6 Grading of Ditches

E28.6.1 Grading of Ditches shall be done in accordance with Specification CW 3110.

E28.6.2 Further to Specification CW 3110, Clause 3.9.3 and Clause 3.9.4, excavate and/or place and compact fill to a depth up to 300 millimetres to meet the final ditch grade requirements. If sodding of ditches is required, excavate and/or place and compact fill to a depth up to 300 millimetres to meet the final grade 100 millimetres below finished ditch grade.

E28.6.3 Excavation in excess of 300 millimetres shall be treated as Common Excavation.

E28.6.4 Placement of backfill material over 300 millimetres in depth required to complete ditch grading will be treated as Fill Material - Placing of Suitable Site Material.

E28.7 Excavation

E28.7.1 As per Specification CW 3110, Clause 3.2, Excavation shall consist of any excavation (including ditch excavation and boulevard excavation) which yields surplus suitable Site material and/or unsuitable Site material, as determined by the Contract Administrator.

E28.7.2 As per Specification CW 3110, Clause 3.2.3, dispose of surplus suitable and/or unsuitable Site material in accordance with Specification CW 1130, Clause 3.4.

MEASUREMENT AND PAYMENT

E28.8 Topsoil Excavation

E28.8.1 Topsoil Excavation will be measured on a volume basis and paid at the Contract Unit Price per cubic metre for "Topsoil Excavation" as per Specification CW 3170, Clause 13.1.

E28.9 Common Excavation – Suitable Site Material

E28.9.1 As per Specification CW 3170, Clause 12.1, Common Excavation – Suitable Site Material will be measured on a volume basis. The volume shall be based on the total number of cubic metres excavated from its original position and determined by the method of Average End Areas. The excavated material must be deemed suitable Site material in accordance with Specification CW 3170 and accepted by the Contract Administrator.

E28.9.2 As per Specification CW 3170, Clause 13.2, Common Excavation - Suitable Site Material will be paid at the Contract Unit Price per cubic metre for "Common Excavation – Suitable Site Material".

E28.10 Fill Material – Placing of Suitable Site Material

E28.10.1 As per Specification CW 3170, Clause 12.2(a), Fill Material - Placing Suitable Site Material will be measured on a volume basis. The volume shall be based on the total number of cubic metres compacted in place in accordance with Specification CW 3170 and accepted by the Contract Administrator, as determined by the method of Average End Areas.

E28.10.2 Loading, hauling, placing and compaction of suitable Site material will be paid at the Contract Unit Price per cubic metre for "Fill Material – Placing of Suitable Site Material". The volume to be paid for will be the total number of cubic metres loaded, hauled, placed and compacted in place. No separate payment will be made for material hauled from a suitable Site material stockpile rather than directly from an excavation.

E28.11 Grading of Boulevards

E28.11.1 As per Specification CW 3110, Clause 4.8, the grading of boulevards will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Grading of Boulevards". The area to be paid for will be the total number of square metres of boulevards graded in accordance with Specification CW 3110, accepted and measured by the Contract Administrator.

E28.12 Ditch Grading

E28.12.1 As per Specification CW 3110, Clause 4.9, ditch grading will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Ditch Grading". The area to be paid for will be the total number of square metres of ditch graded in accordance with Specification CW 3110, accepted and measured by the Contract Administrator.

E28.13 Excavation

E28.13.1 As per Specification 3110, Clause 4.3, Excavation will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Excavation". The volume to be paid for will be the total number of cubic metres of surplus suitable Site or unsuitable Site material excavated in its original position and determined by the method of Average End Areas.

E28.13.2 As per Specification CW 3110, Clause 4.3.4, disposal of surplus suitable and/or unsuitable Site material in accordance with Specification CW 1130, Clause 3.4, will be included in the payment for "Excavation". No separate payment will be made for material hauled from a suitable Site material or unsuitable Site material stockpile rather than directly from an excavation.

E29. SUPPLY OF CATCH PITS

DESCRIPTION

E29.1 This specification covers the supply of catch pits in the centre median of Kenaston Boulevard.

MATERIALS

- E29.2 Further to CW 2130 Clause 2.7.1 and Standard Detail SD-023, the supplied catch pits shall be a 610 mm long pre-cast concrete catch pit section that meets ASTM C 478 and C76 CL II.

CONSTRUCTION METHODS

- E29.3 Construction methods as per Clause 3.8 of CW 2130.

MEASUREMENT AND PAYMENT

- E29.4 Measurement and payment as per Clause 4.4 of CW 2130.