



**THE CITY OF WINNIPEG**

# **BID OPPORTUNITY**

**BID OPPORTUNITY NO. 97- 2009**

**SOUTHWEST RAPID TRANSIT CORRIDOR – STAGE 1: TRANSITWAY  
CONSTRUCTION, DONALD/HARKNESS RECONSTRUCTION & ASSOCIATED  
WORKS**

**NOTE: INCLUDES POTENTIAL FOR ADDITIONAL CONTRACT WORK FOR THE HARKNESS  
RETAINING WALL IN FALL OF 2009 – SEE B15.**

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## **PART B - BIDDING PROCEDURES**

### **B1. CONTRACT TITLE**

- B1.1 Southwest Rapid Transit Corridor – Stage 1: Transitway Construction, Donald/Harkness Reconstruction & Associated Works

### **B2. SUBMISSION DEADLINE**

- B2.1 The Submission Deadline is 12:00 noon Winnipeg time, May 15<sup>th</sup>, 2009.
- B2.2 Bids determined by the Manager of Materials to have been received later than the Submission Deadline will not be accepted and will be returned upon request.
- B2.3 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

### **B3. ENQUIRIES**

- B3.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.
- B3.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.
- B3.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator to all Bidders by issuing an addendum.
- B3.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.
- B3.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

### **B4. ADDENDA**

- B4.1 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.
- B4.2 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.
- B4.3 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>
- B4.4 The Bidder is responsible for ensuring that he 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.
- B4.5 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

## **B5. SUBSTITUTES**

- B5.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.
- B5.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B5.3 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.
- B5.4 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.
- B5.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his 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.
- B5.6 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.
- B5.7 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 wishes to inform.
- B5.8 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B5.9 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his 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 B14.
- B5.10 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.
- B5.11 Notwithstanding B5.2 to B5.10, in accordance with B6.7, deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B14.1(a).

## **B6. BID COMPONENTS**

B6.1 The Bid shall consist of the following components:

- (a) Form A: Bid;
- (b) Form B: Prices, hardcopy;
- (c) Bid Security
  - (i) Form G1: Bid Bond and Agreement to Bond, or  
Form G2: Irrevocable Standby Letter of Credit and Undertaking, or  
a certified cheque or draft.

B6.2 Further to B6.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B5.

B6.3 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.

B6.4 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.

B6.5 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.

B6.5.1 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.

B6.6 Bidders are advised not to include any information/literature except as requested in accordance with B6.1.

B6.7 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 B14.1(a).

B6.8 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B6.9 Bids shall be submitted to:

The City of Winnipeg  
Corporate Finance Department  
Materials Management Division  
185 King Street, Main Floor  
Winnipeg MB R3B 1J1

## **B7. BID**

B7.1 The Bidder shall complete Form A: Bid, making all required entries.

B7.2 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 own name, his 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 own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.

- B7.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B7.2.
- B7.3 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.
- B7.4 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 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 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.
- B7.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.
- B7.5 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.

## **B8. PRICES**

- B8.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B8.1.1 For the convenience of Bidders, and pursuant to B6.5.1 and B14.4.3, 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>
- B8.2 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.
- B8.3 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.
- B8.4 Prices from Non-Resident Bidders are subject to a Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

## **B9. QUALIFICATION**

- B9.1 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.
- B9.2 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>
- B9.3 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).
- B9.4 Further to B9.3(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 Manitoba Construction Safety Association or by the Manitoba Heavy Construction Association's Safety, Health and Environment 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>).
- B9.5 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.
- B9.6 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.

## **B10. BID SECURITY**

- B10.1 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.
- B10.1.1 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.
- B10.1.2 All signatures on bid securities shall be original.
- B10.1.3 The Bidder shall sign the Bid Bond.
- B10.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.



B10.2 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.

B10.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B10.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.

B10.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.

B10.3 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.

## **B11. OPENING OF BIDS AND RELEASE OF INFORMATION**

B11.1 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.

B11.1.1 Bidders or their representatives may attend.

B11.1.2 Bids determined by the Manager of Materials, or his designate, to not include the bid security specified in B10 will not be read out.

B11.2 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>

B11.3 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>

B11.4 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.

## **B12. IRREVOCABLE BID**

B12.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.

B12.2 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.

## **B13. WITHDRAWAL OF BIDS**

B13.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B13.1.1 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.

- B13.1.2 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.
- B13.1.3 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 B13.1.3(b), declare the Bid withdrawn.
- B13.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B12.2 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.

#### **B14. EVALUATION OF BIDS**

- B14.1 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 B9 (pass/fail);
  - (c) Total Bid Price;
  - (d) economic analysis of any approved alternative pursuant to B5.
- B14.2 Further to B14.1(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.
- B14.3 Further to B14.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid or in other information required to be submitted, that he is responsible and qualified.
- B14.4 Further to B14.1(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.
- B14.4.1 If there is any discrepancy between the Total Bid Price written in figures, the Total Bid Price written in words and the sum of the quantities multiplied by the unit prices for each item, the sum of the quantities multiplied by the unit prices for each item shall take precedence.
- B14.4.2 Further to B14.1(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.
- B14.4.3 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.

**B15. POTENTIAL FOR ADDITIONAL CONTRACT WORK FOR HARKNESS RETAINING WALL IN FALL OF 2009**

B15.1 The City of Winnipeg, in its sole discretion after consideration of the Contractor's performance on Bid Opportunity No. 97-2009, may negotiate and enter into a contract change with the Contractor, to undertake the work associated with the construction of the Harkness Avenue Retaining Wall during the fall of 2009, without a public bid solicitation. The City will provide terms, Construction Specifications and other details if it initiates negotiations with the Contractor. No compensation will be provided to the Contractor for participating in this negotiation. The City of Winnipeg will be under no obligation to initiate negotiations or enter into an agreement for this Work, and may choose to issue a public bid solicitation for the Work with respect to the Harkness Retaining Wall or include in a future Bid Opportunity.

**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 B14.

B16.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his 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](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) Pavement Reconstruction
  - (i) Donald Street from Osborne Street to Wardlaw Avenue
  - (ii) Scott Street from Gertrude Avenue to Donald Street
  - (iii) Gertrude Avenue from Scott Street to Donald Street
  - (iv) Stradbrook Avenue from station 13+010 to Harkness Avenue
  - (v) Lagopolous Way
- (b) Transitway Construction
  - (i) STA: 12+310 to 50 m west of Queen Elizabeth Way
- (c) Land Drainage Sewer Construction

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

- (a) Pavement Reconstruction (In stages)
  - (i) Prepare temporary sidewalks and temporary pavements
  - (ii) Removal of existing pavement
  - (iii) Removal of existing concrete curb, median and sidewalk
  - (iv) Excavation
  - (v) Removal of existing catchbasins and catch pits
  - (vi) Compaction of existing sub-grade
  - (vii) Hydrant adjustment (D2.1 a (i))
  - (viii) Installation of catchbasins and connection pipe
  - (ix) Installation of subdrains
  - (x) Installation of geotextile
  - (xi) Placement of sub-base and base course
  - (xii) Construct 230mm concrete pavement (plain-dowelled) (D2.1 a (i) & (iv))
  - (xiii) Construct 200mm concrete pavement (plain-dowelled) (D2.1 a (ii) & (iii))
  - (xiv) Construct 200mm concrete pavement (reinforced) (D2.1 a (v))
  - (xv) Construction of new concrete curb, median and sidewalk
  - (xvi) Construction of concrete traffic barrier (D2.1 a (v))
  - (xvii) Construction of retaining wall at Organza and Gord's Cycle and Ski (D2.1 a (i))
  - (xviii) Boulevard restoration
  - (xix) Parking Fence installation (D2.1 a (i))
  - (xx) Relocation of Door Activation Unit (D2.1 a (v))
- (b) Transitway Construction
  - (i) Excavation
  - (ii) Compaction of existing sub-grade
  - (iii) Installation of catchbasins and connection pipe
  - (iv) Installation of subdrains

- (v) Installation of geotextile
  - (vi) Placement of sub-base and base course
  - (vii) Construct 230mm concrete pavement (plain-dowelled)
  - (viii) Construction of new concrete traffic barrier, curb and sidewalk
  - (ix) Boulevard restoration
  - (x) Construction of Active Transportation Pathway
  - (xi) Construction of Bus Stop Upgrades
  - (xii) Fence installation
  - (xiii) Landscaping Works
- (c) Land Drainage Sewer Construction
- (i) Installation of pipe via open cut and augured methods
  - (ii) Installation of manholes
  - (iii) Tie in to existing sewers

### **D3. CONTRACT ADMINISTRATOR**

D3.1 The Contract Administrator is Dillon Consulting Limited, represented by:

Taran J. Peters, P.Eng.  
Project Manager  
Suite 200-895 Waverley Street  
Winnipeg, Manitoba R3T 5P4

Telephone No. (204) 453-2301  
Facsimile No. (204) 452-4412

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

### **D4. CONTRACTOR'S SUPERVISOR**

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

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

### **D5. NOTICES**

D5.1 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.

D5.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D5.3, D5.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the address or facsimile number identified in D3.1.

- D5.3 Notwithstanding C21., all notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following address or facsimile number:

The City of Winnipeg  
Chief Financial Officer  
Administration Building, 3rd Floor  
510 Main Street  
Winnipeg MB R3B 1B9  
Facsimile No.: (204) 949-1174

- D5.4 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following address or facsimile number:

The City of Winnipeg  
Internal Services Department  
Legal Services Division  
Attn: City Solicitor  
185 King Street, 3rd Floor  
Winnipeg MB R3B 1J1  
Facsimile No.: (204) 947-9155

#### **D6. FURNISHING OF DOCUMENTS**

- D6.1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Bid Opportunity and full size drawings. If the Contractor requires additional sets of the Bid Opportunity, they will be supplied to him at cost.

#### **SUBMISSIONS**

#### **D7. AUTHORITY TO CARRY ON BUSINESS**

- D7.1 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.

#### **D8. SAFE WORK PLAN**

- D8.1 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.
- D8.2 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>

#### **D9. INSURANCE**

- D9.1 The City shall provide and maintain the following Project Insurance Coverages:
- (a) Builder's Risk Insurance in the amount of one hundred percent (100%) of the total project cost.
  - (b) Wrap-Up Liability Insurance in an amount of no less than 10 million dollars (\$10,000,000.00).

- (i) The Contractor shall be responsible for deductibles up to \$50,000.00 maximum of any one loss.
- (ii) The City of Winnipeg will carry such insurance to cover all parties engaged in the Work in this Contract. Provision of this insurance by the City of Winnipeg is not intended in any way to relieve the Contractor from his obligations under the terms of the Contract. Specifically, losses relating to deductibles for insurance, as well as losses in excess of limits of coverage and any risk of loss that is not covered under the terms of the insurance provided by the City of Winnipeg remains with the Contractor.
- (iii) Wrap-Up Liability insurance shall be maintained from the date of commencement of the Work until one year from the date of Substantial Performance of the Work, after which, if Total Performance has not been met, the responsibility for payment of further insurance premiums shall transfer to the Contractor. The City may reduce any payment to the Contractor by the amount of such further insurance premiums.
- (iv) Liability coverage shall be provided for completed operations hazards from the date of Substantial Performance of the Work, as set out in the certificate of Substantial Performance of the Work, on an ongoing basis for a period of six (6) years following Substantial Performance of the Work.

**D9.2 Responsibilities of the Contractor:**

- (a) The Contractor shall provide and maintain automobile liability insurance for owned and non-owned automobiles used for or in connection with the Work in the amount of at least two million dollars (\$2,000,000.00).
- (b) The Contractor is responsible for insuring equipment and tools used on the Project that may be owned, rented, leased or borrowed.
  - (i) Premiums and deductibles shall be borne by the Contractor;
  - (ii) Policies shall be taken out with insurers licensed to and carrying on business in the Province of Manitoba;
  - (iii) The Contractor shall not cancel, or cause any such policy or policies to lapse without a minimum thirty (30) days prior written notice to the City;
  - (iv) The Contractor shall provide written notice to the City of Winnipeg of any material changes to their policies within thirty (30) days of the change taking effect;
  - (v) The Contractor shall provide the Contract Administrator with evidence of insurance at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than seven (7) Calendar Days from notification of the award of Contract and said insurance shall be in the form of a Certificate of Insurance and shall be in a form satisfactory to the City Solicitor.

**D9.3 Responsibilities of Others, including payment of premiums and deductibles:**

- (a) All sub-contractors, consultants and sub-consultants engaged for the Project are responsible to provide and maintain Automobile liability insurance for owned and non-owned automobiles used for or in connection with the Work in the amount of at least two million dollars (\$2,000,000.00);
- (b) All sub-contractors, consultants and sub-consultants engaged for the Project are responsible for insuring equipment and tools used on the Project that may be owned, rented, leased or borrowed.

**D10. PERFORMANCE SECURITY**

**D10.1** 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.

D10.1.1 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.

D10.2 If the bid security provided in his Bid was not a certified cheque or draft pursuant to B10.1(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.

#### **D11. SUBCONTRACTOR LIST**

D11.1 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.

#### **D12. EQUIPMENT LIST**

D12.1 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.

#### **D13. DETAILED WORK SCHEDULE**

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

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

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

D13.3 Further to D13.2(a), the Gantt chart shall clearly identify the start and completion dates of all activities/tasks making up the Work. The Gantt chart shall show the time on a weekly basis, required to carry out the Work. The time shall be on the horizontal axis and the Work shall be on the vertical axis.

#### **D14. ENVIRONMENTAL PROTECTION PLAN**

D14.1 Prior to commencing construction activities or delivery of materials to Site, submit an Environmental Protection Plan for review and approval by Contract Administrator. The Environmental Protection Plan is to present a comprehensive plan to address known or potential environmental issues which may be present during construction.

- (a) Where applicable, the Environmental Protection Plan shall include sub-contractor activities.
- (b) The submission of the Site Environmental Plan to the Contract Administrator shall in no way relieve the Contractor of full responsibility for the success or failure of all the environmental management practices and procedures.

D14.2 The Environmental protection plan shall address the following:

- (a) Name[s] of person[s] responsible for ensuring adherence to Environmental Protection Plan.
- (b) Name[s] and qualifications of person[s] responsible for manifesting hazardous waste to be removed from Site.
- (c) Name[s] and qualifications of person[s] responsible for training site personnel.
- (d) Descriptions of environmental protection personnel training program.
- (e) Erosion and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- (f) Drawings showing locations of proposed temporary excavations or embankments for haul roads, ditch crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on-site.
- (g) Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.
- (h) Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features including vegetation to be preserved within authorized work areas.
- (i) Environmental Emergency Response: including procedures, instructions, and reporting in the event of unforeseen spill of regulated substance.
- (j) Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- (k) Hazardous materials and waste management plan outlining storage, transportation and disposal.
- (l) Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project Site.
- (m) Contaminant prevention plan that: identifies potentially hazardous substances to be used on job Site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- (n) Waste water management plan that identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete wash or curing water, clean-up water, dewatering of ground water, hydrostatic test water, and water used in flushing of lines.
- (o) Monitor and report to ensure implementation of environmental protection measures.

D14.3 Fires

D14.3.1 Fires and burning rubbish or waste materials on-site is not permitted.

D14.4 Disposal of Waste

D14.4.1 Dispose all waste at licensed facilities or with licensed haulers.

- (a) All waste disposal grounds receiving debris and construction waste from this project must be operated under the authority of a valid permit issued pursuant to MR 150 (latest edition) Waste Disposal Grounds Regulation under the Environment Act.
- (b) Dispose of all sewage and septage from the on-site sanitary facilities in accordance with the Onsite Wastewater Management Systems Regulation MR 83/2003.

D14.4.2 Do not bury waste materials on-site.

D14.4.3 Do not dispose of solid or liquid wastes in drains or waterways.

## D14.5 Hazardous Materials

### D14.5.1 Definitions

- (a) Dangerous Goods: product, substance, or organism that is specifically listed or meets hazard criteria established in the Dangerous Goods Handling and Transportation Act or regulations including hazardous materials and wastes.
- (b) Hazardous Material: product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
- (c) Hazardous Waste: any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- (d) Workplace Hazardous Materials Information System (WHMIS): a Canada-wide system designed to give employers and workers information about hazardous materials used in workplace. Under WHMIS, information on hazardous materials is provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by combination of federal and provincial laws.

### D14.5.2 Materials Management

- (a) Only bring on-site quantity of hazardous materials required to perform Work.
- (b) Maintain MSDSs in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.
- (c) Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

### D14.5.3 Storage and Handling

- (a) Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
  - (i) Sign storage areas.
  - (ii) Store and handle flammable and combustible materials in accordance with current *Manitoba* and *National Fire Code of Canada* requirements.
  - (iii) Do not transfer of flammable and combustible liquids in vicinity of open flames or heat-producing devices.
  - (iv) Do not use flammable liquids having flash point below 38 degrees C, such as naphtha or gasoline as solvents or cleaning agents.
  - (v) Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
  - (vi) Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
- (b) Keep no more than 100 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
  - (i) Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
  - (ii) Storage of quantities of flammable and combustible liquids exceeding 100 litres for Work purposes requires the written approval of the Contract Administrator.
  - (iii) Fuel storage exceeding 100L shall be a minimum distance of 100 metres from any water body and in compliance with the requirements of the Storage and Handling of Petroleum Products and Allied Products Manitoba Regulation 188/2001 of the Dangerous Goods Handling and Transportation Act.
- (c) Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:

- (i) Store hazardous materials and wastes in closed and sealed containers.
  - (ii) Label containers of hazardous materials and wastes in accordance with WHMIS.
  - (iii) Store hazardous materials and wastes in containers compatible with that material or waste.
  - (iv) Segregate incompatible materials and wastes. Ensure that different hazardous materials or hazardous wastes are not mixed.
  - (v) Store hazardous materials and wastes in secure storage area with controlled access.
  - (vi) Maintain clear egress from storage area.
  - (vii) Store hazardous materials and wastes in location that will prevent them from spilling into environment.
  - (viii) Store products on spill trays or berms with 110% capacity.
  - (ix) Do not store within 30 meters of a waterway or drain.
  - (x) Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
  - (xi) Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began and disposal occurred. Maintain tipping and other disposal receipts.
- (d) Report spills or accidents immediately
- (i) to the Contract Administrator.
  - (ii) to Manitoba Conservation Accident Reporting Line at 204-944-4888 in accordance with Manitoba Regulation 439/87 of the Dangerous Goods and Transportation Act.
  - (iii) Submit a written spill report to the Contract Administrator outlining cause and proposed corrective action and Manitoba Conservation as required. Provide copies of reports submitted to Manitoba Conservation to the Contract Administrator.

#### D14.5.4 Transportation

- (a) Transport hazardous materials and wastes in accordance with the Manitoba Dangerous Goods Handling and Transportation Act.
- (i) Ensure that trained personnel handle, offer for transport, or transport dangerous goods.
  - (ii) Use licensed carrier authorized by provincial authorities to accept subject material.
  - (iii) Label container[s] with legible, visible safety marks as prescribed by federal and provincial regulations.
  - (iv) Provide photocopy of shipping documents and waste manifests to the Contract Administrator.
  - (v) Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to the Contract Administrator.
  - (vi) Report discharge, emission, or escape of hazardous materials immediately to the Contract Administrator and appropriate provincial authority. Take measures to control release.

#### D14.5.5 Disposal

- (a) Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- (i) Recycle hazardous wastes for which there is approved, cost effective recycling process available.

- (ii) Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
- (iii) Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- (iv) Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

#### D14.6 Drainage

- D14.6.1 Provide temporary drainage and pumping as necessary to keep excavations and Site free from water.
- D14.6.2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- D14.6.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

#### D14.7 Reducing Site Disturbances

- D14.7.1 The Contractor shall not disturb, in any way, the embankment slopes, roadway shoulders, and adjacent ground surfaces areas outside the limits of the construction areas including the approved lay down, staging and access unless the Contractor has obtained written permission from the Contract Administrator. Such written permission will be granted if it can be shown that there is no alternative.
- D14.7.2 The Contractor shall minimize disturbance of any undeveloped areas on-site and maintain existing Site grading where indicated and where possible.
  - (a) Minimize stripping of topsoil and vegetation.
  - (b) Re-grade and plant vegetation on construction Site as soon as possible.
  - (c) Avoid soil compaction where possible.

#### D14.8 Pollution Control

- D14.8.1 Maintain temporary erosion and pollution control features installed under this contract.
- D14.8.2 Maintain construction equipment in good working order. Control emissions from equipment.
- D14.8.3 Cover or wet down dry materials and stockpiled soils to prevent blowing dust and debris. Provide dust control for the construction Site, temporary and access roads.
  - (a) Adhere to Manitoba Infrastructure and Transportation Specifications for dust control Specification No. 1280 (2008).
- D14.8.4 Bring only clean fill, granular, rip rap and other similar construction materials to the project Site.

#### D14.9 Dust and Particulate Control

- D14.9.1 Dust control practices implemented by the Contractor during construction shall include regular street cleaning and dampening of construction access roads and Work areas with water or approved chemicals at an adequate frequency to prevent the creation of dust.
- D14.9.2 Only water or chemicals approved by the Contract Administrator shall be used for dust control. The use of waste petroleum or petroleum by-products is not permitted.
- D14.9.3 The Contractor shall ensure that trucks which are used to haul excavated material and backfill material to and from the Site utilize tarpaulin covers during transport to prevent material from falling onto the street and creating dust.

## **SCHEDULE OF WORK**

### **D15. COMMENCEMENT**

- D15.1 The Contractor shall not commence any Work until he is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.
- D15.2 The Contractor shall not commence any Work on the Site until:
- (a) the Contract Administrator has confirmed receipt and approval of:
    - (i) evidence of authority to carry on business specified in D7;
    - (ii) evidence of the workers compensation coverage specified in C6.15;
    - (iii) the twenty-four (24) hour emergency response phone number specified in D4.2;
    - (iv) the Safe Work Plan specified in D8;
    - (v) evidence of the insurance specified in D9;
    - (vi) the performance security specified in D10;
    - (vii) the subcontractor list specified in D11;
    - (viii) the equipment list specified in D12;
    - (ix) the detailed work schedule specified in D13;
    - (x) the Environmental Protection Plan specified in D14.
  - (b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.
  - (c) the Contractor has provided proof of CN Contractor Safety Training for each individual proposed to Work on CN property. Contractor to contact Christina Cusson at (204) 231-7805 for CN Right of Entry and Safety Training requirements.
- D15.3 The City will have possession of all property prior to June 9, 2009. It is the City's intention to award this Contract at their Public Works meeting on June 9, 2009 with the intention of starting construction on June 15, 2009.

### **D16. WORKING DAYS**

- D16.1 Further to C1.1(gg);
- D16.1.1 The Contract Administrator will determine daily if a Working Day has elapsed and will record his 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 agrees with the Contract Administrator's determination of the Working Days assessed for the report period.
- D16.1.2 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.
- D16.1.3 When the Work includes two or more major types of Work that can be performed under different atmospheric conditions, the Contract Administrator shall consider all major types of Work in determining whether the Contractor was able to work in assessing Working Days.
- D16.1.4 Should the Contractor be permitted to work on a Saturday, Sunday, or a statutory or civic holiday as specified in D17, these days shall be classified as Working Days.

### **D17. RESTRICTED WORK HOURS**

- D17.1 Further to clause 3.10 of CW 1130, the Contractor shall require written permission forty-eight (48) hours in advance from the Contract Administrator for any Work to be performed between 2000 hours and 0700 hours, or on Saturdays, Sundays, Statutory Holidays and or Civic Holidays.

D17.2 In accordance with the Manual of Temporary Traffic Control, Sections 2.03, 2.04, 2.05 and 2.06, should the Traffic Management Branch of the Public Works Department require that Work on Regional Streets be carried out at night or on Sundays or on public holidays, where permitted by the City of Winnipeg Police Department, or that Work be restricted or suspended during peak traffic hours, no additional compensation will be considered to meet these requirements.

## **D18. WORK BY OTHERS**

D18.1 Work by others on or near the Site will include but not necessarily be limited to:

(a) Manitoba Hydro:

- (i) Street Lighting: Temporary street lighting poles and overhead cables will be placed in the northbound lane of the transitway adjacent to Donald Street during the reconstruction of Donald Street and will be relocated after the construction of the pavement and traffic barrier on the west side of the transitway as described in D19 below.
- (ii) Electric: Miscellaneous Hydro works will be taking place throughout the project such as adjustments of manholes or other appurtenances like the Hydro box along Stradbroke near Queen Elizabeth Way and the pedestal behind Masonic Temple.
- (iii) Gas: Gas lines may require lowering or rock wrapping depending on their location, depth, and size of pipe. This Work should be coordinated immediately after excavation has taken place.

(b) CN:

- (i) CN will be working in the area of the transitway behind the Masonic Temple and along Donald Street to remove the over head lines and poles running parallel to the rail line. These lines will also be buried at this time.

(c) Traffic Signals:

- (i) New traffic signal poles and pedestrian crossing push buttons will be required for the Harkness intersection. In addition, detector loops will also be installed.

(d) MTS:

- (i) Miscellaneous adjustments of manholes and relocation of MTS boxes and other appurtenances may be required on Donald Street and Harkness Avenue.

(e) TeraSpan:

- (i) The TeraSpan line that runs along Donald Street and Scott Street will be relocated by TeraSpan to a location outside the project limits. It is anticipated that the relocation of this line will be complete prior to the start of construction on Donald Street.

(f) 360 Networks (Bell Canada):

- (i) A relocation of the 360 Network box is required near the west end of Lagopoulos Way. This Work is anticipated to be done by 360 Network's local contractor prior to construction within this area.

## **D19. SEQUENCE OF WORK**

D19.1 The sequence of Work shall be that the reconstruction of Donald Street and Harkness Avenue, and the installation of the Land Drainage Sewer be done prior to the reconstruction of Lagopoulos Way, Scott Street and Gertrude Avenue, the construction of the transitway, and the landscape works as stated in D20. It is expected that some Work will take place simultaneously for efficiency, but this will be the general sequence that is anticipated.

D19.2 Further to C6.1 and D19.1, the sequence of Work shall be as follows:

D19.2.1 The Work on Donald Street shall be divided into 3 Phases. Each Phase shall be subdivided into stages. Please see drawing sheets P-3299-11 to P-3299-14.

- D19.2.2      **Phase 1** – Donald Reconstruction, Stages 1A to 1C
- (a) **Stage 1A**
- (i) West curb lane of NB Corydon Avenue from 12+325 to Scott Street.
  - (ii) Center lane of NB Corydon Avenue from East Masonic Temple entrance to Scott Street.
  - (iii) Both SB Donald Street lanes from 50m north of Gertrude Avenue to Scott Street.
  - (iv) West curb lane and West center lane of SB McMillan Avenue from Scott Street to 150m West of Scott Street.
- (b) **Stage 1B**
- (i) West curb lane of NB Corydon Avenue from 12+280 to 12+325.
  - (ii) Left turn lane from the NB Donald Street median lane to McMillan Avenue.
- (c) **Stage 1C**
- (i) 45 m of the median lane of SB Donald Street from 50 m West of Scott Street to 95 m West of Scott Street.
- D19.2.3      **Phase 2** – Donald Reconstruction, Stages 2A to 2B
- (a) **Stage 2A**
- (i) Center lane of NB Corydon Avenue from Osborne Street to East Masonic Temple entrance.
  - (ii) Center lane of NB Donald Street from Scott Street to Gertrude Avenue.
  - (iii) Median lane of NB Donald Street from Scott Street to Wardlaw Avenue.
- (b) **Stage 2B**
- (i) Turn lane from NB Donald Street to Scott Street.
- D19.2.4      **Phase 3** – Donald Reconstruction, Stages 3A to 3B
- (a) **Stage 3A**
- (i) Curb lane of NB Donald Street from Osborne to Wardlaw Avenue.
- (b) **Stage 3B**
- (i) Center lane of NB Donald Street from Gertrude Avenue to Wardlaw Avenue.
- D19.2.5      The Work at Harkness Avenue shall be divided into 3 Phases with Phase 1 and 2 being subdivided into stages. Please see drawing sheets 15 – 18
- D19.2.6      **Phase 1** – Harkness Reconstruction, Stages 1A to 1C
- (a) **Stage 1A**
- (i) North curb lane of EB Stradbrook Avenue from 80 m East of Donald Street to Harkness Avenue.
- (b) **Stage 1B**
- (i) 30 m of pavement on the north side of the intersection in the west curb lane of NB Harkness Avenue.
- D19.2.7      **Phase 2** –Harkness Reconstruction, Stages 2A to 2B
- (a) **Stage 2A**
- (i) Centre lane of Stradbrook Avenue from 80 m East of Donald Street to Harkness Avenue.
  - (ii) Median lane of Stradbrook Avenue from Harkness Avenue to 50 m East of Harkness Avenue.
  - (iii) East lane and bus lane of NB Harkness Avenue.
- (b) **Stage 2B**
- (i) Median lane of WB Stradbrook Avenue at Harkness Avenue



D19.2.8 **Phase 3** – Harkness Reconstruction, Stages 3A to 3B

(a) **Stage 3A**

- (i) Curb lane of EB Stradbrook Avenue from 80 m East of Donald Street to 50 m East of Harkness Avenue.
- (ii) Curb lane of WB Stradbrook Avenue at Harkness Avenue.

D19.3 The Contractor shall be permitted, at the Contract Administrators approval, to work concurrently on numerous parts of D2.1 (a), (b), and (c) to improve the efficiency of the Work. However, being permitted to work on other areas will not be reason for argument if the Critical Stages listed in D20 are not met.

D19.4 The Contractor shall be permitted, at the Contract Administrators approval, to reconstruct Scott Street and Gertrude Avenue during Phase I as described in D19.2.2 (a), however, being permitted to work on these areas will not be reason for argument if the Critical Stages listed in D20 are not met.

D19.5 The Contractor shall be permitted, at the Contract Administrators approval, to prepare the base works for the transitway adjacent to Donald Street and the Harkness Avenue intersection during Phase 3 as described in D19.2.4 and D19.2.8, however, being permitted to work on these areas will not be reason for argument if the Critical Stages listed in D20 are not met.

D19.6 If the Contractor so wishes, he may utilize numerous crews that work independently on the same major component of Work as identified in D2.

D19.7 At the end of any day, there shall be no drop-off along any longitudinal joint, except the longitudinal joint between the gutter and approaches.

**D20. CRITICAL STAGES**

D20.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

- (a) Substantial Performance of Work listed in D2.1 (a) (i) and (iv) and D2.1 (c) must be obtained by October 30, 2009.

D20.1.1 The Critical Stage outlined in D20.1 (a) will not include any sidewalk construction or Active Transportation Pathway on the East side of Donald Street from Osborne Street to Stradbrook Avenue.

D20.2 When the Contractor considers the Work associated with D20.1 (a) to be completed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Completion. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.

D20.3 The date on which the Work associated with D20.1 (a) has been accepted by the Contract Administrator as being completed to the requirements of the Contract is the date on which completion of the Critical Stage has been achieved.

**D21. SUBSTANTIAL PERFORMANCE**

D21.1 The Contractor shall achieve Substantial Performance by October 1, 2010.

D21.2 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.

D21.3 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.

## **D22. TOTAL PERFORMANCE**

D22.1 The Contractor shall achieve Total Performance by October 8, 2010.

D22.2 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.

D22.3 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.

## **D23. LIQUIDATED DAMAGES**

D23.1 If the Contractor fails to achieve the Critical Stage, or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:

- (a) Critical Stage – ten thousand dollars (\$10,000);
- (b) Total Performance – two thousand five hundred dollars (\$2500).

D23.2 The amounts specified for liquidated damages in D23.1 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.

D23.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

## **D24. ACCELERATED COMPLETION**

D24.1 Description

D24.1.1 This specification shall cover the accelerated completion of the Works of this contract.

D24.2 Acceleration of Work

D24.2.1 At no risk to the City, the contractor at his own initiative, means, and expense, may undertake to complete the Works of this Contract to facilitate the safe reopening of the entire roadway to traffic in advance of the Critical Stage specified in D20.1 (a).

D24.2.2 Reopening of the entire roadway to traffic shall occur when mainline paving is complete.

D24.2.3 Intersections, median openings and remaining work can be completed with off-peak short local lane closures on one side of the street at a time.

D24.2.4 In recognition of the fact that an early completion of the Works is of benefit to the City, the City will compensate the Contractor for said early completion on a per diem unit price basis, as hereinafter set out, provided that the City will not be liable to pay for any period of acceleration in excess of twenty (20) Working Days.

D24.2.5 It is noted that certain delays on road rehabilitation Work are normal, due to site conditions, necessary layout and dimensional changes. The Contract Administrator will attempt to resolve each situation as soon as possible. The Contractor is advised that no extension to the end date will be given for events of this sort which cause construction delay and are

resolved within 48 hours of the requirement of change becoming known to both the Contractor and the Contract Administrator.

**D24.3 Method of Measurement**

D24.3.1 Subject to clause D24.2 hereof, accelerated completion will be measured on a unit basis per diem. The number of days to be paid for will be the total number of Working Days which the entire facility is safely reopened to vehicular and pedestrian traffic in advance of the number of Working Days specified herein for Critical Stage in D20, with all specified Works completed acceptable to the Contract Administrator.

**D24.4 Basis of Payment**

D24.4.1 Subject to clause D24.2 hereof, accelerated completion will be paid for at the Unit Price per diem specified hereinafter for "Accelerated Completion" which price shall be payment in full for performing all operations undertaken and all other items incidental to the Work included in this Specification. Unit Price per diem = \$10,000.00.

D24.4.2 Payment for this item is not identified on Form B: Prices, and shall not be included thereon. If accelerated completion does occur as specified herein, then payment will be made for this item as an addition to the contract.

**D25. SCHEDULED MAINTENANCE**

D25.1 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 warranty period) as specified in CW 3250;
- (b) Sodding (maintenance period) as specified in CW 3510;
- (c) Landscaping as specified within this specification.

D25.2 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**

**D26. JOB MEETINGS**

D26.1 Regular weekly job meetings will be held at the field office[at the Site or specify location]. These meetings shall be attended by a minimum of one representative of the Contract Administrator, the City[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[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.

D26.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

**D27. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)**

D27.1 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).

## **WARRANTY**

### **D28. WARRANTY**

- D28.1 The warranty period for this project shall be broken up as follows:
- (a) Warranty for Work described in D2.1 (a) (i), (iv) and D2.1 (c) described herein these specifications and shown on the Contract drawings, except for the Work described in D28.1 (b) and (c) below;
  - (b) Warranty for Work described in D2.1 (a) (ii), (iii), and (v) described herein these specifications and shown on the Contract drawings;
  - (c) Warranty for the Work described in D2.1 (b) and associated works.
- D28.2 Notwithstanding C13.2, the warranty period for the Work described in D28.1 (a) above shall begin on the date of the acceptance of the Work completed to the Critical Stage described in D20 and shall expire two (2) years thereafter unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.
- D28.3 Notwithstanding C13.2, the warranty period for the Work described in D28.1 (b) above shall begin on the date of Total Performance of the Work completed to the completion of this project herein described, except for the Work listed in D28.1 (a) and (c) and shall expire two (2) years thereafter unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.
- D28.4 Notwithstanding C13.2, the warranty period for the Work described in D28.2 (c) above shall begin on the date of Total Performance and shall expire two (2) years after the Grand Opening date of the Southwest Rapid Transit Corridor Stage 1 unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.
- (a) The Grand Opening date is expected to take place in the fall of 2011. Until then the Work outlined to be under warranty in D28.1 (b) will not be in use, or will see only limited use, which may include minor construction traffic. Consideration will be given to any defects caused by construction activity during the warranty period.

**FORM H1: PERFORMANCE BOND**  
(See D9)

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. 97- 2009

Southwest Rapid Transit Corridor – Stage 1: Transitway Construction, Donald/Harkness Reconstruction & 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 D9)**

\_\_\_\_\_  
(Date)

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

RE: PERFORMANCE SECURITY – BID OPPORTUNITY NO. 97- 2009

Southwest Rapid Transit Corridor – Stage 1: Transitway Construction, Donald/Harkness  
Reconstruction & 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 D11)

Southwest Rapid Transit Corridor – Stage 1: Transitway Construction, Donald/Harkness Reconstruction & Associated Works

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
<b><i>Supply of Materials:</i></b>		
Concrete		
Asphalt		
Base Course and Sub-Base		
Sod		
Landscaping/Plant Material		
Fencing		
Underground Works		
Other		
<b><i>Installation/Placement:</i></b>		
Concrete		
Asphalt		
Base Course and Sub-Base		
Sod		
Landscaping/Plant Material		
Fencing		
Underground Works		
Other		

**FORM K: EQUIPMENT**  
(See D12)

Southwest Rapid Transit Corridor – Stage 1: Transitway Construction, Donald/Harkness Reconstruction & Associated Works

<p><b>1. Category/type:</b></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><b>2. Category/type:</b></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><b>3. Category/type:</b></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 D12)

Southwest Rapid Transit Corridor – Stage 1: Transitway Construction, Donald/Harkness Reconstruction & Associated Works

<p><b>4. Category/type:</b></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><b>5. Category/type:</b></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><b>6. Category/type:</b></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>

## 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-3299-01	Cover Sheet	A1
P-3299-02	Drawing List	A1
P-3299-03	Legend	A1
P-3299-04	General Arrangement	A1
P-3299-05	Removals – Corydon Ave & McMillan Ave.	A1
P-3299-06	Removals – Donald Street – Scott Street – Gertrude Ave.	A1
P-3299-07	Removals – Lagopoulos Way	A1
P-3299-08	Removals – Stradbrook Ave.	A1
P-3299-09	Removals – Harkness Ave.	A1
P-3299-10	Removals – Queen Elizabeth Way	A1
P-3299-11	Traffic Staging – Donald St. – All Stages	A1
P-3299-12	Traffic Staging – Donald St. – Stage 1	A1
P-3299-13	Traffic Staging – Donald St. – Stage 2	A1
P-3299-14	Traffic Staging – Donald St. – Stage 3	A1
P-3299-15	Traffic Staging – Stradbrook–Harkness – All Stages	A1
P-3299-16	Traffic Staging – Stradbrook–Harkness – Stage 1	A1
P-3299-17	Traffic Staging – Stradbrook–Harkness – Stage 2	A1

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
P-3299-18	Traffic Staging – Stradbrook–Harkness – Stage 3	A1
P-3299-19	Horiz. Geometry – Transitway STA. 12+320 to 13+300 & Donald St	A1
P-3299-20	Horiz. Geometry – Transitway STA. 13+000 to 13+357 & Harkness Ave	A1
P-3299-21	Paving & Grading – Donald St. – STA. 12+250 to 12+400	A1
P-3299-22	Paving & Grading – Donald St. – STA. 12+400 to 12+540	A1
P-3299-23	Paving & Grading – McMillan Ave. – STA. 12+405 to 12+540	A1
P-3299-24	Paving & Grading – Donald St. – STA. 12+540 to 12+690	A1
P-3299-25	Paving & Grading – Donald St. – STA. 12+690 to 12+800	A1
P-3299-26	Paving & Grading – Scott St.	A1
P-3299-27	Paving & Grading – Gertrude Ave.	A1
P-3299-28	Paving & Grading – Stradbrook Ave. – STA. 13+000 to 13+135	A1
P-3299-29	Paving & Grading – Stradbrook Ave. – STA. 13+135 to 13+260	A1
P-3299-30	Paving & Grading – Harkness Ave. – STA. 13+159 to 13+248	A1
P-3299-31	Paving & Grading – Lagopoulos Way – STA. 0+100 to STA. 0+252.62	A1
P-3299-32	Paving & Grading – Transitway – STA. 12+310 to 12+420	A1
P-3299-33	Paving & Grading – Transitway – STA. 12+420 to 12+545	A1
P-3299-34	Paving & Grading – Transitway – STA. 12+545 to 12+705	A1
P-3299-35	Paving & Grading – Transitway – STA. 12+705 to 12+870	A1
P-3299-36	Paving & Grading – Transitway – STA. 12+870 to 13+025	A1
P-3299-37	Paving & Grading – Transitway – STA. 13+025 to 13+185	A1
P-3299-38	Paving & Grading – Transitway – STA. 13+185to 13+345	A1
P-3299-39	Paving & Grading – Transitway – STA. 13+345 to 13+445	A1
P-3299-40	Cross Sections – STA. 12+390 to 12+605	A1
P-3299-41	Cross Sections – STA. 12+900 to 13+060	A1
P-3299-42	Cross Sections – STA. 13+110 to 13+160	A1
P-3299-43	Cross Sections – STA. 13+250 to 13+470	A1
P-3299-44	Concrete Barrier & Curb Details	A1

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
P-3299-45	Concrete Barrier & Curb Transition Details	A1
P-3299-46	Catch Basin Details	A1
P-3299-47	Misc. Details	A1
P-3299-48	Retaining Walls	A1
P-3299-49	Sidewalk Details	A1
P-3299-50	LDS – Donald St. & Corydon Ave.	A1
P-3299-51	LDS – Donald St. & Scott St.	A1
P-3299-52	LDS – Donald St. & Wardlaw Ave.	A1
P-3299-53	LDS – Stradbrook to Queen Elizabeth Way – STA. 1+000 to 1+160	A1
P-3299-54	LDS – Stradbrook to Queen Elizabeth Way – STA. 1+160 to 1+310	A1
P-3299-55	Streetscape and Landscape Works – Corydon Avenue	A1
P-3299-56	Streetscape and Landscape Works – Donald Street (1 of 3)	A1
P-3299-57	Streetscape and Landscape Works – Donald Street (2 of 3)	A1
P-3299-58	Streetscape and Landscape Works – Donald Street (3 of 3) and Lagopoulos Way	A1
P-3299-59	Streetscape and Landscape Works – Stradbrook Avenue (1 of 3)	A1
P-3299-60	Streetscape and Landscape Works – Stradbrook Avenue (2 of 3)	A1
P-3299-61	Streetscape and Landscape Works – Stradbrook Avenue (3 of 3)	A1
P-3299-62	Landscape Details (1 of 3)	A1
P-3299-63	Landscape Details (2 of 3)	A1
P-3299-64	Landscape Details (3 of 3)	A1

## **E2. GEOTECHNICAL REPORT**

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

## **E3. OFFICE FACILITIES**

E3.1 The Contractor shall supply office facilities meeting the following requirements:

- (a) The field office shall be for the exclusive use of the Contract Administrator.
- (b) The building shall be conveniently located near the Site of the Work.

- (c) The building shall have a minimum floor area of 25 square metres, a height of 2.4m with two windows for cross 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 equipped with internet hook up.
- (g) The building shall be furnished with two desks, one drafting table, table 3m X 1.2m, one stool, one four drawer legal size filing cabinet, and a minimum of 8 chairs.
- (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 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.

#### **E4. PROTECTION OF EXISTING TREES**

E4.1 The Contractor shall take the following precautionary steps to prevent damage from construction activities.

E4.2 All trees will have a protective zone at the dripline of the crown, which will remain free of digging, trenching, grade changes, stock piling of materials and soil compaction, throughout the duration of the Contract. Protective snow fencing around these areas is required.

E4.3 Trees within and immediately adjacent to proposed construction areas and those identified to be at risk by the Contract Administrator, will require 25 x 100 x 2400mm wood planks strapped to the tree trunk to completely protect the tree trunk from impact damage. (Smaller trees will be similarly protected using proportionally sized wood planks.)

E4.4 Excavation shall be performed in a manner that minimizes damage to the existing root systems. Where possible, excavation shall be carried out such that the edge of the excavation shall be a minimum of 3m from the closest edge of the trunk. Where roots must be cut to facilitate excavation, they shall be pruned neatly at the face of excavation. They must be properly trimmed with sharp tools to prevent crushing or being pulled up by construction equipment. No paint is required. All exposed roots must be mulched until the excavated area is filled with clean earth to avoid exposure to sunlight and desiccation.

E4.5 Operation of equipment within the dripline of the trees shall be kept to the minimum required to perform the Work required. Equipment shall not be parked, repaired, refuelled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposition on areas where trees are located.

E4.6 Work on-site shall be carried out in such a manner so as to minimize damage to existing tree branches. Where damage to branches does occur, they shall be neatly pruned.

E4.7 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the City Forester or his designate.

E4.8 No separate measurement or payment will be made for the protection of trees.

E4.9 Auguring under existing trees will be the only acceptable method of underground installations. Any other excavations must be approved by the Forestry Branch.

## **E5. TRAFFIC CONTROL**

E5.1 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 CW 3410.
- (b) In accordance with the Manual of Temporary Traffic Control, the Contractor ("Agency" in the manual) shall make arrangements with the Traffic Services Section 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 Section of the City of Winnipeg in connection with the Works undertaken by the Contractor.

## **E6. TRAFFIC MANAGEMENT**

E6.1 Further to clause 3.7 of CW 1130:

- E6.1.1 Maintain a minimum of two lanes of traffic on Donald Street Northbound and Southbound, Corydon Avenue and McMillan Avenue during their respective construction times;
- E6.1.2 Maintain access to Donald Street from the thru lane of Corydon west of Osborne Avenue at all times.
- E6.1.3 Where left turn lanes exist, an additional lane to accommodate the left turn storage lane shall be maintained at all times.
- E6.1.4 Intersecting street and private approach access shall be maintained at all times.
- E6.1.5 Should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, he shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.
- E6.1.6 Access to the underground parking and parking lot for the apartments off of Lagopoulos Way shall be maintained at all times.
- E6.1.7 Ambulance/emergency vehicle access must be maintained at all times.
- E6.1.8 One lane of pedestrian access must be maintained at all times.

## **E7. REFUSE AND RECYCLING COLLECTION**

E7.1 While access to refuse and/or recycling collection vehicles is restricted, on collection day(s) the Contractor shall move all of the affected property owners refuse and/or recycling materials to a nearby common area, prior to an established time, in accordance with E7.2 to permit the normal collection vehicles to collect the materials. Immediately following recycling collection the Contractor shall return recycling receptacles to the addresses marked on the receptacles.



E7.2 Collection Schedule:

**Donald Street, Stradbrook Avenue, Harkness Avenue, Scott Street, Gertrude Avenue and Lagopoulos Way**

<i>Residential Units Garbage and Recycling Collection Day(s):</i>	<b>5</b>
<i>Collection Time:</i>	<b>7:00 am</b>
<i>Apartment/Multi-family Units Garbage Collection Day(s):</i>	<b>Tuesday and Friday</b>
<i>Collection Time:</i>	<b>7:00 am</b>
<i>Apartment/Multi-family Units Recycling Collection Day(s):</i>	<b>Thursday</b>
<i>Collection Time:</i>	<b>7:00 am</b>

E7.3 No measurement or payment will be made for the Work associated with this specification.

**E8. WATER USED BY CONTRACTOR**

E8.1 Further to clause 3.7 of CW 1120, the Contractor shall pay for all costs associated with obtaining water in accordance with the Waterworks By-law. Sewer charges will not be assessed for water obtained from a hydrant.

**E9. SURFACE RESTORATIONS**

E9.1 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.

**E10. CONCRETE TRAFFIC BARRIER (TYPE 1 & TYPE 2)**

E10.1 Description

E10.1.1 General

- (a) This specification shall cover the furnishing and placing of Type I (525mm, Slip Formed) and Type II (450mm, Cast-in-place) Portland Cement Concrete Barrier on the accepted and prepared sub-base and base course or on existing pavement.
- (b) This specification supplements City of Winnipeg Standard Construction Specification CW 3310 – Portland Cement Concrete Works.

E10.2 Materials

E10.2.1 As per CW 3310.

E10.3 Construction Methods

E10.3.1 As per CW 3310.

E10.4 Measurement and Payment

E10.4.1 Concrete Barrier – (Type 1)

- (a) Concrete Barrier installation will be measured on a length basis and paid for at the Contract Unit Price per metre for “Concrete Barrier – (Type 1)”. The length to be paid for will be the total number of metres of slip formed concrete barrier installed in accordance with this specification, accepted and measured by the Contract Administrator.

E10.4.2 Concrete Barrier – (Type 2)

- (a) Concrete Barrier installation will be measured on a length basis and paid for at the Contract Unit Price per metre for “Concrete Barrier – (Type 2)”. The length to be paid for will be the total number of metres of cast in place concrete barrier installed in accordance with this specification, accepted and measured by the Contract Administrator.

**E11. SIGN SUPPORT CLAMPS**

E11.1 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 and parking meter poles.

E11.2 All costs in connection with the installation of sign support clamps are incidental.

**E12. INSTALLATION OF STEEL BOLLARDS**

E12.1 Description

E12.1.1 General

- (a) This specification shall cover the supply and installation of Steel Bollards as described on the Drawings. The Work to be done by the Contractor under this Specification shall include the furnishings of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work hereinafter specified.

E12.2 Materials

E12.2.1 Steel Bollards

- (a) Bollard shall be constructed and finished as described on the Drawings.

E12.2.2 Concrete Fill

- (a) All concrete material for fill shall conform to supply and mix requirements specified in CW 2160.

E12.3 Construction Methods

E12.3.1 Steel Bollards

- (a) All Steel Bollards shall be installed at locations indicated on Drawings and each element shall appear, upon installation, to be aligned properly with adjacent bollards as described on the Drawings and approved by the Contract Administrator.
- (b) All Steel Bollards shall be plumb and level and shall sit at the required height and depth, as described on the Drawings.

E12.3.2 Concrete Fill

- (a) Concrete Fill shall be installed as specified in CW 2160 to depth indicated on the Drawings.

E12.4 Measurement and Payment

E12.4.1 The supply and installation of Steel Bollards will be measured on a Unit Basis and paid for at the Contract Unit Price per unit for “Installation of Steel Bollard”. The number to be paid for shall be the total number of each steel bollard supplied and installed in accordance with this specification, and accepted by the Contract Administrator.

### **E13. REMOVAL OF DOOR ACTIVATION UNIT**

#### E13.1 Description

##### E13.1.1 General

- (a) This specification shall cover the removal of the door activation unit and disconnect the circuit to the underground parking off of Lagopoulos Way.

#### E13.2 Construction Methods

E13.2.1 Remove and dispose of door activation unit and disconnect circuit as per standard electrical requirements.

E13.2.2 It is anticipated that the apartment building will have a new remote access system in place prior to the removal of the existing door activation unit.

#### E13.3 Measurement and Payment

E13.3.1 The removal of the door activation unit and disconnecting of the circuit shall be measured on a Lump Sum Basis and paid for at the Contract Unit Price for "Removal of Door Activation Unit". The amount to be paid for shall be for the removal of the door activation unit and disconnection of the circuit in accordance with this specification, and accepted by the Contract Administrator.

### **E14. CONSTRUCTION OF PARTIAL CONCRETE SAFETY MEDIAN**

#### E14.1 Description

##### E14.1.1 General

- (a) This specification shall cover the construction of Construction of Partial Concrete Safety Median, to be constructed during Stage 2A of the Donald Street Reconstruction.
- (b) Referenced Standard Construction Specifications
  - (i) CW 3235 – Renewal of Existing Miscellaneous Concrete Slabs
  - (ii) CW 3310 – Portland Cement Concrete Pavement Works

#### E14.2 Materials

E14.2.1 As per CW 3310.

#### E14.3 Construction Methods

##### E14.3.1 General

- (a) As per CW 3235 and SD-226B, except as modified in the following clauses.
- (b) The Partial Concrete Safety Median placed during Stage 2A shall tie directly into the Safety Curb placed in Stage 1A.

#### E14.4 Measurement and Payment

E14.4.1 The Construction of Partial Concrete Safety Median will be measured on an area basis and paid for at the Contract Unit Price per square meter for "Construction of Partial Concrete Safety Median". The area to be paid for will be the total number of square meters of partial concrete safety median installed in accordance with this specification, accepted and measured by the Contract Administrator.

## **E15. BASE COURSE AND SUB-BASE MATERIAL**

### E15.1 Description

#### E15.1.1 General

- (a) This specification shall supplement the specification for Base Course and Sub-Base material found in CW 3110.

### E15.2 Materials

#### E15.2.1 Base Course and Sub-Base Material

- (a) All material shall be Crushed Limestone supplied and installed in accordance with CW 3110.
- (b) Use of Recycled Concrete Pavement will not be permitted.

### E15.3 Construction Methods

#### E15.3.1 As per CW 3110.

### E15.4 Measurement and Payment

#### E15.4.1 As per CW 3110.

## **E16. RELOCATION/REMOVAL OF EXISTING CHAIN LINK FENCE**

### E16.1 Description

#### E16.1.1 General

- (a) This specification shall cover the relocation of the existing chain link fence on the East side of Donald Street to the east side of the transitway between the transitway and the CN Rail line. This fence shall be in place until the fence along the concrete barrier is in place to protect the CN Rail line.

### E16.2 Execution

#### E16.2.1 Remove all objects designated by the Contract Administrator for removal, including any concrete bases visible or not. Fill and re-grade any holes created from the removal of the concrete bases using an acceptable fill as approved by the Contract Administrator.

#### E16.2.2 Relocate all poles, chain link fencing to the approval of the Contract Administrator.

#### E16.2.3 The fence shall be erected and maintained throughout the duration of this project. The limits shall be the limits of the project including tying into the existing chain link fence immediately outside the limits of the project. The temporary fence shall be in place from the start of the project to the time that the new fence on the top of the west concrete barrier of the transitway is in place.

#### E16.2.4 Upon the completion of the installation of the fence along the concrete barrier the chain link fence east of the transitway shall be removed. Removal shall include but are not limited to poles, fencing, and concrete piles as directed by the Contract Administrator.

#### E16.2.5 All debris is to be removed from the Site and disposed of or salvaged by the Contractor.

### E16.3 Measurement and Payment

#### E16.3.1 The Relocation of the existing chain link fence will be measured on a length basis and paid for at the Contract Unit Price per lineal meter for "Relocation of Chain Link Fence". The length to be paid for will be the total number of lineal meters of chain link fence relocated in accordance with this specification, accepted and measured by the Contract Administrator.

E16.3.2 The Removal of the existing chain link fence will be measured on a length basis and paid for at the Contract Unit Price per lineal meter for "Removal of Chain Link Fence". The length to be paid for will be the total number of lineal meters of chain link fence removed in accordance with this specification, accepted and measured by the Contract Administrator.

## **E17. TEMPORARY FENCING**

E17.1 Description

E17.1.1 General

- (a) This specification shall be supplemental to CW 3550.
- (b) This specification shall cover the supply and installation of Temporary Fencing along the pedestrian sidewalk on the west side of Donald Street. This fence shall be in place during Stage 1 of the Donald Street Reconstruction.

E17.2 Materials

E17.2.1 Fencing

- (a) The temporary fence described in E17.1 a (i) shall consist of plastic snow fence or an equal approved by the Contract Administrator.
- (b) The Contractor shall discuss their temporary fencing intentions with the Contract Administrator prior to installation.

E17.3 Construction Methods

E17.3.1 Temporary Fencing

- (a) Donald Street Sidewalk Fence
  - (i) The temporary fencing to be placed at the location described in E17.1 a (i) shall be erected and maintained throughout the duration of the Donald Street Stage 1 construction. This fence shall be in place to prevent pedestrian traffic from accessing the construction Site.
  - (ii) All temporary asphalt to be placed to provide a sidewalk for pedestrians shall be placed as directed by the Contract Administrator. This shall be measured and paid for as asphalt patches as described in CW 3410.
  - (iii) The temporary fencing shall be to a minimum height of 1200 mm.

E17.4 Measurement and Payment

E17.4.1 Installation of Temporary Fencing will be measured on a length basis and paid for at the Contract Unit Price per lineal metre for the "Temporary Fencing – 1200 mm height". The length to be paid for shall be the total number of lineal metres supplied and installed in accordance with this specification and accepted by the Contract Administrator.

## **E18. CATCHBASIN AND CATCHPIT WITH SQUARE FRAME AND COVER**

E18.1 Description

E18.1.1 General

- (a) This specification shall cover the supply and installation of a standard SD-024 catchbasin or SD-023 catchpit with a square frame and cover. The square frame and cover is different from the City of Winnipeg Approved Product Barrier Curb and Gutter Inlet Frame and Cover listed in AP-008 and AP-009.

E18.2 Materials

E18.2.1 Materials for SD-024 and SD-023 as per City of Winnipeg Standards.

E18.2.2 As per City of Winnipeg Standard Specifications and the Contract Drawings.

- E18.2.3 Frame and Cover shall be a TF-107-6" as supplied by Titan Foundry of Winnipeg, Manitoba. The TF-107-6" can be found at the following link:  
<http://www.trojanindustries.com/cms/doc/Titan%20-%20Catch%20Basin%20Frames%20and%20Covers.pdf>
- E18.3 Construction Methods
- E18.3.1 Construction methods for SD-024 and SD-023 as per City of Winnipeg Standards.
- E18.3.2 Contractor to place frame and cover as per CW 2130 and Contract Drawings.
- E18.4 Measurement and Payment
- E18.4.1 Supply and Install of a Catchbasin or a Catchpit with a square Frame and Cover will be measured and paid for at the Contract Unit Price as a standard Catchbasin (SD-024) and/or a standard Catchpit (SD-023) described in CW 2130 in accordance with this specification and accepted by the Contract Administrator. No additional measurement or payment will be made for the use of a TF-107-6" as opposed to any other frame and cover that may be required.

## **E19. DITCH INLET GRATES**

- E19.1 Description
- E19.1.1 General
- (a) This specification covers the supply and installation of "beehive" manhole covers, typically used in open swales or ditches as an alternative to City of Winnipeg Approved Product grated manhole cover AP-006.
- E19.2 Materials and Equipment
- E19.2.1 As per Contract Drawings.
- E19.2.2 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.
- E19.2.3 Cover to be Shopost Iron Works MK-A1 or approved equal in accordance with B5.
- E19.3 Construction Methods
- E19.3.1 General
- (a) Contractor to securely affix "beehive" cover to manhole reducer or riser utilizing stainless steel hardware.
- (b) Any galvanized surfaces that are damaged shall be coated with a galvanizing compound approved by the Contract Administrator.
- E19.4 Measurement and Payment
- E19.4.1 "Beehive" Manhole Covers will be measured on a unit basis and paid for at the Contract Unit Price per cover as "Beehive Manhole Covers". The number to be paid for will be the total number of 'Beehive' Manhole Covers installed in accordance with this specification and accepted by the Contract Administrator.

## **E20. TREE REMOVALS**

- E20.1 Description
- E20.1.1 General
- (a) This Special Provision shall amend the City of Winnipeg Standard Construction specification CW 3010 "Clearing and Grubbing", and shall cover the removal of trees as specified on the Contract Drawings. The City of Winnipeg, Forestry Branch must be contacted prior to removing any trees.

## E20.2 Construction Methods

### E20.2.1 Tree Removals

- (a) Remove only trees marked and confirmed for removal in the field by the Contract Administrator.
- (b) Remove trees in accordance with CW 3010.
- (c) The Contractor shall arrange for any Elmwood to be disposed of by the City of Winnipeg.

### E20.3 Measurement and Payment

- E20.3.1 Removal of trees will be measured on a unit basis and paid for at the Contract Unit Price per unit item of "Tree Removal". The number to be paid for will be the total number of trees removed in accordance with this specification and accepted by the Contract Administrator.

## E21. CONSTRUCTION OF TINTED CONCRETE

### E21.1 Description

#### E21.1.1 General

- (a) This specification covers the construction of "red" tinted concrete pavement, intended to delineate Transit only lanes at various locations in this project. The tinted concrete is finished at grade and is the width of the travel lane. Care must be taken with consistency in water/cement ratio and finishing as the color can be affected load to load.
- (b) Referenced Standard Construction Specifications:
  - (i) CW 3310 – Portland Cement Concrete Pavement Works.

### E21.2 Materials and Equipment

#### E21.2.1 Concrete Materials

- (a) The contractor shall base the tinted concrete mix on a mix design that has been approved for the 2009 construction season by the City of Winnipeg Research and Standards Department.
- (b) The base mix design shall conform to Section 6 of CW 3310 with the following alterations:
  - (i) Type 1 mix as per Section 6.2 of CW 3310; and
  - (ii) Slump for hand placement shall be 80 mm +/- 20 mm prior to adding superplasticizers (if needed) to facilitate finishing without adding water to the surface.
- (c) Alterations to the base mix design will be considered by the Contract Administrator if necessary to account for the concrete tint material and finishing operations.

#### E21.3 Concrete Tint

- (a) "Red" coloured metal oxide pigment used to permanently color ready-mix concrete.
- (b) Approved Product List
  - (i) Lafarge Red (Premium) supplied through L.M. Scofield Company;
  - (ii) SG160-2 Sunrise Red supplied through L.M. Scofield Company;
  - (iii) RG-2827R Baja Red (1 bag) supplied through Interstar;
  - (iv) Baja Red supplied through Davis Colors.
- (c) Contractor to cast one coloured concrete sample minimum 200 mm X 200 mm in area using base concrete mix for approval by Contract Administrator.

- (d) Tinted concrete shall not be placed until sample color has been accepted by the Contract Administrator. The contractor shall demonstrate that the sample will achieve the approximate color advertised by the pigment supplier using local concrete mix materials.

#### E21.4 Superplasticizers

- (a) Superplasticizers shall conform to the requirements of CSA CAN3-A266.5 and CAN3-A266.6, but must be compatible with the air-entraining agent. The agent shall be free of chlorides and shall not affect the air-entraining agent's ability to produce a satisfactory air void system.

#### E21.5 Liquid Membrane-Forming Curing Compound

- (a) Curing Compound shall be clear (no pigment), and water based conforming to the requirements of ASTM C309.

#### E21.6 Other Materials

- (a) All other materials as per CW 3310

#### E21.7 Floating and Finishing Equipment

- (a) Use only wood or magnesium floats. Bull floats used for initial finishing shall be constructed of wood only.

#### E21.8 Other Equipment

- (a) All other equipment as per CW 3310.

#### E21.9 CONSTRUCTION METHODS

##### E21.9.1 General

- (a) Concrete formwork, steel reinforcement, placement, curing, and joint sealing as per CW 3310 except as modified in the following clauses.
- (b) As shown on the drawings, construct formed 50 mm headers to define the lane edge and transverse termination of at-grade coloured concrete where the adjacent pavement is to be asphalt overlaid.
- (c) Clean finishing tools and equipment and let dry prior to finishing. Wet tools will fade the colouring. Wetting of tools during finishing operation is not permitted.
- (d) Place concrete at a consistent slump. No water shall be added on Site. Superplasticizer may be added at a rate suggested by the concrete supplier if additional workability is needed.
- (e) No localized water spray or fogging is permitted to assist in finishing as this will locally fade the colour.
- (f) Clear curing compound only shall be used. The use of water curing or plastic film is not allowed. Plastic film for insulation in cold weather must be approved by the Contract Administrator.

#### E21.10 Measurement and Payment

##### E21.10.1 Construction of Tinted Concrete

- (a) Construction of Tinted Concrete will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Construction of 230 mm Concrete Pavement (Plain-Dowelled, Tinted)" listed below. The area to be paid for will be the total number of square meters of tinted concrete supplied and placed at grade, or below an asphalt overlay in accordance with this specification and accepted by the Contract Administrator.



## **E22. SHOP DRAWINGS**

### **E22.1 Description**

**E22.1.1** This Specification provides instructions for the preparation and submission of shop drawings.

- (a) The term 'shop drawings' means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, including Site erection drawings which are to be provided by the Contractor to illustrate details of a portion of the Work.
- (b) The Contractor shall submit specified shop drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be show on all submissions for Contract Administrator review.

### **E22.1.2 Shop Drawings**

- (a) Original drawings are to be prepared by Contractor, SubContractor, supplier, distributor, or manufacturer, which illustrate appropriate portion of Work; showing fabrication, layout, setting or erection details as specified in appropriate sections.
- (b) Shop drawings for the following structural components shall bear the seal of a registered Engineer of Manitoba.
  - (i) Metal Fabrications
  - (ii) Shoring

### **E22.1.3 Contractor's Responsibilities**

- (a) Review shop drawings, product data and samples prior to submission and stamp and sign drawings indicating conformance to the Contract requirements.
- (b) Verify:
  - (i) Field Measurements
  - (ii) Field Construction Criteria
  - (iii) Catalogue numbers and similar data
- (c) Coordinate each submission with requirements of Work and Contract Documents. Individual shop drawings will not be reviewed until all related drawings are available.
- (d) Notify Contract Administrator, in writing at time of submission, of deviations from requirements of Contract Documents.
- (e) Responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator's review of submission, unless Contract Administrator gives written acceptance of specified deviations.
- (f) Responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.
- (g) The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the required number of corrected copies of Shop Drawings. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on previous submission.
- (h) After Contract Administrator's review and return of copies, distribute copies to subtrades as appropriate.
- (i) Maintain one (1) complete set of reviewed shop drawings, filed by Specification Section Number, at the Site of the Work for use and reference of the Contract Administrator and SubContractors.

### **E22.1.4 Submission Requirements**

- (a) Schedule submissions at least fourteen (14) Calendar Days before dates reviewed submissions will be needed, and allow for a fourteen (14) Calendar Day period for

review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.

- (b) Submit two (2) paper prints of shop drawings. The Contractor is advised that the Contract Administrator will retain one (1) copy of all submittals and return one (1) copy to the Contractor.
- (c) Accompany submissions with transmittal letter, containing:
  - (i) Date
  - (ii) Project title and Bid Opportunity number
  - (iii) Contractor's name and address
  - (iv) Number of each shop drawing, product data and sample submitted
  - (v) Specification Section, Title, Number and Clause
  - (vi) Drawing Number and Detail/Section Number
  - (vii) Other pertinent data
- (d) Submissions shall include:
  - (i) Date and revision dates.
  - (ii) Project title and Bid Opportunity number.
  - (iii) Name of:
    - 1. Contractor
    - 2. SubContractor
    - 3. Supplier
    - 4. Manufacturer
    - 5. Separate detailer when pertinent
  - (iv) Identification of product of material.
  - (v) Relation to adjacent structure or materials.
  - (vi) Field dimensions, clearly identified as such.
  - (vii) Specification section name, number and clause number or drawing number and detail/section number.
  - (viii) Applicable standards, such as CSA or CGSB numbers.
  - (ix) Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.
- (e) Other Considerations
  - (i) Fabrication, erection, installation or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent shop drawings and resubmit.
  - (ii) Material and equipment delivered to the Site of the Works will not be paid for at least until pertinent shop drawings have been submitted and reviewed.
  - (iii) Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.
  - (iv) No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of shop drawings.

## **E23. STRUCTURAL CONCRETE**

### **E23.1 Description**

E23.1.1 This Specification shall cover the preparation of Portland Cement Structural Concrete for, and all concreting operations related to, the construction of Portland Cement Structural Concrete Works as specified herein.

E23.1.2 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.

## E23.2 Materials

### E23.2.1 General

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

### E23.2.2 Handling and Storage of Materials

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

### E23.2.3 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.

### E23.2.4 Bonding Agents

- (a) The Contractor shall identify the product(s) and submit product information to the Contract Administrator for review and approval.

### E23.2.5 Curing Compound

- (a) If permitted for use, curing compound shall be liquid membrane-forming and conform to the requirements of ASTM Standard C309 and the proposed standard ASTM P198. Rate of application shall be 1.5 times the rate required to meet the requirements of ASTM P198 for the texture of concrete to which the curing compound is being applied.
- (b) Curing compounds shall be resin-based and white-pigmented.

### E23.2.6 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.

### E23.2.7 Non-Shrink Cementitious Grout

- (a) Where non-shrink cementitious grout is used, it shall be Sternson M-bed Standard, Specialty Construction Products CPD Non-Shrink Grout, Sika 212 Non-Shrink Grout, Meadows CG-86, or approved equal in accordance with B5 as accepted by the Contract Administrator. The minimum compressive strength of the grout at 28 days shall be 40 MPa.

### E23.2.8 Formwork

- (a) Formwork materials shall conform to CSA Standard CAN/CSA-A23.1, and American Concrete Publication SP:4, "Formwork for Concrete".
- (b) No "stay-in-place" formwork or falsework is permitted.

- (c) Form sheeting plywood to be covered with form liner or to be directly in contact with soil shall be exterior Douglas Fir, concrete form grade, conforming to CSA Standard O121-M1978, a minimum of 20 mm thick.
- (d) Where form liner is not being used, form sheeting shall be Douglas Fir, overlay form liner type conforming to CSA Standard O121-M1978. Approved manufacturers are "Evans" and "C-Z".
- (e) Boards used for formwork shall be fully seasoned and free from defects such as knots, warps, cracks, etc., which may mark the concrete surface.
- (f) No formwork accessories will be allowed to be left in place within 50 mm of the surface following form removal. Items to be left in place, must be made from a non-rusting material or galvanized steel; and they shall not stain, blemish, or spall the concrete surface for the life of the concrete.
- (g) Forms for exposed concrete surfaces that do not require a form liner may be either new plywood or steel as authorized by the Contract Administrator.
- (h) Studding shall be spruce or pine and shall have such dimensions and spacing that they shall withstand distortion from all the forces to which the forms will be subjected. Minimum dimensions shall be 50 mm x 150 mm.
- (i) Walers shall be spruce or pine, with minimum dimensions of 100 mm x 150 mm.
- (j) All forms are incidental to these Works and must be removed by the Contractor once adequate strength and curing of the concrete has been achieved.

E23.2.9 Permeable Formliner

- (a) Formliner shall be Hyroform, Texel Drainform or approved equal in accordance with B5.

E23.2.10 Concrete

- (a) General
  - (i) Concrete repair material shall be compatible with the concrete substrate.
- (b) The Contractor shall be responsible for the design and performance of all concrete mixes supplied under this specification. Either ready mix concrete or proprietary repair mortars, where applicable, may be used having the following minimum properties in accordance with CSA A23.1-04:
  - (i) Class of Exposure: C-1
  - (ii) Compressive Strength @ 28 days = 35 MPa
  - (iii) Water / Cementing Materials Ratio = 0.4
  - (iv) Air Content: Category 1 per Table 4 of CSA A23.1-04
- (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 abutment and pier cap repairs.
- (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.

#### E23.2.11 Aggregates

- (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
  - (i) The maximum nominal size of coarse aggregate shall be sized to suit the Contractor's mix design. Gradation shall be in accordance with CSA A23.1, Table 11, Group 1. The coarse aggregate shall satisfy the Standard Requirements specified in CSA A23.1, Table 12, "Concrete Exposed to Freezing and Thawing".
  - (ii) Coarse aggregate shall consist of crushed stone or gravel or a combination thereof, having hard, strong, durable particles free from elongation, dust, shale, earth, vegetable matter or other injurious substances. Coarse aggregate shall be clean and free from alkali, organic or other deleterious matter; and shall have an absorption not exceeding 2.25%.
  - (iii) The aggregate retained on the 5 mm sieve shall consist of clean, hard, tough, durable, angular particles with a rough surface texture, and shall be free from organic material, adherent coatings of clay, clay balls, and excess of thin particles or any other extraneous material.
  - (iv) Coarse aggregate when tested for abrasion in accordance with ASTM C131 shall not have a loss greater than 30%.
  - (v) Tests of the coarse aggregate shall not exceed the limits for standard for requirements prescribed in CSA A23.1, Table 12, for concrete exposed to freezing and thawing.
- (c) Fine Aggregate
  - (i) Fine aggregate shall meet the grading requirements of CSA A23.1, Table 10, Gradation FA1.
  - (ii) Fine aggregate shall consist of sand, stone, screenings, other inert materials with similar characteristics or a combination thereof, having clean, hard, strong, durable, uncoated grains free from injurious amounts of dust, lumps, shale, alkali, organic matter, loam, or other deleterious substances.
  - (iii) Tests of the fine aggregate shall not exceed the limits for standard requirements prescribed in CSA A23.1, Table 12.

#### E23.2.12 Cementing Materials

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

#### E23.2.13 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.

#### E23.2.14 Water

- (a) Water to be used for mixing and curing concrete or grout and saturating substrate shall conform to the requirements of CSA A23.1 and shall be free of oil, alkali, acidic, organic materials or deleterious substances.

#### E23.2.15 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 120 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.

#### E23.2.16 Flexible Joint Sealant

- (a) Flexible joint sealant for all horizontal, vertical, and sloping joints shall be guaranteed non-staining grey polyurethane, approved by the Contract Administrator and applied in strict accordance with the manufacturer's instructions, including appropriate primers. Approved products are Vulkem 116 by Mameco; Sonolastic NP1 by Sonneborne; RC-1 by Permapol; and Sikaflex by Sika; or approved equal in accordance with B5.

#### E23.2.17 Fibre Joint Filler

- (a) Fibre joint filler shall be rot-proof and of the preformed, non-extruding, resilient-type, made with a bituminous fibre such as "Flexcell," and shall conform to the requirements of ASTM Standard D1751, or approved equal in accordance with B5.

#### E23.2.18 Expanding Joint Filler

- (a) Expanding joint filler shall be compressed to 20 percent of its expanded width and be a polyurethane foam, impregnated throughout with a latex modified asphalt. An approved product is "Emseal," by Emseal Corporation. Expanding joint filler to be installed as per Manufacturer's instructions.

#### E23.2.19 Miscellaneous Materials

- (a) The Contractor shall supply all materials, as approved by the Contract Administrator, to ensure the satisfactory completion of the concrete repair works.

### E23.3 Equipment

#### E23.3.1 General

- (a) All equipment shall be of a type accepted by the Contract Administrator. The equipment shall be in good working order, kept free from hardened concrete or foreign materials, and shall be cleaned at frequent intervals.

- (b) The Contractor shall have sufficient standby equipment available on short notice at all times.

#### E23.3.2 Vibrators

- (a) The Contractor shall have sufficient numbers of internal concrete vibrators and experienced operators on-site to properly consolidate all concrete in accordance with ACI 309. The type and size of vibrators shall be appropriate for the particular application, the size of the pour, and the amount of reinforcing and shall conform to standard construction procedures.
- (b) The Contractor shall use rubber coated vibrators for consolidating concrete.
- (c) The Contractor shall have standby vibrators available at all times during the pour.

#### E23.3.3 Miscellaneous Equipment

- (a) The Contractor shall provide all miscellaneous equipment as required to properly and thoroughly execute and complete all operations related to the supply and placement of structural concrete.

#### E23.4 Construction Methods

##### E23.4.1 General

- (a) The Works involving Structural Concrete include the construction of:
  - (i) Organza Retaining Wall including removal of Existing Concrete Wall;
  - (ii) Gord's Retaining Wall and Structural Slab.

##### E23.4.2 Removal of Existing Concrete Wall

- (a) The Contractor shall remove and dispose of the existing concrete wall and fence to the limits as shown on the Drawings. The Contractor shall provide a rough finish on the sawcut face of the existing concrete wall to provide a good bond surface. No additional payment will be made for this Work as it is considered incidental to the Contract Unit Price for "Supply and Place Structural Concrete".

##### E23.4.3 Concrete Working Base

- (a) Upon completion of all excavation, the bottom of the excavation shall be inspected by the Contract Administrator. Concrete working base shall be installed where shown on the Drawings. Under no circumstances shall the Contractor place the concrete working base without the prior approval from the Contract Administrator. The supply and installation of working base will be considered incidental to the unit cost for "Supply and Place Structural Concrete", and no separate payment will be made.

##### E23.4.4 Form Work and Shoring

- (a) Formwork shall be designed, erected, braced, and maintained to safely support all vertical and lateral loads until such loads can be supported by the concrete.
- (b) As a maximum, the following spacings shall apply, for studding and whaling:
  - (i) 20 mm plywood: studding - 450 mm centre to centre
  - (ii) walers - 760 mm centre to centre
- (c) Forms shall be clean before use. Plywood and other wood surfaces shall be sealed against adsorption of moisture from the concrete by a field-applied form coating or a factory-applied liner.
- (d) Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be a commercially manufactured type. The portion remaining within the concrete shall leave no metal within 50 mm of the surface when the concrete is exposed to view. Spreader cones on ties shall not exceed 25 mm in diameter.
- (e) All exposed edges shall be chamfered 25 mm unless otherwise noted on the Drawings.

- (f) Slots, recesses, chases, sleeves, inserts, bolts, hangers, and other items shall be formed or set in coordination and cooperation with the trade concerned. No openings shall be made in structural members that are not shown on the structural drawings without the prior approval of the Contract Administrator.
- (g) Shores shall be provided with positive means of adjustment (jacks or wedges). All settlement shall be taken up before or during concreting as required.
- (h) Mud sills of suitable size shall be provided beneath shores, bedded in sand or stone, where they would otherwise bear on soil. The soil below shores must be adequately prepared to avoid settlements during or after concreting. Shores must not be placed on frozen ground.
- (i) Brace shores horizontally in two directions and diagonally in the same two vertical planes so that they can safely withstand all dead and moving loads to which they will be subjected.
- (j) The loads and lateral pressures are outlined in Part 3, Section 102 of "Recommended Practice for Concrete Formwork," (ACI 347). Additional design considerations concerning factors of safety for formwork elements and allowable settlements outlined in Section 103 of the above reference shall apply.
- (k) Formwork shall have sufficient strengths and rigidity so that the resultant finished concrete conforms to the shapes, lines, and dimensions of the members shown on the Drawings.
- (l) Formwork shall be constructed to permit easy dismantling and stripping and such that removal will not damage the concrete. Provision shall be made in the formwork for shores to remain undisturbed during stripping where required.
- (m) Formwork shall be cambered, where necessary to maintain the specified tolerances, to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads.
- (n) Forms shall be sufficiently tight to prevent leakage of grout or cement paste.
- (o) Form panels shall be constructed so that the contact edges are kept flush and aligned.
- (p) All form lumber, studding, etc. becomes the property of the Contractor when the Work is finished, and it shall be removed from the concrete and the Site by the Contractor after the concrete is set, free of extra charge, and the entire Site left in a neat and clean condition.
- (q) It shall be permissible to use the forms over again where possible, provided they are thoroughly cleaned and in good condition after being removed from the former portions of the Work. The Contract Administrator shall be the sole judge of their condition and his decision shall be final regarding the use of them again.

#### E23.4.5 Formliner

- (a) Formliners shall be used on all exposed formed surfaces, except soffit surfaces.

#### E23.4.6 General Curing

- (a) The use of curing compound will not be allowed on concrete areas that are to receive additional concrete or waterproofing.
- (b) Unformed concrete surfaces shall be covered and kept moist by means of wet polyester blankets for seven (7) consecutive days immediately following finishing operations or otherwise approved by the Contract Administrator and shall be maintained at above 10°C for at least seven (7) consecutive days thereafter. Construction joints shall only be covered and kept saturated by means of wet polyester curing blankets for the curing period.
- (c) If permitted for use, curing compounds shall be applied at the rate of not less than 4 m<sup>2</sup>/L. The compound must be applied uniformly and by roller. Spraying of the compound will not be permitted.



- (d) 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.
- (e) Changes in temperature of the concrete shall be uniform and gradual and shall not exceed 3° in anyone hour period or 20° in any twenty-four hour period.
- (f) Formed surfaces shall receive, immediately after stripping and patching, the same application of curing compound as finished surfaces.
- (g) After completing the finishing of unformed surfaces, where curing compound is not permitted, the surfaces shall be promptly covered with a minimum of a single layer of clean, damp polyester curing blanket and 6 mil polyethylene.
- (h) Care shall be exercised to ensure that the polyester curing blanket is well drained and that it is placed as soon as the surface will support it without deformation. The Contractor shall ensure that water from the polyester curing blankets does not run into areas where concrete placement and finishing operations are underway. If this occurs, concrete placement shall stop until the problem is corrected satisfactory to the Contract Administrator.

#### E23.4.7 Placing Concrete

- (a) The Contract Administrator must be notified at least 24 hours prior to concrete placement so that an adequate inspection may be made of formwork, shoring, reinforcement, and related works. Placement without required prior notification will not be allowed.
- (b) Equipment for mixing or conveying concrete shall be thoroughly flushed with clean water before and after each pour. Water used for this purpose shall be discharged outside the forms.
- (c) Concrete shall be conveyed from the mixer to the place of final deposit by methods that will prevent segregation and a marked change in consistency.
- (d) Before depositing any concrete, all debris shall be removed from the space to be occupied by the concrete and any mortar splashed upon the reinforcement or forms shall be removed.
- (e) Placing of concrete, when started, shall be continuous. No concrete shall be placed against concrete that has sufficiently hardened to cause the formation of seams or "cold joints" within the section. If placing must be interrupted, construction joints shall be located where shown on the Drawings or as approved.
- (f) Concrete shall be placed as nearly as possible to its finish position. Rakes or mechanical vibrators shall not be used to transport concrete.
- (g) The maximum drop of free concrete into the forms shall not be greater than 1.5 m; otherwise, rubber tubes or pouring ports spaced not more than 1.5 m vertically and 2.5 m horizontally shall be used.
- (h) All concrete, during and immediately after deposition, shall be consolidated by mechanical vibrators so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into the corners of the forms; eliminating all air or stone pockets that may cause honeycombing, pitting or planes of weakness. Mechanical vibrators, when immersed, shall have a minimum frequency of 7,000 revolutions per minute.
- (i) Vibrators shall be inserted systematically into the concrete at intervals such that the zones of influence of the vibrator overlap (generally 300 to 900 mm). Apply the vibrator at any point until the concrete is sufficiently compacted (5 to 15 seconds) but not long enough for segregation to occur. Spare vibrators in working condition shall be kept on the job Site during all placing operations.
- (j) Concrete shall not be placed in rain or snow, unless adequate protection is provided for formwork and concrete surfaces.

#### E23.4.8 Finishing of Unformed Surfaces

- (a) Screeding of all unformed concrete surfaces shall be performed by the sawing movement of a straight edge along wood or metal strips or form edges that have been accurately set at required elevations.
- (b) Screeding shall be done on all concrete surfaces as a first step in other finishing operations. Screeding shall be done immediately after the concrete has been vibrated.
- (c) After screeding, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared. The surface shall then be consolidated with hand floats. Concrete surfaces after floating shall have a uniform, smooth, granular texture.
- (d) The surface of the structural sidewalk shall be given a transverse broom finish.

#### E23.4.9 Form Removal

- (a) All forms shall remain in place for a minimum of seven (7) days. The Contract Administrator must be notified at least 24 hours prior to any form removal. The Contractor must receive approval from the Contract Administrator prior to beginning Work.
- (b) The minimum strength of concrete in place for safe removal of soffit forms for horizontal or inclined members, as well as vertical forms shall be 20 MPa, with the added provisions that the member shall be of sufficient strength to carry safely its own weight, together with superimposed construction loads, and that the forms shall stay in place a minimum of three days unless otherwise approved by the Contract Administrator.
- (c) Field-cured test specimens, representative of the in-place concrete being stripped, may be tested to verify the concrete strength.

#### E23.4.10 Patching of Formed Surfaces

- (a) Immediately after forms have been removed, but before any repairing or surface finishing is started, the concrete surface shall be inspected by the Contract Administrator. Any repair or 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 thoroughly 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 adjacent 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.
- (d) All objectionable fins, projections, offsets, streaks, or other surface imperfections shall be removed by approved means to the Contract Administrator's satisfaction. Cement washes of any kind shall not be used.
- (e) Concrete shall be cast against forms that will produce plane surfaces with no bulges, indentations, or protuberances other than those shown on the Drawings. The arrangement of panel joints shall be kept to a minimum. Panels containing worn edges, patches, or other defects that will impair the texture of concrete surfaces shall not be used. All fins on the concrete surfaces shall be removed.

E23.4.11 Hot Weather Concreting

- (a) The requirements of this section shall be applied during hot weather, i.e. air temperatures above 25°C during placing.
- (b) Concrete shall be placed at as low a temperature as possible, preferably below 15°C but not above 27°C. Aggregate stockpiles may be cooled by water sprays and sun shades.
- (c) Ice may be substituted for a portion of the mixing water, providing it has melted by the time mixing is completed.
- (d) Form and conveying equipment shall be kept as cool as possible before concreting by shading them from the sun, painting their surfaces white and/or the use of water sprays.
- (e) Sun shades and wind breaks shall be used as required during placing and finishing.
- (f) Work shall be planned so that concrete can be placed as quickly as possible to eliminate the possibility of "cold joints" from occurring at any location.
- (g) The Contract Administrator's acceptance is necessary before the Contractor may use admixtures such as retardants to delay setting, or water-reducing agents to maintain workability and strength, and these must then appear in the Mix Design Statement submitted to the Contract Administrator.
- (h) Curing shall follow immediately after the finishing operation.
- (i) When the air temperature is at or above 25°C, or when there is probability of its rising to 25°C during the placing period, facilities shall be provided for protection of the concrete in place from the effects of hot and/or drying weather conditions. Under severe drying conditions, as defined below the formwork, reinforcement, and concreting equipment shall be protected from the direct rays of the sun or cooled by fogging and evaporation.
- (j) The temperature of the concrete as placed shall be as low as practicable and in no case greater than that shown below for the indicated size of the concrete section.

Thickness of Section, m	Temperatures °C	
	Minimum	Maximum
Less than		
0.3	10	27
0.3 - 1	10	27
1.2	5	25

- (k) Moderate Drying Conditions:
  - (i) When surface moisture evaporation exceeds 0.75 kg/m<sup>2</sup>/h, windbreaks shall be erected around the sides of the structural element.
- (l) Severe Drying Conditions:
  - (i) When surface moisture evaporation exceeds 1.0 kg/m<sup>2</sup>/h, additional measures shall be taken to prevent rapid loss of moisture from the surface of the concrete. Such additional measures shall consist of the following:
    1. Erecting sunshades over the concrete during finishing and placing operations.
    2. Lowering the concrete temperature.
    3. Applying fog spray immediately after placement and before finishing. Care shall be taken to prevent accumulation of water that may reduce the quality of the cement paste.
    4. Beginning the concrete curing immediately after trowelling.

- (m) The nomograph, Figure D1, Appendix D of CSA Standard CAN/CSA A23.1-2000 shall be used to estimate surface moisture evaporation rates.

#### E23.4.12 Construction Joints

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

#### E23.4.13 Clean Up

- (a) The Contractor shall maintain the Sites of Work in a tidy condition and free from the accumulation of waste and debris.

#### E23.5 Quality Control

##### E23.5.1 Inspection

- (a) All workmanship and 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 the Work, through to final acceptance of the specified Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or Works which are not in accordance with the requirements of this Specification.

##### E23.5.2 Access

- (a) The Contract Administrator shall be afforded full access for the inspection and control of testing of concrete and constituent materials, both at the Site of Work and at any plant used for the production of concrete, to determine whether the concrete is being supplied in accordance with this Specification.

##### E23.5.3 Materials

- (a) All materials supplied under this Specification shall be subject to testing and approval by the Contract Administrator.

##### E23.5.4 Concrete Quality

- (a) Quality control tests will be used to determine the acceptability of the concrete supplied by the Contractor.
- (b) The Contractor shall provide, without charge, the samples of concrete and the constituent materials required for quality control tests and provide such assistance and use of tools and construction equipment as is required.
- (c) The frequency and number of concrete quality control tests shall be in accordance with the requirements of CSA Standard CAN/CSA-A23.1.

- (d) Compressive strength tests on specimens cured under the same conditions as the concrete works will be made to check the strength of the in-place concrete and the adequacy of curing. Backfilling or subsequent concreting operations will not be allowed until the in-place concrete has achieved a compressive strength of 25 MPa.

#### E23.5.5 Corrective Action

- (a) If the results of the tests indicate that the concrete is not of the specified quality, the Contract Administrator shall have the right to implement additional testing, as required, to further evaluate the concrete at the Contractor's expense.
- (b) The Contractor shall, at his own expense, correct such Work or replace such materials found to be defective under this Specification in an approved manner to the satisfaction of the Contract Administrator.

#### E23.6 Method of Measurement

E23.6.1 Supplying and placing structural concrete will be measured on a volume basis. The volume to be paid for shall be the total number of cubic metres of structural concrete supplied and placed in accordance with this Specification, acceptable to the Contract Administrator, as computed from the Drawing dimensions. No deductions will be made for chamfers, reinforcing steel, structural steel, bolts or voids of seventy-five (75) mm in diameter or less. All accessories like inserts are incidental to the supply and placement of structural concrete and no payment will be made for this Work.

#### E23.7 Basis of Payment

E23.7.1 Supplying and placing structural concrete will be paid for at the Contract Unit Price per cubic metre for the "Supply and Place Structural Concrete", measured as specified herein, which price will be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification.

### **E24. SUPPLYING AND PLACING REINFORCING STEEL**

#### E24.1 Description

- E24.1.1 This Specification shall cover the supply, fabrication and placement of plain reinforcing steel.
- E24.1.2 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.

#### E24.2 Materials

##### E24.2.1 General

- (a) The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification.
- (b) 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 the latest edition of CSA Standard CAN3-A23.1, Storage of Materials, except as otherwise specified herein.

##### E24.2.2 Reinforcing Steel

- (a) All reinforcing steel shall conform to the requirements of CSA Standard G30.18, Grade 400, Billet-Steel Bars for concrete reinforcement. If, in the opinion of the Contract Administrator, any reinforcing steel provided for the concrete works exhibits flaws in manufacture or fabrication, such material shall be immediately removed from the Site and replaced with acceptable reinforcing steel.

- (b) All reinforcing steel shall be straight and free from paint, oil, mill-scale, and injurious defects. Surface seams or surface irregularities will not be cause for rejection, provided that the minimum dimensions, cross section area, and tensile properties of a hand wire-brushed specimen are not less than the requirements of CSA Standard G30.18.

#### E24.2.3 Bar Accessories

- (a) Bar accessories shall be of a type approved by the Contract Administrator. They shall be made from a non-rusting material, and shall not stain, blemish, or spall the concreted surface for the life of the concrete.
- (b) Bar accessories shall include bar chairs, spacers, clips, wire ties, wire (18 gauge minimum), or other similar devices that may be approved by the Contract Administrator.

#### E24.2.4 Reinforcing Steel Shop Drawings

- (a) The Contractor will be responsible to produce the detailed drawings for the fabrication and placement of the reinforcing steel. Submit shop drawings for the supply and placement of reinforcing steel. Shop drawings shall consist of bar bending details, lists, placing drawings and mass tabulations. On placing drawings, indicate sizes, spacing, location, and quantities of reinforcement. Prepare drawings in accordance with ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures. Detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise indicated. Provide drawing in AutoCAD or other suitable electronic format.

### E24.3 Construction Methods

#### E24.3.1 Fabrication of Reinforcing Steel

- (a) Reinforcing steel shall be fabricated in accordance with CSA Standard G30.18 to the lengths and shapes as shown on the Drawings.

#### E24.3.2 Placing of Reinforcing Steel

- (a) Reinforcing steel shall be placed accurately in the positions shown on the Drawings and shall be retained in such positions by means of a sufficient number of bar accessories to that the bars shall not be moved out of alignment during or after the depositing of concrete. The Contractor's decision in this matter shall be final.
- (b) Reinforcing steel shall be free of all foreign material in order to ensure a positive bond between the concrete and steel. The Contractor shall also remove any dry concrete, which may have been deposited on the steel from previous concrete placement, before additional concrete may be placed. Intersecting bars shall be tied positively at each intersection.
- (c) Splices in reinforcing steel shall be made only where indicated on the Drawings. Prior approval of the Contract Administrator shall be obtained where other splices are to be made. Welded splices shall conform to CSA Standard W186, and are subject to prior written approval of the Contract Administrator.
- (d) Reinforcing steel shall not be straightened or rebent in a manner that will injure the metal. Bars with bends not shown on the Drawings shall not be used. Heating of reinforcing steel will not be permitted without the prior approval of the Contract Administrator. A minimum of twenty-four (24) hours advance notice shall be given to the Contract Administrator prior to placing of any concrete to allow for inspection of the reinforcement.

### E24.4 Quality Control

#### E24.4.1 Inspection

- (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 specified Work. The Contractor shall be wholly responsible

for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.

**E24.4.2 Access**

- (a) The Contract Administrator shall be afforded full access for the inspection and quality control testing of reinforcing steel; both at the Site of Work and at any plant used for fabrication of the reinforcing steel, to determine whether the reinforcing steel is being supplied in accordance with this Specification.

**E24.4.3 Quality Testing**

- (a) Quality control testing will be used to determine the acceptability of the reinforcing steel supplied by the Contractor.
- (b) The Contractor shall provide, without charge, the samples of reinforcing steel required for quality control tests and provide such assistance and use of tools and construction equipment, as is required.

**E24.5 Method of Measurement**

- E24.5.1** Supplying and placing reinforcing steel will be measured on a mass basis. The mass to be paid for shall be the total number of kilograms of reinforcing steel installed in accordance with this Specification, acceptable to the Contract Administrator, as computed from the approved reinforcing layout shown on the Drawings, excluding the mass of bar accessories.

**E24.6 Basis of Payment**

- E24.6.1** Supplying and placing reinforcing steel will be paid for at the Contract Unit Price per kilogram for the "Supply and Place Reinforcing Steel (Plain)", measured as specified herein, which price will be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification.

**E25. WOOD FENCE**

**E25.1 Description**

- E25.1.1** This specification shall cover:

- (a) The supply and installation of timber post and rail fencing as shown on the drawings and as specified herein including compacted granular foundation.
- (b) The removal of the wood fence in front of Midtown Car Wash.

**E25.2 Products**

- E25.2.1** Lumber identification by a grade stamp of an agent certified by the Canadian Lumber Accreditation Board.

- E25.2.2** Pressure treated wood is to be guaranteed for 10 years against rot, decay, insect attack, splitting, warping, or breaking. Fences are to be guaranteed against defects in materials and workmanship for a period of 12 months from the date of Substantial Performance of the Contract. The contractor is not responsible for acceptable wear through usage or acts of vandalism.

- E25.2.3** Wood: all wood for fences shall be no. 2 or better wolmanized pressure treated pine, spruce or fir; no wane, bark, checking, or splitting permitted. Colour as specified.

- E25.2.4** Hardware: all hardware is as follows:

- (a) Nails, spikes, and screws: hot dipped galvanized, size indicted on drawings, or specified.

- (b) Bolts: galvanized; 12 mm in diameter unless otherwise specified, complete with nuts and washers.
- (c) Galvanizing: to CSA G164-M1981; use galvanized.
- (d) Joist hangers: min. 1.0 mm thick sheet steel galvanized coating.
- (e) Fasteners indicated on drawing or specified by the Owner (no substitutes).

E25.2.5 Wood preservative: Surface applied wood preservative; coloured, or copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.

E25.2.6 Granular material: crushed limestone, 10 mm diameter containing down size material with degree of fines.

### E25.3 Construction Methods

#### E25.3.1 Timber Post and Rail Fence Installation

- (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 specified Work. The contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or Works which are not in accordance with the requirements of this Specification.
- (b) The Contractor shall, at his own expense, correct such Work or replace such materials found to be defective under this Specification in an approved manner to the satisfaction of the Contract Administrator.
- (c) The Contract Administrator shall be afforded full access for the inspection and control testing of materials, both at the Site and at any plant or borrow pit used for the supply of the materials to determine whether the material is being supplied in accordance with this Specification.
- (d) All lumber shall be neatly cut for a proper fit. All cuts shall be treated with preservation before being secured.
- (e) Fences to be constructed to the lines, grades, and specifications as shown in the drawings or as specified herein. Establish final grades and elevations for fences after regrading of Site. In the event that asphalt paving is to be carried on in the location of the fencing, the paving shall precede the fence construction.
- (f) The contractor shall stake out the post locations as located on the Drawings. Prior to drilling holes, all underground services shall be protected. Fence support posts shall be set true in line and elevation.
- (g) Factory treated end of post shall always be placed down in excavated hole prior to backfilling, under no circumstance shall a cut end of a post be placed down into an excavated hole. Treat all cuts or cut tops with preservative prior to any other lumber being secured to the post. Install posts plumb and level to the lines and grades required by the Work. Nail outside rails to posts. Secure all pickets to the rails. After all pickets are installed, install inside rails between posts and finish by installing cap over fence top.
- (h) Backfill hole excavations with crushed limestone, compacting the material by tamping with a blunt pole or rod. Material shall be compacted in layers not exceeding 150 mm. Top of fill to be overfilled so that the fill has convex appearance, sloping away from the post.
- (i) All wood shall be even and neat and shall provide a solid finished product suitable for the purposes intended.
- (j) Install spanning members with crown edge up.



- (k) Treat all cut, trimmed, or drilled with liberal application of preservative before installation. Apply preservative by dipping or by brushing to completely saturate and maintain wet film on surface for minimum 3 minute soak.

#### E25.3.2 Wood Fence Removal

- (a) Remove all objects designated by the Contract Administrator for removal, including any concrete bases visible or not. Fill and re-grade any holes created from the removal of the concrete bases using an acceptable fill as approved by the Contract Administrator.
- (b) All debris is to be removed from the Site and disposed of or salvaged by the Contractor.

#### E25.4 Measurement and Payment

E25.4.1 The supply and installation of timber post and rail fence will be measured on a length basis and paid for at the Contract Unit Price per lineal meter for "Timber Fence". The length to be paid for will be the total lineal meters of timber fence supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E25.4.2 The removal of wood fence along the Midtown Car Wash property will be measured on a length basis and paid for at the Contract Unit Price per lineal meter for "Wood Fence Removal". The length to be paid for will be the total lineal meters of wood fence removed in accordance with this specification, accepted and measured by the Contract Administrator.

### **E26. CAST-IN-PLACE PILE FOUNDATIONS**

#### E26.1 Description

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

#### E26.2 Materials

##### E26.2.1 General

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

##### E26.2.2 Handling and Storage of Materials

- (a) All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with CSA Standard CAN3-A23.1-00.

##### E26.2.3 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 conform to CSA Standard CAN/CSA-A23.1-00.
- (c) All Testing of materials shall conform to CSA Standard CAN/CSA-23.2-00.

##### E26.2.4 Cement

- (a) Cement shall be Type HS, high-sulphate-resistant hydraulic cement, conforming to the requirements of CSA A3001-03.

E26.2.5 Supplementary Cementing Materials

- (a) Use of pozzolans, fly ash, or silica fume will not be permitted for use in structural concrete supplied under this Specification.

E26.2.6 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.

E26.2.7 Aggregate

- (a) The Contractor shall furnish in writing to the Contract Administrator, the location of the sources where aggregate will be obtained, in order that same may be inspected and tentatively approved by the Contract Administrator. Changes in the source of aggregate supply during the course of the Contract will not be permitted without notification in writing to and the expressed approval of the Contract Administrator.

Fine Aggregate:

- (i) shall consist of sand having clean, hard, strong, durable, uncoated grains; free from injurious amounts of dust, soft or flaking particles, shale, alkali, organic matter, loam, or other deleterious substances.
- (ii) Fine aggregate shall be well-graded throughout and shall conform to the following grading requirements:

Gradation of Fine Aggregates	
Canadian Metric Sieve Size	Percent of Total Dry Weight Passing Each Sieve
10,000	100%
5,000	95% - 100%
2,500	80% - 100%
1,250	50% - 90%
630	25% - 65%
315	10% - 35%
160	2% - 10%
80	0% - 3%

- (iii) The fineness modulus of fine aggregate shall not be less than 2.2 nor more than 3.1 unless otherwise approved by the Contract Administrator.

Coarse Aggregate (20 mm Nominal)

- (iv) Standard course aggregate shall be used for cast-in-place concrete foundation required in this Specification.
- (v) Standard course aggregate shall consist of natural gravel, crushed stone, or other approved 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. Course aggregate shall be well graded throughout and shall conform to the grading requirements shown in the following table:

Gradation of 20 mm Coarse Aggregate	
Canadian Metric Sieve Size	Percent of Total Dry Weight Passing Each Sieve
28,000	100%
20,000	90% - 100%
10,000	25% - 60%
5,000	0% - 10%
2,500	0% - 5%
80	0% - 1%

E26.2.8 Admixtures

- (a) No admixtures other than air-entraining agent shall be used without the written authorization of the Contract Administrator, unless otherwise specified in these Specifications. It shall be the Contractor's responsibility to ensure that any admixture is compatible with all other constituent materials.

E26.2.9 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 G30.12, Grade 400 MPa, 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 CSA Standard G164 for a minimum net retention of 600 g/m<sup>2</sup>. Reinforcing steel supply and installation will be incidental to construction of concrete pile foundation and no separate payment will be made.

E26.2.10 Anchor Bolts, Nuts, and Washers

- (a) Anchor bolts, nuts, and washers shall be in accordance with CSA Standard G40.21 Grade 300W, and shall be hot-dip galvanized full length in accordance with CSA G164 for a minimum net retention of 600 g/m<sup>2</sup>, 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.

E26.2.11 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.

E26.2.12 Miscellaneous Materials

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

E26.3 Concrete Mix Design

- (a) Proportioning of fine aggregate, coarse aggregate, cement, water, and air entraining agent shall be such as yield concrete having the required strength and workability as follows:
  - (i) Minimum Compressive Strength at 28 days = 35 MPa
  - (ii) Maximum Water/Cement Ratio = 0.45
  - (iii) Minimum Cement Content = 340 kg/m<sup>3</sup>
  - (iv) Slump = 80 mm to 30 mm
  - (v) Aggregate: 20 mm nominal
  - (vi) Air Content: 5.0 to 8.0 percent
  - (vii) Cement – Type HS, high sulphate-resistant

E26.4 Construction Methods

E26.4.1 Location and Alignment of Piles

- (a) Pile construction shall not commence until the Contractor has obtained clearance from the appropriate Utility Authorities.
- (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.

#### E26.4.2 Buried Utilities

- (a) The Contractor shall exercise extreme caution when constructing the pile foundations in the vicinity of existing buried utilities. 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.

#### E26.4.3 Excavation

- (a) Excavations for piles shall be made with equipment designed to remove a core of the diameter shown on the Drawings.
- (b) Upon reaching the required elevation, the bottom of the excavation shall be cleaned as directed by the Contract Administrator in the field.
- (c) All excavated material from the piles shall be promptly hauled away from the Site to an approved disposal area as located by the Contractor.
- (d) Upon completion of the cleaning out of the bottom to the satisfaction of the Contract Administrator, the reinforcement and anchor bolts shall be set in place and the concrete poured immediately. Under no circumstances shall a hole be left to stand open after boring has been completed.
- (e) If any hole is condemned because of caving, it shall be filled with lean-mix concrete and a new hole bored 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 above the utility. Payment will not be made for condemned piles.

#### E26.4.4 Sleeving

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

#### E26.4.5 Inspection of Bores

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

#### E26.4.6 Placing Reinforcing Steel

- (a) Reinforcement shall be:
  - (i) placed in accordance with the details shown on the Drawings;
  - (ii) rigidly fastened together; and
  - (iii) lowered into the bore intact before concrete is placed.

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

#### E26.4.7 Placing Reinforced Concrete Barrier

- (a) Where the slip formed concrete barrier is located directly above the pile foundations for the light standard, at three (3) locations, the Work shall include:
  - (i) Sawcut and remove slip formed barrier at pile locations as shown on the Drawings.
  - (ii) Install Concrete Piles as described herein, as shown on the Drawings.
  - (iii) Extend Pile Reinforcing through top of cast-in-place concrete barrier as shown on the Drawings.
  - (iv) Place concrete barrier as shown on the Drawings.

#### E26.4.8 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. 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.

#### E26.4.9 Forms

- (a) 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.
- (b) 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.

#### E26.4.10 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.

#### E26.4.11 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 bore 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 bore 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.

E26.4.12 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.

E26.4.13 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.

E26.4.14 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.

E26.4.15 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.

E26.4.16 Cold Weather Concreting

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

## E26.5 Quality Control

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

## E26.6 Measurement and Payment

E26.6.1 Construction of cast-in-place concrete pile foundations including supply and installation of anchor bolts and steel template will not be measured and will be paid for at the Contract Lump Sum Price per pile per Site for the "Items of Work" listed here below for concrete piles constructed in accordance with this Specification and accepted by the Contract Administrator. In the locations where a concrete barrier is to be constructed together with the pile, all sawcutting, removal of slip formed concrete barrier, formwork, supply and installation of reinforcing steel, dowels, structural concrete, anchor bolts and steel template shall be included in the measurement and payment as listed below.

(i) Items of Work:

Cast-in-Place Concrete Pile Foundations

- (a) Bored Excavation
- (b) Bored Excavation with Concrete Barrier

E26.6.2 Construction of bus stop flag base will be measured and paid for at the Contract Unit price per pile for "Concrete Base for Bus Stop Flag." The number of units to be paid for will be the number of concrete bases constructed in accordance with this Specification and accepted by the Contract Administrator.

## E27. HYDRO EXCAVATION

### E27.1 Description

#### E27.1.1 General

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

### E27.2 Equipment

E27.2.1 Hydro Excavation unit shall be capable of maintaining a minimum working pressure of 10,000 psi, at a rate of flow of 10 to 12 gallons per minute. Unit should be adjustable, so as to provide adequate pressure to remove earthen material identified by the Contract Administrator.

E27.2.2 Spray head shall be equipped with a rotating type nozzle, in order to provide a wider path of cut.

### E27.3 Construction Method

#### E27.3.1 Hydro-removal of earthen material

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

E27.3.2 Recovery of excavated material

- (a) The recovery of excavated material shall be done using vacuum type method, or other type method as approved by the Contract Administrator.
- (b) The recovery of material shall follow immediately behind the excavation, to avoid excavated areas from filling with excavated material.
- (c) The use of mechanical sweepers will not be allowed.
- (d) Dispose of material in accordance with Section 3.4 of CW 1130.

E27.3.3 Back fill of hydro excavated hole

- (a) The Contractor shall be responsible for the backfill of the hydro excavated hole upon the completion of the Work described herein, to the approval of the Contract Administrator.

E27.4 Measurement and Payment

E27.4.1 Hydro Excavation

- (a) Hydro Excavation of earthen material will be measured on an hourly basis and paid for at the Contract Unit Price per hour for "Hydro Excavation". The hours to be paid for will be the total number of hours of Hydro Excavation in accordance with this specification, accepted and measured by the Contract Administrator. Travel to and from the Site will not be accounted for in the payment of this item.

**E28. EARTHWORK AND ROUGH GRADING**

E28.1 This specification is supplemental to CW 3110 and CW 3170. The Work of this section comprises the furnishing of all labour, equipment and materials required to complete the excavation and related Work including, but not necessarily confined to, the following:

- (a) Excavation, removals, disposal, subgrade compaction and rough grading of the existing Site for the construction sodded and seeded areas, planting beds, mulch beds, berms, swales, etc. to the design requirements noted on the Drawings, approved on Site by the Contract Administrator, less the appropriate surface finish allowance.
- (b) Stockpile suitable, approved material on Site for reuse (clean topsoil, clean earth fill and gravel fill). Remove and dispose of unsuitable material.
- (c) Earthwork and Grading of the existing Site to the design elevations shown on the Drawings, less the appropriate surface finish allowance.
- (d) Earthwork and Grading of the existing Site (cut and fill including compaction of subgrade and fill material) to ensure positive drainage in all swales and adjacent sodded/seeded areas and planting beds.
- (e) Supply and install imported fill in areas as required to create berms as shown on the drawings and ensure positive drainage.

E28.2 Materials

E28.2.1 All fill materials shall conform to CW 3170.

E28.3 Construction Methods

E28.3.1 The Contractor shall construct the Site within the limits indicated to the design elevations and gradients noted on the Drawings, less the appropriate surface treatment depths specified and shall excavate, remove and dispose of all unsuitable materials of whatever nature encountered.

E28.3.2 The Contractor shall construct all sub-grades in accordance with Specification CW 3110, including removal of unsuitable excavated material and surplus materials.



- E28.3.3 The Contractor shall restrict his activities strictly to within the limits of the Work, unless receiving prior written approval from the Contract Administrator. The Contractor shall take all precautions to prevent damage to traffic structures, pole lines, existing trees, Site services and adjacent property and he shall be liable for any damages occurring in the performance of this Work.
- E28.3.4 The Contractor shall examine the Site and make themselves familiar with the existing conditions and the nature of the Work to be done.
- E28.3.5 Prevent damage to surface or underground utility lines which are to remain. Make good any damage.
- E28.3.6 The Contractor shall excavate to the design grades shown less the appropriate allowance for surface treatment and shall excavate, remove and dispose of all unsuitable materials of whatever nature encountered.
- E28.3.7 Excavated or graded materials to be approved before use as fill for grading Work. Protect such approved material from contamination. Stockpile in approved locations on-site. Protection and stockpiling are incidental to unit prices bid for excavation, removals and rough grading.
- E28.3.8 The Contractor shall ensure that upon completion of the earthwork and grading operations the Site is left in a neat condition free from debris, etc. for approval by the Contract Administrator prior to placing base courses and clean fill.
- E28.3.9 Except for drainage swales, berms and embankments indicated, the design gradient for all other areas shall be considered to be straight grade between the design elevations shown. Changes in grade at swales, berms, embankments and field shall be gently contoured as directed by the Contract Administrator to provide future ease of grass mowing operation.
- E28.3.10 Construction to the new design grades shall be accomplished by the placement of clean fill in areas as indicated on the Drawings.
- E28.3.11 Areas of Fill
- (a) Fill low areas in sodded/planting bed areas with imported clean earth fill suitable for plant growth free from roots, muskeg, organic or cohesive matter, building debris, waste materials, rubble, rubbish, frozen portions, soluble materials and rocks larger than 25mm (1") in diameter and capable of sustaining plant and seed growth. Compact to 95% S. P. D. in 150mm (6") lifts to 1000mm below finish grade for all planting beds and 900mm below finish grade for sodded and seeded areas noted on the Drawings. Where depth of planting soil is not noted on drawings for sodded and seeded areas place earth fill to 150mm below finish grade.
  - (b) Construct berms and sloped areas using imported clean earth fill suitable for plant growth free from roots, muskeg, organic or cohesive matter, building debris, waste materials, rubble, rubbish, frozen portions, soluble materials and rocks larger than 25mm (1") in diameter and capable of sustaining plant and seed growth. Compact to 95% S. P. D. in 150mm (6") lifts to 1000mm below finish grade for all planting beds and 900mm below finish grade for sodded and seeded areas noted on the Drawings. Where depth of planting soil is not noted on drawings for sodded and seeded areas place earth fill to 150mm below finish grade.
  - (c) Prior to placing fill over existing ground, scarify surface to depth of 150mm. Maintain fill and existing surface at approximately the same moisture content to facilitate bonding.
  - (d) No direct payment will be made for placing and grading of existing fill as all costs for this Work shall be included in the lump sum bid for excavation, removals and rough grading within the limit of the Work.
- E28.3.12 Compaction shall include the use of sheep's foot or other suitable compaction equipment as approved by the Contract Administrator to achieve a minimum compaction of 98% Standard Proctor Density below all paved areas and rock areas, and 95% Standard Proctor Density in all other areas disturbed under this Contract.

- E28.3.13 The Contractor shall construct the sub-grade surface to the following depths below the grades shown on the Drawings for each area:
- (a) Planting bed : 1150 mm
  - (b) Mulch / landscape rock bed: 1150 mm
  - (c) Planting area with trees: 1050 mm
  - (d) Sodded and seeded areas with trees: 1050 mm
  - (e) Sodded areas: 150 mm
  - (f) Seeded areas: 300 mm
- E28.3.14 Following earth moving, rough grading and compaction the Work areas shall be fine graded to provide a maximum deviation of 50mm in 10 metres from the design grade with no low areas to hold water. The finished surface of all disturbed areas shall be dragged and smoothed in such a manner that there are no loose soil particles greater than 50mm in maximum dimensions. Fine grading is incidental to the unit prices bid for each item listed in the schedule of prices.
- E28.3.15 If required and at locations directed by the Contract Administrator, the Contractor shall excavate and remove unsuitable subgrade material and replace it with compacted granular material in accordance with Specification CW3110.
- E28.4 Method of Measurement
- E28.4.1 Rough grading for sodded and seeded areas will be measured on an area basis. The area to be paid for shall be the total number of square metres that are excavated in accordance with this Specification as computed from measurements made by the Contract Administrator. No payment will be made for material removed outside of the limits of excavation as established by the Contract Administrator.
- E28.4.2 Measurement of supply and install imported compacted clean earth fill and related Work will be on a cubic metre basis.
- E28.4.3 No measurement will be made for filling holes/low areas left by excavation and removals operations as this item shall be incidental to this specification.
- E28.4.4 No measurement will be made for the excavation or compaction of the subgrade as this shall be incidental to this specification.
- E28.4.5 No measurement will be made for disposing of surplus fill and unsuitable material as this shall be incidental to this specification.
- E28.5 Basis of Payment
- E28.5.1 Rough grading for sodded and seeded areas will be measured as described herein and paid for at the Contract Unit Price per square meter for "Rough Grading for Sodded and Seeded Areas". The area to be paid for will be the total square meters rough graded in accordance with this specification, accepted and measured by the Contract Administrator.
- E28.5.2 No payment will be made for filling holes/low areas left by excavation and removals operations as this item shall be incidental to this specification.
- E28.5.3 No payment will be made for the excavation or compaction of the subgrade as this shall be incidental to this specification.
- E28.5.4 No payment will be made for disposing of surplus fill and unsuitable material as this shall be incidental to this specification.

## **E29. PLANTING BED PREPARATION**

### **E29.1 Description**

E29.1.1 The following list generally describes the scope of this Section:

- (a) Cultivate subsoil;
- (b) Supply and install drainage course and drainage pipe;
- (c) Supply and install planting soil mixture in planting beds;
- (d) Supply and install wood chip mulch and filter fabric.

E29.1.2 Submit to the Contract Administrator samples of the following materials:

- (a) Planting Soil Mixture: 1 kg
- (b) Wood chip mulch: 500g
- (c) Geotextile

### **E29.2 Delivery and Storage**

E29.2.1 Deliver and store fertilizer in waterproof bags showing weight, analysis and name of manufacturer.

### **E29.3 Materials**

E29.3.1 Planting Soil: For mix imported topsoil with 20% peatmoss loose by volume, and 5% sand loose by volume. Incorporate bonemeal into planting soil at rate of 5 lbs /cu.yd. of soil mixture. Planting soil items to be comprised as follows:

E29.3.2 Peatmoss: horticultural grade Class "A" decomposed plant material, fairly elastic and homogeneous. Free of decomposed colloidal residue, weed, sulphur and iron. To have pH value of 5.9 to 7.0, 60% organic matter by weight, moisture content not exceeding 15% and water absorption capacity of not less than 300% by weight on oven dry basis.

E29.3.3 Bonemeal: shall be raw bonemeal, finely ground with a minimum analysis of 3% nitrogen and 20% phosphoric acid.

E29.3.4 Imported topsoil: natural, fertile, agricultural soil typical of locality, capable of sustaining vigorous plant growth, from well drained Site that is free of flooding, not in frozen or muddy condition, not less than 6% organic matter to a maximum 25% organic matter by volume, and pH value of 5.9 to 7.0. Free from subsoil, slag or clay, stones, lumps, live plants and their roots, sticks, crabgrass, couchgrass, noxious weeds and foreign matter.

E29.3.5 Sand: hard, granular natural beach sand, washed free of impurities, chemical or organic matter.

E29.3.6 Fertilizer: commercial type with 50% of the elements derived from organic sources.

E29.3.7 Drainage fabric as per CW 3120.

E29.3.8 Drainage material as per CW 3120.

E29.3.9 Drainage pipe as per CW 3120.

E29.3.10 Wood chip mulch: varying in size from 15-25 mm and 5-20 mm thick, from coniferous trees.

### **E29.4 Construction Methods**

E29.4.1 Remove debris, broken roots, branches, stones in excess of 50mm diameter and other deleterious materials. Remove subsoil that has been contaminated with oil, gasoline or calcium chloride. Dispose of removed materials as directed.

E29.4.2 Excavate bed to a depth of 1150mm as per details on the Drawings.

- E29.4.3 Place drainage pipe, drainage fabric and drainage material as per the Drawings. Connect subdrain to catchbasins as shown on the drawings. All Work related to subdrain for planting beds is incidental to the unit prices bid for shrub bed preparation.
- E29.4.4 Do not spread planting soil mixture until Contract Administrator has inspected drainage course.
- E29.4.5 Spread planting soil mixture with adequate moisture in uniform layers during dry weather over approved, dry, unfrozen sub-grade, where planting is indicated.
- E29.4.6 Bring planting soil mixture up to 100 mm below finished grade in beds.
- E29.4.7 Remove stones, roots, grass, weeds, construction materials, debris and foreign non-organic objects from soil mixture.
- E29.4.8 Spread fertilizer at manufacturer's recommended rate of application. Mix fertilizer thoroughly into upper 50mm of planting soil.
- E29.4.9 Fine grade entire planting soil area. Eliminate rough spots.
- E29.4.10 Compact planting soil to leave surface smooth, uniform, firm against deep foot printing, with a fine, loose texture. Tolerance: plus or minus 15mm of design grade.
- E29.4.11 Supply and install 100mm wood chip mulch in beds.
- E29.5 Method of Measurement
- E29.5.1 Supply and install planting bed shall be measured on an area basis. The area to be paid for shall be the total number of square metres in place in accordance with this Specification acceptable to the Contract Administrator, as computed from measurements made by the Contract Administrator.
- E29.6 Basis of Payment
- E29.6.1 Supply and install planting bed will be paid for at the Contract Unit Price per square metre for "Supply and Install Planting Bed" which price shall be payment in full for supply of all materials and performing all operations herein described and for all other items incidental to the Work included in this Specification.

### **E30. PLANT MATERIAL**

- E30.1 Description
- E30.1.1 The following list generally describes the scope of this section:
- (a) Supply and planting of trees and shrubs;
  - (b) Supply and planting of perennials and vines;
  - (c) Supply and planting of native plug plants;
  - (d) Maintenance to date of substantial performance;
  - (e) Warranty for two full years.
- E30.2 General
- E30.2.1 Obtain approval of plant material at source.
- E30.2.2 Notify Contract Administrator of source of material at least 7 days in advance of shipment. No Work under this Section is to proceed without approval.
- E30.2.3 Acceptance of plant material at source does not prevent rejection at Site prior to or after planting operations.
- E30.2.4 Source of all plant material to be from an area within the same hardiness zone and soil conditions as Winnipeg.

### E30.3 Shipment and Pre-Planting Care

- E30.3.1 Co-ordinate shipping of plants and excavation of holes to ensure minimum time lapse between digging and planting. Tie branches of trees and shrubs securely and protect plant material against abrasion, exposure and extreme temperature change during transit. Avoid binding of planting stock with rope or wire which would damage bark, break branches or destroy natural shape of plant. Give full support to root ball of large trees during lifting.
- E30.3.2 Cover plant foliage with tarpaulin, and protect bare roots by means of dampened straw, peatmoss, sawdust or other acceptable material to prevent loss of moisture during transit and storage.
- E30.3.3 Remove broken and damaged roots with sharp pruning shears. Make clean cut and cover cuts over 50 mm diameter with wound dressing.
- E30.3.4 Keep roots moist and protected from sun and wind. Heel-in shrubs, which cannot be planted immediately, in shaded areas, and water well.

### E30.4 Water

- E30.4.1 Water should be potable and free of minerals, which may be detrimental to plant growth.

### E30.5 Anti-Desiccant

- E30.5.1 Anti-desiccant should be wax-like emulsion to provide film over plant surface reducing evaporation but permeable enough to permit transpiration.

### E30.6 Wound Dressing

- E30.6.1 Wound dressing should be horticulturally accepted non-toxic, non-hardening emulsion.

### E30.7 Plant Material

- E30.7.1 Quality and Source: Comply with City of Winnipeg tree planting guidelines, referring to size and development of plant material and root ball. All plant material to be approved by City and Contract Administrator at source.
- E30.7.2 Measure plants when branches are in their natural position. Height and spread dimensions refer to main body of plant and not from branch tip to branch tip. Use trees of No. 1 grade.
- E30.7.3 Additional plant material qualifications:
  - (a) Use perennials and plant plugs with strong fibrous root system free of disease, insects, defects or injuries and structurally sound. Plant must have been root pruned regularly, but not later than one growing season prior to arrival on-site.

### E30.8 Cold Storage

- E30.8.1 Approval required for plant material, which has been held in cold storage.

### E30.9 Container – Grown Stock

- E30.9.1 Acceptable if containers large enough for root development. Shrubs and vines must have grown in container for minimum of one growing season but not longer than two. Root system must be able to "hold" soil when removed from container. Plants that have become root bound are not acceptable. Container stock must have been fertilized with slow releasing fertilizer.

### E30.10 Substitutions

- E30.10.1 Substitutions to plant material as indicated on plantings plan are not permitted unless written approval has been obtained as to type, variety and size prior to award of Contract. Plant substitutions must be similar species and of equal size to those originally specified.

### E30.11 Root balls

- E30.11.1 Deciduous trees in excess of 3 m height must have been dug with large firm ball. Root balls must include 75% of fibrous and feeder root system. This excludes use of native trees grown in light sandy or rocky soil. Lift root ball from hole, place in wire basket designed for purpose and line with burlap. Secure root balls with burlap, heavy twine and wire basket. Protect root balls against sudden changes in temperature and exposure to heavy rainfall. Take care not to injure trunk of tree with wire basket ties or rope.
- E30.11.2 Tree spade material shall not be accepted, unless dug in field and secured as above.

### E30.12 Workmanship

- E30.12.1 Stake out location of trees and shrubs as per the Construction Drawings. Obtain approval by City and Contract Administrator prior to excavating.
- E30.12.2 Apply anti-desiccant in accordance with material manufacturer's instructions only as required.
- E30.12.3 Co-ordinate operations. Keep Site clean and planting holes drained. Immediately remove soil or debris spilled onto pavement.

### E30.13 Planting Time

- E30.13.1 Plant deciduous plant material during dormant period, before buds have broken. Plant material noted for spring planting only, must be planted in dormant period.
- E30.13.2 When permission has been obtained to plant materials after buds have broken, spray plants with anti-desiccant to slow down transpiration prior to transplanting.
- E30.13.3 When permission has been obtained, shrubs and perennials growing in containers may be planted throughout growing season.
- E30.13.4 Plant only under conditions that are conducive to health and physical conditions of plants.
- E30.13.5 Provide planting schedule. Executing planting operations over long period using limited crew will not be accepted.

### E30.14 Excavations

- E30.14.1 Prepare planting areas as shown on the Drawings.
- E30.14.2 Provide drainage for planting holes in heavy soil if natural drainage does not exist. Have method approved.
- E30.14.3 Protect bottom of excavations against freezing.
- E30.14.4 Remove water, which enters excavations prior to planting. Ensure source of water is not ground water.

### E30.15 Planting

- E30.15.1 Scarify sides of planting hole to depth of 150 mm where tree is planted in isolated tree pit.
- E30.15.2 Plant trees, shrubs and perennials vertically with roots placed straight out in hole. Orient plant material to give best appearance in relation to structure, roads and walks.
- E30.15.3 Place plant material to depth equal to depth they were originally growing in nursery. Allow for soil settlement in planting.
- E30.15.4 With balled and burlapped roots balls, loosen burlap and cut away minimum top 1/2 without disturbing root ball. Cut vertical slits in remaining burlap around root ball at 250mm intervals. Remove all rope, string, or other ties from around trunk. Do not pull burlap or rope from under root ball. With container stock, remove entire container without disturbing root ball. Non bio-degradable wrappings must be removed including wire baskets.

- E30.15.5 Tamp planting soil around root system in layers of 150mm eliminating air voids. Frozen or saturated planting soil is unacceptable. When 2/3 of planting soil has been placed, fill hole with water. After water has completely penetrated into soil, complete backfilling.
- E30.15.6 Build 100 mm deep saucer around outer edge of hole to assist with maintenance watering. Install 100mm depth wood chip mulch in saucer as shown on drawings.
- E30.15.7 When planting is completed, give surface of planting saucer dressing of organic 10-6-4 fertilizer at rate of 12 kg/100 m for shrub beds or 40 to 50 g/mm of calliper for trees. Mix fertilizer thoroughly with top layer of planting soil and water in well.
- E30.16 Pruning
- E30.16.1 Prune trees and shrubs after planting only as required to remove broken diseased or dead branches. Employ clean sharp tools and make cuts flush with main branch, smooth and sloping as to prevent accumulation of water.
- E30.17 Maintenance
- E30.17.1 After completion of planting operation to the satisfaction of the Contract Administrator and City of Winnipeg, the Contractor shall be responsible for the maintenance of the plant material until date of Substantial Performance and commencement of two year warranty.
- E30.17.2 Replace any dead or damaged plant material during the maintenance period, including replacement of vandalized material.
- E30.17.3 Water sufficiently to maintain optimum growing conditions. Ensure adequate moisture in root zone at freeze-up.
- E30.17.4 The Contractor shall provide all necessary equipment, including: tractors, mowers, hand mowers, trimmers, fertilizer spreaders, pruning tools, hoses, water meters, and any other items necessary for the maintenance of the plant material indicated in this Specification.
- E30.17.5 Remove all weeds and debris from mulch beds, planting beds and tree wells on a weekly basis.
- E30.17.6 Turn and top up mulch in beds and tree wells each spring and prior to start of extended maintenance.
- E30.18 Personnel
- E30.18.1 The Contractor shall provide all necessary personnel for the ongoing maintenance operations.
- E30.18.2 Personnel should have at least one year of experience in landscape maintenance and should be under the direction of a foreman, in all cases, with not less than five years of experience with similar maintenance operations.
- E30.19 Maintenance Methods
- E30.19.1 Watering
- (a) Trees shall be watered twice weekly, or during the summer, if temperatures are fairly high and there has been no rainfall, water approximately once a week.
- (b) To determine the need for watering, make a soil test weekly with a one-inch auger. Take a test sample from both the planting soil and from the root ball by drilling to a minimum depth of 600 mm. The soil shall contain enough moisture to hold together when compressed in the hand, but not be muddy.
- E30.19.2 Fertilizing
- (a) Because of the specialized nature of such operations, fertilizing is to be done by a qualified local arborist.

- (b) Fertilize in the fall over the surface of the ground surrounding the plants, then soak the area thoroughly, use 10-6-4 analysis fertilizer spreading a maximum of 0.13 kg per square metre.

E30.19.3 Spraying

- (a) Spray trees to control insect pests and diseases. Use horticulturally recommended compounds specific for the problem to be contained.

E30.19.4 Insects and Diseases

- (a) Spray plants to combat pests and diseases. Do not use DDT or sprays prohibited by Agriculture Canada.

E30.20 Method of Measurement

- E30.20.1 Supply and Installation of Plant Material will be measured on a unit basis. The number of units to be paid shall be the total number of each type and size of units supplied and installed in accordance with the Drawings and Specifications and as measured and accepted by the Contract Administrator.

E30.21 Basis of Payment

- E30.21.1 Supply and Installation of Plant Material will be paid for at the Contract Unit Price for each type and size specified for "Items of Work", 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 this Specification.

- (a) Items of Work:

Supply and Installation of Plant Material

- (i) Manchurian Ash
- (ii) Glenleven Linden
- (iii) American Elm
- (iv) Amur Maple
- (v) Spring Snow Crabapple
- (vi) White Spruce
- (vii) Colorado Spruce
- (viii) Chokeberry
- (ix) Pygmy Caragana
- (x) Wood's Rose
- (xi) Three-lobed Spirea
- (xii) Nannyberry
- (xiii) Daylily
- (xiv) Chequers Lamium
- (xv) Native Grape
- (xvi) Bittersweet

**E31. EXTENDED MAINTENANCE**

E31.1 Description

- E31.1.1 This Specification shall deal with the maintenance of the trees, mulch beds, and perennials for Two (2) calendar years after the date of the Substantial Performance.



## E31.2 Materials and Personnel

E31.2.1 The Contractor shall provide all necessary equipment, including: tractors, trimmers, fertilizer spreaders, pruning tools, water trucks, hoses, water meters, and any other items necessary for the maintenance of the area indicated in this Specification.

E31.2.2 The Contractor shall provide all necessary personnel for the ongoing maintenance operations.

## E31.3 Work Included

E31.3.1 The following areas shall be part of the maintenance jurisdiction:

- (a) The trees, shrubs perennials and vines as indicated on the Drawings.
- (b) Mulch beds as indicated on the Drawings.
- (c) All sodded areas as indicated on the Drawings.

## E31.4 Maintenance of Trees, Shrubs and Perennials

### E31.4.1 Watering

- (a) All plant material shall be watered bi-weekly, or during the summer, if temperatures are fairly high and there has been no rainfall, water approximately once a week. Where irrigation is not available this should be executed by leaving a hose, with a gentle rate of flow, running into the saucer of the root ball for about one hour.
- (b) To determine the need for watering, make a soil test weekly with a one-inch auger. Take a test sample from both the planting soil and from the root ball by drilling to a minimum depth of 600 mm. The soil shall contain enough moisture to hold together when compressed in the hand, but shall not be muddy.

### E31.4.2 Fertilizing and pest control

- (a) Fertilizing, Pruning and Spraying Deciduous Trees and Shrubs. Because of the specialized nature of such operations, this should be done by a qualified local arborist.
- (b) Fertilize in the fall over the surface of the ground surrounding the plants, then soak the area thoroughly. Use 10-6-4 analysis fertilizer spreading a maximum of 0.13 kg per square metre.
- (c) Spray to control insect pests and diseases. Use horticulturally recommended compounds specific for the problem to be contained.

### E31.4.3 Weeding

- (a) Remove all weeds in tree wells planting beds and mulch beds by hand on a weekly basis. Do not use chemical weed killer.
- (b) Remove all debris from beds, including weeds, and dispose of off site in a legal manor.

### E31.4.4 Other Maintenance

- (a) Tighten, or remove, turnbuckles or guy wires for trees as required or directed by the Contract Administrator.
- (b) Straighten trees as required and directed by the Contract Administrator.

E31.4.5 The Contractor shall agree and guarantee to replace and replant any nursery stock found dead or in poor condition during and at the completion of the maintenance period. All plant material to be replaced and maintained for a minimum of 30 days prior to end of maintenance period. "Poor Condition" shall be interpreted as meaning nursery stock in which branches are dead or dying, or have not shown satisfactory growth of leaves. All replacements shall be of same size and species, as specified.

E31.4.6 Upon the end of the required maintenance period, a Site inspection shall be held. If at this time, all material and Works is satisfactory the Contract for maintenance and warranty

shall be terminated. If materials and Works are found unacceptable the warranty shall be extended by 30 days for a follow up inspection. Extension of warranty will continue in 30 day increments for inspection until all Work and material are satisfactory.

E31.5 Maintenance of Sod

E31.5.1 Sod maintenance as per CW 3510.

E31.6 Method of Measurement

E31.6.1 Extended Maintenance will be measured on a per year lump sum basis and paid for in accordance with this Specification and accepted by the Contract Administrator.

E31.7 Basis of Payment

E31.7.1 Extended Maintenance will be paid for each year at the Contract per Year Lump Sum Price for "Extended Two Year Maintenance"; which price shall be payment in full for supply of all materials and performing all operations herein described and for all other items incidental to the Work included in this Specification.

**E32. TOPSOIL AND FINISH GRADING**

E32.1 Description

E32.1.1 Further to CW3540 this section shall cover the supply and placement of topsoil for areas of sodding and seeding.

E32.2 Materials

E32.2.1 Topsoil for sod as per CW3540.

E32.2.2 Soil in areas of sod and seed with trees to be planting soil to minimum 900mm depth. Soil to be as per planting bed preparation.

E32.2.3 Topsoil for top 300mm of seed areas to be weed free topsoil as supplied and installed by Native Plant Solutions. Contact Glen Koblun 953-8206.

E32.3 Installation

E32.3.1 Installation of topsoil for sod as per CW3540.

E32.3.2 Installation of to 300mm of topsoil for seed areas to be by Native Plant Solutions.

E32.4 Method of Measurement

E32.4.1 There shall be no separate measurement for supply and installation of topsoil in areas of sod.

E32.4.2 Supply and installation of planting soil in sodded and seeded areas with trees shall be measured on a volume basis. The volume to be paid for shall be the total number of cubic metres in place in accordance with this Specification acceptable to the Contract Administrator, as computed from measurements made by the Contract Administrator.

E32.4.3 Supply and installation of weed free planting soil shall be measured on a volume basis. The volume to be paid for shall be the total number of cubic metres in place in accordance with this Specification acceptable to the Contract Administrator, as computed from measurements made by the Contract Administrator.

E32.5 Basis of Payment

E32.5.1 There shall be no separate payment for supply and installation of topsoil in areas of sod.

E32.5.2 Payment for supply and install planting soil in sodded and seeded areas with trees will be paid at the Contract unit price per cubic metre for "Supply and Install Planting Soil" which price shall be payment in full for supply of all materials and performing all operations

herein described and for all other items incidental to the Work included in this Specification.

- E32.5.3 Payment for supply and install weed free planting soil will be paid at the Contract unit price per cubic metre for "Supply and Install Weed Free Soil" which price shall be payment in full for supply of all materials and performing all operations herein described and for all other items incidental to the Work included in this Specification.

### **E33. SODDING**

- E33.1 All Work to be to CW 3510.

#### **E33.2 Method of Measurement**

- E33.2.1 Sodding will be measured on an area basis. The area to be paid for shall be the total number of square metres sodded and maintained in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

#### **E33.3 Basis of Payment**

- E33.3.1 Sodding will be paid for at the Contract Unit Price per square metre for "Supply and Install Sod", measured as specified herein, which price shall be payment in full for completing all operations herein described and all other items incidental to the Work included in this Specification.

### **E34. ESTABLISHMENT OF SEEDED AREAS**

#### **E34.1 Description**

- E34.1.1 This Specification will cover all work and materials required to establish seeded areas.
- E34.1.2 Native seed areas to be constructed using Native Plant solutions for all materials and labour required for the establishment of native turf grass and native tall grass prairie. Contact: Glen Koblun 953-8206.

#### **E34.2 Method of Measurement**

- E34.2.1 Establishment of seeded areas will be measured on an area basis. The area to be paid for shall be the total number of square metres seeded and maintained in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

#### **E34.3 Basis of Payment**

- E34.3.1 Establishment of seeded areas will be paid for at the Contract Unit Price per square metre for "Supply and Install Seeded Area", measured as specified herein, which price shall be payment in full for completing all operations herein described and all other items incidental to the Work included in this Specification.

### **E35. LANDSCAPE ROCK**

#### **E35.1 Scope of Work**

- E35.1.1 The following list generally describes the scope of this Section:
- (a) Supply and install rough field stone rock on geotextile fabric with limestone fines infill.

#### **E35.2 Samples**

- E35.2.1 Submit to the Contract Administrator samples of the following materials:
- (a) Rock: 1 -350mm-450mm O.D.
- (b) Geotextile: 1 sq.m

### E35.3 Products

E35.3.1 Limestone and granite rock to be from a Manitoba quarry, colour to be approved by Contract Administrator. Size range to be:

- (a) 300mm-450mm O.D. – 50%
- (b) 550mm-600mm O.D. – 40%
- (c) 650mm-800mm O.D. – 10%

### E35.4 Installation

E35.4.1 Verify grades of compacted subgrade (to 95% SPD) and adjacent features for conformity with existing grades before placing boulder.

E35.4.2 Remove and dispose of unsuitable subgrade material as directed by Contact Administrator.

E35.4.3 Supply and installation of geotextile as per the Drawings. The cost to supply and install geotextile is incidental to the Work in this section.

E35.4.4 Place landscape rock in locations as shown on the Drawings and directed on-site by project landscape architect.

E35.4.5 Place rock as per the drawings and backfill with limestone fines.

### E35.5 Method of Measurement

E35.5.1 Landscape rock shall be measured on a volume basis. The items to be paid for shall be the total cubic metres that are placed in accordance with this specification, acceptable to the Contract Administrator.

### E35.6 Basis of Payment

E35.6.1 Landscape Rock will be paid for at the Contract Unit Price per cubic metre for "Supply and Install Landscape Rock", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification.

## E36. SITE FURNITURE

### E36.1 Description

E36.1.1 This specification covers the supply and installation of backless bench.

E36.1.2 Store units in a protected location, immediately upon arrival on the Site.

E36.1.3 Remove from Site any units which have been damaged during transportation and replace.

### E36.2 Products

E36.2.1 Backless benches to be cast aluminium bench with concrete seats product number CTRA-BLB as supplied by:

Urban Park,  
49 Life Sciences Parkway  
Steinbach, Manitoba, R5G 2G7  
Ph: 1.800.775.0018  
Attn. Myron Krentz

### E36.3 Installation

E36.3.1 Install benches on existing concrete sidewalk paving or in areas of unit paver.

- E36.3.2 Where benches are to be located in unit paver the Contractor is to supply and install extensions on the legs to meet the depth of the pavers and provide a solid base for mounting. Cost of extensions is incidental to the unit price for benches.
- E36.3.3 Drill holes and install stainless steel threaded insert to fit bolts. Epoxy in place.
- E36.3.4 Set benches level and plumb. Dry fit bench with bolts.
- E36.3.5 Fill under bench legs with non-shrinking grout where legs do not fit flush to sidewalk, maximum 15mm depth. Finish exposed edges with smooth trowel finish with consistent slope to sidewalk surface. Install grout as per manufacturer's specifications. Notify Contract Administrator of grout requirements prior to placing bench.
- E36.3.6 Fasten benches with stainless steel, tamper proof bolts. Surface of bolt head to be flush or slightly recessed from base plate of legs.
- E36.4 Method of Measurement
- E36.4.1 Supply and Installation of benches will be measured on a unit basis. The number of each item to be paid for will be the total number supplied and placed in accordance with this Specification and accepted by the Contract Administrator, as measured by the Contract Administrator.
- E36.5 Basis of Payment
- E36.5.1 Supply and Installation of benches be paid for at the Contract Unit Price for "Supply and Install Benches", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification.

## **E37. DETECTABLE PAVING**

- E37.1 Description
- E37.1.1 This specification shall cover the supply and installation of detectable paving in sidewalk.
- E37.2 Materials
- E37.2.1 Detectable paving in sidewalk ramps to be 12"x12" panels of cast in place system in federal yellow by Armor-Tile as supplied by:
- Alsip's Industrial Products  
1 Cole Ave  
Winnipeg MB, R2L 1J3  
Ph: 204-667-3330  
Attn. Jason Alsip
- E37.2.2 Detectable guidance tile in sidewalk 4"x24" detectable directional tile in brick red and ocean blue by Armor-Tile as supplied by:
- Alsip's Industrial Products  
1 Cole Ave  
Winnipeg MB, R2L 1J3  
Ph: 204-667-3330  
Attn. Jason Alsip
- E37.3 Installation
- E37.3.1 Install all materials to manufacturer's specifications. Position and shape of materials as per Drawings and as directed on-site by Contract Administrator.
- E37.4 Method of Measurement
- E37.4.1 Detectable paving shall be measured on an area basis for each type of paving. The number to be paid shall be the total number of square metres constructed in accordance

with the Drawings and Specifications and as measured and accepted by the Contract Administrator.

**E37.5 Basis of Payment**

E37.5.1 Supply and Install Detectable Paving will be paid for at the Contract Unit Price per square metre for "Items of Work", 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 this Specification.

(a) Items of Work:

Supply and Install Detectable Paving

(i) Yellow Detectable Panels

**E38. CONCRETE SIDEWALK WITH DIRECTIONAL TILE**

**E38.1 Description**

E38.1.1 This specification shall cover the supply and installation of detectable paving in sidewalk.

E38.1.2 All Work in this section shall be to City of Winnipeg Specification CW 3325 for Supply and Installation of Concrete Sidewalk.

**E38.2 Materials**

E38.2.1 Detectable guidance tile in sidewalk 4"x24" detectable directional tile in brick red and ocean blue by Armor-Tile as supplied by:

Alsip's Industrial Products  
1 Cole Ave  
Winnipeg MB, R2L 1J3  
Ph: 204-667-3330  
Attn. Jason Alsip

**E38.3 Installation**

E38.3.1 Further to specification CW 3325 the Contractor shall construct the proposed concrete sidewalk with block-outs in the concrete for the directional tile as shown on the Drawings. The "block-outs" shall be constructed utilizing forming techniques capable of accommodating the proposed paving stone and brick paving to the dimensions and tolerances as shown on the Drawings and as confirmed with paving stone and brick manufacturer.

E38.3.2 All costs in connection with the additional forming in the concrete as a result of the "block-outs" shall be incidental to the cost of the pay items listed below.

E38.3.3 The concrete sidewalk shall be poured such that the block-outs and remaining sidewalk act as a monolithic section.

E38.3.4 Install all directional tile materials to manufacturer's specifications. Position and shape of materials as per Drawings and as directed on-site by Contract Administrator. The approximate quantity of Red Brick Directional Tile and Ocean Blue Directional Tile is estimated at 275 square metres each.

E38.3.5 Blockouts for all paving bands in sidewalk to be constructed as per the Drawings. All forming is incidental to the unit price bid for concrete sidewalk.

E38.3.6 Thickened sidewalk will be incidental to the unit prices listed in this specification.

E38.3.7 The concrete sidewalk with directional tiles along Stradbrook Avenue from Harkness Avenue to Queen Elizabeth Way will include a 150 mm (exposed height) curb placed along the landscaping side of the sidewalk as per the Contract Drawings. The total length of curb will be approximately 225 m and shall be placed as per City of Winnipeg

Standards. The installation of the curb including all supply of materials shall be incidental to the pay items listed below.

E38.3.8 In locations where concrete sidewalk with directional tile is to be placed as monolithic curb and sidewalk, it shall be paid for the same as the locations to be placed as sidewalk butting up to an existing curb.

E38.3.9 All saw cutting required shall be incidental to the work described in the specification. All sawcut joints shall be laid out as shown on the drawings and are subject for review and approval by the Contract Administrator prior to construction. All saw cutting performed to City of Winnipeg specifications.

#### E38.4 Method of Measurement

E38.4.1 Supply and installation of concrete sidewalk will be measured on an area basis. The surface area to be paid for shall be the total number of square metres supplied in accordance with the specifications and accepted by the Contract Administrator, as measured and accepted by the Contract Administrator.

#### E38.5 Basis of Payment

E38.5.1 Supply and installation of concrete sidewalk will be paid for at the contract square metre price for "Concrete Sidewalk with Directional Tile", measured as specified herein, which price shall be payment in full for supplying all materials including base course, concrete sidewalk, and directional tile as required and performing all operations herein described and all other items incidental to the Work included in this specification.

### **E39. UNIT PAVER INSERT FOR BUS STOP**

#### E39.1 Description

E39.1.1 Further to CW 3335 this Specification shall cover the:

- (a) reinstallation of stockpiled interlocking paving stones (unit pavers);
- (b) supply and installation of interlocking paving stones (unit pavers);
- (c) supply and installation of sand setting bed;
- (d) supply and installation of grout.

E39.1.2 Delivery of unused stockpiled interlocking paving stone.

E39.1.3 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary or and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

#### E39.2 Materials

E39.2.1 Concrete interlocking paving stones (unit pavers) shall be Holland Stone Pavers, supplied by Barkman Concrete, contact Wayne Wiebe, phone 667-3310, as shown on the Drawings and as follows:

- (a) Blue Holland Stone 105x210x60mm (approximate quantity 6 square metres)
- (b) Natural Holland Square Stone 210x210x60mm (approximate quantity 2 square metres)

E39.2.2 Sand:

- (a) Clean brick sand as joint filler.
- (b) Clean brick sand as minimum 13mm depth setting bed.

E39.2.3 Grout:

- (a) Grout as specified hereinafter shall be used for grouting paving stone and brick in areas indicated on the drawings. The grout shall have a compressive strength of 25 MPA at 28 days, determined on 50 mm cubes stored and tested in accordance with ASTM C109, and shall consist of normal Portland cement, sand and water.
- (b) The water-cement ratio shall be kept in the range of 0.45 to 0.55.
- (c) The grout shall have between 3% and 5% entrained air.
- (d) Acryl-Stik or approved equal in accordance with B5 to be used in grout at approximately 4 litres Acryl-Stik to 3 litres water.
- (e) Admixtures to be used in the grout shall be supplied in accordance with the requirements of the City of Winnipeg Standard CW 3310.
- (f) The grout shall be of a consistency suitable for the application intended as approved by the Contract Administrator.
- (g) The Contractor shall provide the Contract Administrator with a mix design statement certifying the constituent materials and mix proportions that will be used in the grout for approval prior to construction.

E39.3 Construction Methods

E39.3.1 Interlocking paving stones shall be installed in block out in concrete sidewalk or on granular base as per the Drawings.

E39.3.2 If cutting of existing concrete sidewalk is required, this shall be incidental to the pay item described in this specification.

E39.4 Installation

E39.4.1 Contractor to install stockpiled pavers prior to supply and installation of new pavers.

E39.4.2 Install sand setting bed for pavers on granular base as shown on the Drawings.

E39.4.3 Contractor to verify the exact dimensions of pavers and panels prior to construction of block outs in concrete sidewalk.

- (a) Install concrete sidewalk as specified on Drawings.
- (b) Install sand bed to minimum 13mm depth as specified on Drawings. Adjust depth of pavers under areas to be re-levelled to ensure surface of pavers is flush with adjacent paving.
- (c) Do not compact setting bed prior to installation of pavers.
- (d) Spread only sufficient area which can be covered with pavers same day.
- (e) Lay pavers on sand bed hand tight.
- (f) In areas where pavers are to be grouted in place clean existing concrete, install grout bed and then place pavers on grout.
- (g) Grout between pavers as required ensuring stability.
- (h) Remove adjacent pavers in bands as required to ensure that bricks do not require cutting on straight bands.
- (i) Where paving pattern is interrupted by vertical structural elements pavers must be sawcut and fit true and hand tight.
- (j) Commence installation of pavers against edge to obtain straightest possible course for installation.
- (k) Pavers shall be cut with a saw only, to obtain true even undamaged edges. Chipped pavers are unacceptable.
- (l) Crews shall Work on installed pavers, not on sand layer.



- (m) Spread and fine grade brick sand over paving surface and sweep into joints, in several directions. Sand is incidental to the price for supply and installation of pavers.
- (n) Compact pavers with vibratory plate compactor having mass of at least 113kg. Compaction is incidental to the price for supply and installation of paving stone.
- (o) Sweep remaining sand over all paving areas and remove from Site.
- (p) Replace at no extra cost all whole or cut stones marked as unacceptable.
- (q) Remove cracked, chipped, broken or otherwise damaged paving materials from Site immediately.
- (r) Upon completion, clean in accordance with manufacturer's recommendations.

#### E39.5 Method of Measurement

- E39.5.1 Supply and installation of interlocking paving stones will be measured on a Unit basis. The amount to be paid for shall be the total number of unit paver inserts for bus stops installed in accordance with the Drawings and Specifications and accepted by the Contract Administrator. There is one unit paver insert for bus stops at each of the bus stop upgrade locations, which consist of paving stones forming a square to identify the location for people to load onto a transit bus.

#### E39.6 Basis of Payment

- E39.6.1 Supply and installation of interlocking paving stones will be paid at the Contract Unit Price per for "Unit Paver Insert for Bus Stop" measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.