



**THE CITY OF WINNIPEG**

# **BID OPPORTUNITY**

**BID OPPORTUNITY NO. 632-2009**

**LOMBARD AVE. & WATERFRONT DR. LDS OUTFALL GATE CHAMBER  
CONSTRUCTION AND UPGRADES – CONTRACT NO. 43**

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## **PART B - BIDDING PROCEDURES**

### **B1. CONTRACT TITLE**

- B1.1 LOMBARD AVE. & WATERFRONT DR. LDS OUTFALL GATE CHAMBER CONSTRUCTION AND UPGRADES – CONTRACT NO. 43

### **B2. SUBMISSION DEADLINE**

- B2.1 The Submission Deadline is 12:00 noon Winnipeg time, October 7, 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.
- B4.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division internet site at <http://www.winnipeg.ca/matmgt>.
- B4.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Division internet site for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B4.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

## **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.
- B5.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.
- B5.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B5.8 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.
- B5.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.
- B5.10 Notwithstanding B5.2 to B5.9, and in accordance with B6.6, 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;
- (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.

B6.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.

B6.5 Bidders are advised not to include any information/literature except as requested in accordance with B6.1.

B6.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B14.1(a).

B6.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B6.8 Bids shall be submitted to:  
The City of Winnipeg  
Corporate Finance Department  
Materials Management Division  
185 King Street, Main Floor  
Winnipeg MB R3B 1J1

## **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, should 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.

B8.2 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 internet site 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 three (3) 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 internet site 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.

B11.2 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 internet site 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 internet site 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(a), 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.

## **B15. AWARD OF CONTRACT**

B15.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B15.2 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.

B15.2.1 Without limiting the generality of B15.2, 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.

B15.3 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.

**B15.3.1** 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 internet site 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 the construction of a cast-in-place concrete gate chamber and installation of 1500mm diameter pump-out manhole base on the existing LDS and PLD for flood control purposes

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

- (a) Construction of a cast-in-place concrete gate chamber including pick-up and installation of a cast-iron sluice and flap gates.
- (b) Remove and dispose of existing manhole.
- (c) Supply and installation of a new manhole as shown on the drawings.
- (d) Supply and installation of approximately 6.0 metres of 900mm diameter concrete land drainage sewer by trenchless methods.
- (e) Removal and disposal of existing sluice gate and operator, and sealing all openings in the top of the existing chamber.
- (f) Removal and disposal of the flap gate at the existing Lombard Avenue manhole.
- (g) Landscaping.
- (h) Site restoration and clean up.

#### **D3. CONTRACT ADMINISTRATOR**

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

Mr. Grantley King, P.Eng.  
Project Engineer, Bridges & Structures  
111-93 Lombard Avenue  
Winnipeg, MB R3B 3B1

Telephone No. (204) 272-2013

Facsimile No. (204) 943-4948

D3.2 At the pre-construction meeting, Mr. King 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.

#### **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 C21.3, 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. 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 should 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 internet site at <http://www.winnipeg.ca/matmgt/safety/default.stm> .

### **D9. INSURANCE**

D9.1 The Contractor shall provide and maintain the following insurance coverage:

- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;
- (b) automobile liability insurance for owned automobiles used for or in connection with the Work in the amount of at least two million dollars (\$2,000,000.00) at all times during the performance of the Work and until the date of Total Performance;
- (c) all risks course of construction insurance in the amount of one hundred percent (100%) of the total Contract Price, written in the name of the Contractor and The City of Winnipeg, at all times during the performance of the Work and until the date of Total Performance.

D9.2 Deductibles shall be borne by the Contractor.

D9.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4.1 for the return of the executed Contract.

D9.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

## **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 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 but in no event later than the date specified in C4.1 for the return of the executed Contract.

## **D11. DETAILED PRICES**

D11.1 The Contractor shall provide the Contract Administrator with a detailed price breakdown (Form I: Detailed Prices) 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 C4.1 for the return of the executed Contract.

D11.2 The Contractor shall state a price for each item or sub-item of the Work identified on Form I: Detailed Prices. The detailed prices must be consistent with the price(s) provided in the Contractor's Bid.

## **D12. DETAILED WORK SCHEDULE**

- D12.1 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 C4.1 for the return of the executed Contract.
- D12.2 The detailed work schedule shall consist of the following:
- (a) a Gantt chart for the Work acceptable to the Contract Administrator;
- D12.3 Further to D12.2(a), the Gantt chart schedule shall clearly identify dates of all of the following activities/tasks making up the Work as well as showing those activities/tasks for the project.
- (a) Flap gates and sluice gates:
    - (i) pick-up;
    - (ii) installation;
    - (iii) show separate tasks for wall thimbles, flap gate, and sluice gate, if different dates apply.
  - (b) Gate chamber excavation and shoring:
    - (i) Mobilization;
    - (ii) submit construction method submission;
    - (iii) submit shoring shop drawings;
    - (iv) dewatering (if required);
    - (v) excavation and shoring.
  - (c) Gate chamber construction:
    - (i) submit required shop drawings;
    - (ii) construct hoarding;
    - (iii) construct floor;
    - (iv) install wall thimbles;
    - (v) construct walls (indicate each separate pour);
    - (vi) construct roof;
    - (vii) remove shoring and backfill;
    - (viii) install miscellaneous metals;
    - (ix) install gates (show separate tasks for wall thimbles, flap gate, and sluice gate, if different dates apply);
    - (x) test gates.
  - (d) Installation of new precast manhole and piping.
  - (e) Removal of existing sluice gate and flap gate from manhole on Lombard Avenue.
  - (f) Surface restoration and landscaping.
- D12.4 Further to D12.2 (a), the Gantt chart shall show the time on a weekly basis, required to carry out each Work activity. The time shall be on the horizontal axis, and the activity shall be on the vertical axis.

## **SCHEDULE OF WORK**

### **D13. COMMENCEMENT**

- D13.1 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.
- D13.2 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 Safe Work Plan specified in D8;
  - (iv) evidence of the insurance specified in D9;
  - (v) the performance security specified in D10;
  - (vi) the detailed prices specified in D11; and
  - (vii) the detailed work schedule specified in D12.
- (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) Commencement of the work shall be at the discretion of the contractor provided the commencement date will allow the achievement of Substantial Performance of the work in accordance with D14.1

#### **D14. SUBSTANTIAL PERFORMANCE**

- D14.1 The Contractor shall achieve Substantial Performance by March 15, 2010.
- D14.2 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 reinspected.
- D14.3 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.

#### **D15. TOTAL PERFORMANCE**

- D15.1 The Contractor shall achieve Total Performance by June 30, 2010.
- D15.2 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 reinspected.
- D15.3 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.

#### **D16. LIQUIDATED DAMAGES**

- D16.1 If the Contractor fails to achieve critical stages, Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:
- (a) Substantial Performance – one thousand dollars (\$1,000.00);
  - (b) Total Performance – five hundred dollars (\$500.00);
- D16.2 The amounts specified for liquidated damages in D16.1 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.
- D16.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

## **D17. SCHEDULED MAINTENANCE**

D17.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

(a) Landscaping maintenance is as specified in E20 and E21;

D17.2 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**

### **D18. JOB MEETINGS**

D18.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City and the Contractor respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.

D18.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

### **D19. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)**

D19.1 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).

### **D20. TRAFFIC CONTROL AND MAINTENANCE OF ACCESS**

D20.1 Comply with the requirements of CW 1130 for traffic control and maintenance of access.

D20.2 Do not park construction vehicles in a manner that will block traffic on streets adjacent to the Site.

D20.3 Provide flag persons to direct traffic around construction vehicles that are unloading equipment and materials at the Site.

D20.4 Do not stockpile materials in a location and manner that will obstruct the safe operation of motor vehicles past the Site.

## **MEASUREMENT AND PAYMENT**

### **D21. PAYMENT SCHEDULE**

D21.1 Further to C12.1, payment for the supply and installation of all materials and other items incorporated into the completed work for Construction of underground concrete structure Gate Chambers shall be in accordance with the following payment schedule:

(a) Payment shall be pro-rated against the Unit Bid Prices based on percentage completion of each of the items of work identified on Form B: Prices, including percentage completion of major items of work identified on Form I: Detailed Prices.

**FORM H1: PERFORMANCE BOND**  
(See D10)

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. 632-2009

LOMBARD AVE. & WATERFRONT DR. LDS OUTFALL GATE CHAMBER CONSTRUCTION AND  
UPGRADES – CONTRACT NO. 43

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 D10)

\_\_\_\_\_  
(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. 632-2009

LOMBARD AVE. & WATERFRONT DR. LDS OUTFALL GATE CHAMBER CONSTRUCTION AND  
UPGRADES – CONTRACT NO. 43

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 I: DETAILED PRICES**  
 (See D11)

**LOMBARD AVE. & WATERFRONT DR. LDS OUTFALL GATE CHAMBER CONSTRUCTION AND  
 UPGRADES – CONTRACT NO. 43**

ITEM NO.	DESCRIPTION	AMOUNT
1.	Excavation and shoring.	
2.	Chamber floor slab.	
3.	Chamber walls and roof slab.	
4.	Pick-up and installation of flap and sluice gates.	
5.	Miscellaneous metal fabrications.	
6.	Removal of existing sluice and flap gates.	
7.	Supply and installation of manhole.	
8.	LDS trenchless installation.	
9.	Reinstatement of primary dyke.	
	Total of items 1 thru 9 above (to equal Bid Price for Section A on Form B: Prices)	

## 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 internet site at <http://www.winnipeg.ca/matmgt>.
- 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>Information Drawings</u>	<u>Drawing Name/Title</u>
	Lombard Ave. & Waterfront Dr. LDS Outfall Gate Chamber - Cover Sheet
LD-5438	Lombard Ave. & Waterfront Dr. LDS Outfall Gate Chamber - Site Plan
LD-5439	Lombard Ave. & Waterfront Dr. LDS Outfall Gate Chamber - Concrete Details (Sheet 1 of 2)
LD-5440	Lombard Ave. & Waterfront Dr. LDS Outfall Gate Chamber - Concrete Details (Sheet 2 of 2)
LD-5441	Lombard Ave. & Waterfront Dr. LDS Outfall Gate Chamber - Reinforcing Details
LD-5442	Lombard Ave. & Waterfront Dr. LDS Outfall Gate Chamber - Access Hatch Details
LD-5444	Lombard Ave. & Waterfront Dr. LDS Outfall Gate Chamber - Miscellaneous Details

#### E2. SOILS INVESTIGATION REPORT

- E2.1 Further to C3.1, of the General Conditions, a geotechnical soils investigation has been done in the vicinity of the proposed works to determine the character of the subsurface soil to facilitate the design of the Work. The information is considered accurate at the locations indicated and at the time of the investigation. However, considerable variations in the soil conditions may exist between test holes and fluctuations in ground water levels can be expected seasonally. Test hole logs are included.
- E2.2 Bidders are responsible for any interpretation they place on the supplied information and are expected to make such additional investigation of the soil as they feel necessary to satisfy themselves.
- E2.3 Any test borings made by the bidder shall be done in accordance with the requirements of the appropriate authority of the City of Winnipeg. Bidders shall notify the contract Administrator prior to starting any soil boring operation.

#### E3. DANGEROUS WORK CONDITIONS

- E3.1 Further to clause C6.26 of the General Conditions, the Contractor shall be aware that underground chambers, manholes, and sewers are considered a confined space and shall follow the "Guidelines for confined Entry Work" as published by the Manitoba Workplace Safety and Health Division. Contractor to address confined space entry procedures in site specific safe work plan.



- E3.2 The Contractor shall be aware of the potential hazards that can be encountered in gate chambers, manholes and sewers such as explosive gases, toxic gases and oxygen deficiency.
- E3.3 The air in a confined space must be tested before entry and continuously during the time that personnel are inside the space. Equipment for continuous monitoring of gases must be explosion-proof and equipped with a visible and audible alarm. The principal tests are for oxygen deficiency, explosion range and toxic gases. Testing equipment must be calibrated in accordance with manufacturer's specifications.
- E3.4 The Contractor shall ventilate all confined spaces including underground chambers, tunnels, pipes and shafts as required and approved by the Manitoba Workplace Safety and Health Act (the "Act"). If no ventilation is supplied, a worker must wear a respirator or supplied air to enter the confined space.
- E3.5 Workers must wear a respirator or supplied air at all times when entering a chamber, manhole or sewer where live sewage is present.
- E3.6 The Contractor shall provide a photoionization detector (PID) on site at all times to monitor potential hydrocarbon vapours in the confined spaces. The gas detector and safety equipment conforming to the Act shall be made available to the Contract Administrator for his use during inspections. In addition, the Contract Administrator shall collect discrete air samples for laboratory analysis.
- E3.7 The Contract Administrator may issue a stop work order to the Contractor if the above guidelines are not being followed. The Contractor shall not resume his operations until the Contract Administrator is satisfied the Contractor is following the appropriate procedures. The Contractor shall have no claim for extra time or costs due to the stop work order for not following these safety guidelines.

#### **E4. MOBILIZATION AND DEMOBILIZATION**

- E4.1 Mobilization and Demobilization will include but not be limited to start-up costs, equipment set-up and removal, field office and storage facilities set-up, removal and site cleanup.
- E4.2 Mobilization and Demobilization will not be measured and shall be included in Gate Chamber Construction.

#### **E5. PROTECTION OF EXISTING TREES**

- E5.1 Take the following precautionary steps to avoid damage from construction activities to existing boulevard trees within the limits of the construction area.
- E5.1.1 Do not stockpile materials and soil or park vehicles and equipment on boulevards within two (2) metres of trees.
- E5.1.2 Strap mature tree trunks with 25mm x 150mm x 2400mm wood planks. Smaller trees shall be similarly protected using appropriately sized wood planks.
- E5.1.3 Excavations shall be carried out in a manner to minimize damage to existing root systems. Where roots must be cut to facilitate an excavation they shall be neatly pruned at the face of the excavation.
- E5.1.4 Work on site shall be carried out in a manner to minimize damage to existing tree branches. Where damage to tree branches does occur, the Contractor shall neatly prune the damaged branch.
- E5.1.5 American elm trees shall not be pruned between April 1<sup>st</sup> and August 1<sup>st</sup> and Siberian elm trees between April 1<sup>st</sup> and July 1<sup>st</sup> of any year under provisions of The Dutch Elm Disease Act.

E5.2 All damage to existing trees due to construction activities shall be repaired to the requirements and satisfaction of the City of Winnipeg, Parks and Recreation Department, Forestry Branch at the Contractor's expense.

E5.3 Costs for protection of trees will be included in gate chamber construction.

## **E6. WATERWAY BY-LAW**

E6.1 The Contractor shall note that all works within 107 metres (350 feet) of a riverbank are within the jurisdiction of the Waterway By-law. The Contract Administrator will apply and pay for required Waterway Permits for the project. The Contractor shall adhere to restrictions imposed by the permit.

E6.2 Under no circumstances will stockpiling of any material be permitted within 107 metres of a riverbank or dyke.

## **E7. SHOP DRAWINGS**

E7.1 Description

(a) This Specification shall revise, amend and supplement the requirements of CW 1100.

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

(b) Shop Drawings

- (i) Original drawings are to be prepared by the Contractor, Subcontractor, Supplier, Distributor, or Manufacturer, which illustrate appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate sections.
- (ii) Shop drawings for the following structural components shall bear the seal of a Professional Engineer registered to practice in the Province of Manitoba.
  - (a) Shoring;
  - (b) Reinforcing steel;
  - (c) Metal fabrications.

(c) Contractor's Responsibilities

- (i) Review shop drawings, product data and samples prior to submission and stamp and sign drawings indicating conformance to the Contract requirements.
- (ii) Verify:
  - (a) Field measurements;
  - (b) Field construction criteria;
  - (c) Catalogue numbers and similar data.
- (iii) Coordinate each submission with requirements of work and Contract Documents. Individual shop drawings will not be reviewed until all related drawings are available.
- (iv) Notify Contract Administrator, in writing at time of submission, of deviations from requirements of Contract Documents.
- (v) Responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator's review of submission, unless Contract Administrator gives written acceptance of specified deviations.
- (vi) Responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.
- (vii) The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the required number of corrected copies of Shop Drawings. The

Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on previous submission.

- (viii) After Contract Administrator's review and return of copies, distribute copies to sub-trades as appropriate.
  - (ix) Maintain one (1) complete set of reviewed shop drawings, filed by Specification Section Number, at the site of the work for use and reference of the Contract Administrator and Subcontractors.
- (d) Submission Requirements
- (i) Schedule submissions at least 14 Calendar days before dates reviewed submissions will be needed, and allow for a 14 Calendar day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.
  - (ii) Submit five (5) paper prints of shop drawings. The Contractor is advised that the Contract Administrator will retain three (3) copies of all submittals and return two (2) copies to the Contractor.
  - (iii) Accompany submissions with transmittal letter, containing:
    - (a) Date
    - (b) Project title and Bid Opportunity number
    - (c) Contractor's name and address
    - (d) Number of each shop drawing, product data and sample submitted
    - (e) Specification Section, Title, Number and Clause
    - (f) Drawing Number and Detail/Section Number
    - (g) Other pertinent data
  - (iv) Submissions shall include:
    - (a) Date and revision dates.
    - (b) Project title and Bid Opportunity number.
    - (c) Name of:
      - (i) Contractor
      - (ii) Subcontractor
      - (iii) Supplier
      - (iv) Manufacturer
      - (v) Separate detailer when pertinent
    - (d) Identification of product of material.
    - (e) Relation to adjacent structure or materials.
    - (f) Field dimensions, clearly identified as such.
    - (g) Specification section name, number and clause number or drawing number and detail/section number.
    - (h) Applicable standards, such as CSA or CGSB numbers.
    - (i) Contractor's stamp, initialled 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.
  - (v) Contractor to monitor the shoring for movement daily and provide a written weekly report showing the daily records to Contract Administrator.

**E7.2 Measurement and payment**

- (a) Preparation, submittal, and revisions of shop drawings shall be included in Gate Chamber Construction.

**E8. FLOW CONTROL**

- E8.1 During winter months land drainage and combined sewers can receive flow of an undetermined amount from groundwater infiltration, watermain breaks, snow melt and other unforeseen sources.
- E8.2 Provide flow control measures to contend with and maintain flow in the land drainage and combined sewers that are directed to the location where the gate chamber is being constructed. Flow control measures shall include but not be limited to diversions, flumes and by-pass pumping.
- E8.3 Discharge hoses for by-pass pumping shall not be laid across vehicle or pedestrian traffic areas and must be protected from freezing during winter months. Pumping equipment if used, shall be set-up in a location and in such a way to not be a noise problem for nearby residences
- E8.4 Provide a flow control plan to the Contract Administrator for review before removing any existing sewer pipe.
- E8.5 Payment for flow control shall be included in Gate Chamber Construction.
- E8.6 In the event the river level becomes higher than the gate chamber activation level and flow in the sewer system is expected to exceed the sewer capacity due to spring runoff, the Contract Administrator may suspend work activities that require temporary by-pass pumping and temporary shutdown of the site. Suspension of these activities will continue until the river level drops below flood pumping activation level and the high flow diminishes in the sewer.
- E8.7 If in the opinion of the Contract Administrator suspension of work activities that require temporary by-pass pumping and temporary shutdown of the site may cause a delay in completion of the Work through no fault of the Contractor, the completion date of the Work will be adjusted accordingly.

**E9. CAST-IN-PLACE CONCRETE GATE CHAMBER CONSTRUCTION & REMOVAL OF EXISTING MANHOLE**

**E9.1 Description**

- (a) This specification shall cover construction of cast-in-place concrete gate chamber, and removal and disposal of the existing manhole. This specification shall also supplement, revise and amend CW 2160.

**E9.2 Materials**

- (a) Concrete Mix Design
  - (i) Concrete mix design shall be as indicated in the Construction Notes on the Drawings.
- (b) Lean-Mix Concrete Design
  - (i) Proportioning of fine aggregate, coarse aggregate, cement, and water for lean mix concrete shall be as follows:
    - (a) Cement: Type 50
    - (b) Minimum Compressive Strength @ 28 days: 15 MPa
    - (e) Slump: 80 mm
    - (f) Air Content: 5-8%
    - (g) Minimum Cement Content = 240 kg/m<sup>3</sup>

- (h) Maximum Water/Cement Ratio = 0.49
- (c) Grout
  - (i) Grout shall be Sika Grout 212 or approved equal in accordance with B5.
- (d) Reinforcing Steel
  - (i) Bar accessories:
    - (a) To be made from a non-corroding material.
    - (b) Shall not stain, blemish or spall the concrete surface for the life of the concrete.
    - (c) Shall be approved by the Contract Administrator.
    - (d) Bar chairs shall be PVC.
- (e) Bonding Agent
  - (i) Bonding agent shall be ACRYL-STIX or approved equal in accordance with B5.
- (f) Waterproofing
  - (i) Waterproofing shall be in accordance with E13 of this specification.
- (g) Waterstop
  - (i) Waterstop shall be 150mm wide by 10mm thick vinylex ribbed-center bulb or approved equal in accordance with B5.
- (h) Cast Iron Sluice Gates
  - (i) Cast iron sluice gates, wall thimbles, mechanical lift operator, stems and accessories shall be in accordance with E11 of this specification.
- (i) Cast Iron Flap Gates
  - (i) Cast iron flap gates and wall thimbles shall be in accordance with E12 of this specification.
- (j) Miscellaneous Metals and Accessories
  - (i) In accordance with E14 of this specification and as shown on the Drawings.
- (k) Shop Drawings
  - (i) Provide shop drawings in accordance with E7 of this specification.
  - (ii) Submit shop drawings for reinforcing steel a minimum of two (2) weeks prior to the fabrication of any reinforcing steel.
- (l) Backfill
  - (i) In accordance with CW 2030. Class of backfill to be as shown on the Drawings.

### E9.3 Construction Methods

- (a) Construction Method Submission
  - (i) No work shall commence on construction of cast-in-place gate chambers until after the Contract Administrator's review of the Contractor's Construction Method submission.
  - (ii) Excavation for the construction of the gate chambers shall be by the shored excavation method.
  - (iii) Prepare for the Contract Administrator's review a Construction Method submission detailing:
    - (i) Construction sequence to be followed including all methods to be employed to ensure no damage occurs to existing structures or adjacent properties within or adjacent to an excavation.
    - (ii) Shoring system to be used.
    - (iii) Proposed method of chamber construction.
    - (iv) Specialized equipment to be used.
    - (v) Any design revisions proposed to accommodate the Contractor's proposed construction method.

- (vi) Water control considerations including details on the Contractor's proposed method of groundwater and surface runoff control.
  - (iv) The Contractor shall respond to any concerns that may be raised by the Contract Administrator after review of Construction Method submission.
- (b) Excavation
  - (i) Remove excavated material from the site immediately. Excavated material shall not be stockpiled on-site unless it will be used as backfill the same day it is excavated.
  - (ii) Place a minimum 75mm thick lean mix concrete slab in the bottom of the excavation to provide a clean working base upon completion of the excavation to the required limits. Allow the concrete to set for twenty-four (24) hours before setting up forms or placing reinforcing steel.
  - (iii) Lean mix concrete shall be well-tamped and screened to give a level working platform for setting up forms and placing reinforcing steel.
  - (iv) Supply and place lean mix concrete, as directed by the Contract Administrator, as backfill for any portions of the excavation, carried beyond the required limits of excavation. The limits of excavation shall be considered to be the inside face of the shoring system and the underside of the working base slab.
  - (v) All working areas below grade shall be kept adequately and securely supported during and after excavation until the shoring and bracing is in place to prevent loss of ground or injury to any person from falling material.
- (c) Sluice Gate located on existing chamber.
  - (i) Remove the existing sluice gate, stem extensions and operator located in the existing gate chamber.
  - (ii) Costs for the removal of the sluice gate, stem extensions and operator will be included in the gate chamber construction.
- (d) Flap Gate located on existing 900mm diameter manhole.
  - (i) Remove the existing flap gate located in the existing Lombard Avenue Manhole.
  - (ii) Install approximately 6 meters of 900mm diameter concrete pipe including tie-ins at the new MH and Gate Chamber as shown on drawing LD-5438.
  - (iii) Cost for the removal of the flap gate and 900mm diameter concrete pipe installation including tie-ins shall be included in the gate chamber construction.
- (e) Excavation Security Fence
  - (i) Further to Clause 3.1 of CW 1130, completely cover the excavation and provide a security fence to completely surround the excavation when unattended generally in accordance with the following.
  - (ii) Security fence shall be chain link fence or approved equal in accordance with B5, a minimum 1.80 metres high with metal support posts embedded far enough into the ground and spaced close enough together so the fence will not sag or collapse.
  - (iii) Attach fencing securely to posts.
  - (iv) Secure the gate or end of the fencing to a post with chain and a padlock.
  - (v) Provide alternate security fence proposal to Contract Administrator for approval.
- (f) Shoring
  - (i) The type, strength, and amount of shoring and bracing shall be such as the nature of the ground and attendance conditions may require, taking into account property lines, existing slopes, utilities and roadways.
  - (ii) Shoring and bracing shall be so spaced and dimensioned as to prevent caving, loss of ground, surface settlement, or squeezing of the soil beyond the neat lines of excavation. It shall be free from defects that might impair its strength or suitability for the work. Sheeting/shoring and bracing shall conform to the latest revisions of the "Construction Safety Act" of the Department of Labour of the Government of Manitoba.

- (iii) Supporting design calculations as required to facilitate review of the submission for conformance with the Contract Documents.
  - (iv) Submit Shop Drawings and design calculations for the shoring/excavation system designed and sealed by a Professional Engineer registered or licensed to practice in the Province of Manitoba and experienced in the structural design of shoring systems. The designer of the shoring system shall inspect the system during construction and certify, in writing to the Contract Administrator, that construction is in conformance with the approved design.
  - (v) Shoring and bracing shall be installed such that the structure size, wall thickness, and any work relating to the construction of the gate chamber as shown on the drawings can be achieved subsequent to installation of the shoring system.
  - (vi) Shoring and bracing shall remain in place until concrete has attained 75% of the design strength.
- (g) Cast-in-place Concrete Chamber Construction
- (i) Construct cast-in-place concrete chambers in accordance with CW 2160, except as supplemented, revised or amended in this specification and as indicated in the construction notes on the Drawings.
  - (ii) Adjust the location of reinforcing steel adjacent to openings to frame those openings in accordance with good practice, and maintain the bar spacing intent.
  - (iii) Do not use welded splices for reinforcing steel.
  - (iv) Order all wall reinforcing steel in lengths to best suit the spacing of walers so that reinforcing bars will not be bent or misformed in order to remove the walers.
  - (v) Install foundation waterproofing in accordance with E13 of this Specification.
- (h) Backfill
- (i) Place and compact backfill material as indicated on the Drawings in accordance with CW 2030. Do not place backfill material in a frozen state. Supply heating and hoarding in accordance with CW 2160 if required to ensure material does not freeze before compaction is complete.
  - (ii) Notify the Contract Administrator at least one (1) full working day in advance of any backfilling operation. No Backfill shall be placed against concrete until approved by the Contract Administrator and in no case before field cured test cylinders show the concrete strength to be 75% of that specified.
- (i) Grout
- (i) Mix and apply grout in accordance with the manufacturer's instructions. Consistency to be suitable for the intended application.
- (j) Sluice Gate Installation
- (i) Install sluice gates, wall thimbles, mechanical lift operator, stem and accessories as shown on the Drawings and in accordance with E11 of this specification.
  - (ii) Sluice gates shall be left in the open position at all times except when on site working on the gate.
- (k) Flap Gate Installation
- (i) Install flap gates, wall thimbles and lifting cable as shown on the Drawings and in accordance with E12 of this specification.
- (l) Miscellaneous Metal Fabrications
- (i) Install miscellaneous metal fabrications as shown on the Drawings and in accordance with E14 of this specification.

#### E9.4 Measurement and Payment

- (a) Construction of cast-in-place concrete gate chambers will be measured on a unit basis and paid for at the Contract Unit Price for "Gate Chamber Construction". The number of units to be paid for will be the total number of cast-in-place concrete gate chambers constructed in accordance with this specification, accepted and measured by the Contract Administrator.





(c) Wall Thimble	ASTM A48 Cast Iron, Class 30
(d) Wedges	ASTM B564 Manganese Bronze, Alloy 865
(e) Wedge Blocks	ASTM A48 Cast Iron, Class 30
(f) Fasteners & Anchors	ASTM A276 Type 316 Stainless Steel
(g) Stem	ASTM A276 Type 304 Stainless Steel
(h) Stem Couplings	ASTM A276 Type 304 Stainless Steel
(i) Stem Guide	ASTM A48 Cast iron, Class 30 with Bronze bushings
(j) Operator Pedestal	ASTM A48 Cast Iron, Class 30 or Steel
(k) Stem cover	Aluminum or Galvanized Steel

### E11.3 Construction Methods

#### (a) Installation

- (i) Install cast iron sluice gate, wall thimble, mechanical lift operator, stems, wall brackets and accessories as shown on the drawings and in accordance with the manufacturer's recommendations.
- (ii) The Contractor will not be allowed to form a block-out in the wall for the installation of the wall thimble. The wall thimble shall be set in place prior to constructing any portion of the wall.
- (iii) Make arrangements to have a qualified field representative of the sluice gate supplier/manufacturer inspect the installation during and after completion and provide a Certificate of Satisfactory Installation to the Contract Administrator.

#### (b) Field Testing

- (i) Perform leakage tests in the Contract Administrator's presence once sluice gates have been installed to ensure compliance with the allowable leakage rate indicated in the latest edition of AWWA C501.
- (ii) Arrange for a qualified field representative of the sluice gate supplier/manufacturer to be present during field testing.
- (iii) Generally, the test for seating head will be performed by closing the gate against high river levels in the spring and measuring the leakage rate through the gate.
- (iv) If it is not possible to use high river level, install an inflatable plug in the outfall, fill the chamber with water to the specified head and measure the leakage rate through the gate. Inflatable plug shall be inflated from, anchored to and removable from the ground surface.
- (v) The test for the unseating head will be performed by closing the sluice gate and flap gate, filling the chamber between the gates with water to the specified head and measuring the leakage rate through the gates. The flap gate may be braced when closed to eliminate leakage through it during the test. Any damage to the flap gate shall be corrected by the contractor at their expense.
- (vi) The Contractor will be responsible to pump river water or supply water from a hydrant into the chamber for testing purposes.
- (vii) If the gate fails the field leakage test, the supplier/manufacturer shall be responsible for the cost associated to repeat the test, and shall undertake all adjustments, replacements or other modifications necessary to facilitate the test at his own expense. The sequence shall be repeated until the gate passes the allowable leakage rate.

### E11.4 Measurement and Payment

- (a) Pick-up, installation and testing of cast iron sluice gates, wall thimbles, mechanical lift operator, stems, wall brackets and accessories shall be included in Gate Chamber Construction.

## E12. CAST IRON FLAP GATE

### E12.1 Description

#### (a) General

- (i) This Specification shall cover the pick-up, load, installation and testing of cast iron flap gate, wall thimble, and accessories.
- (b) All materials herein described to be incorporated in the gate chamber have been supplied and delivered by Others under Bid Opportunity 619-2009, and are located at 360 McPhillips Street, Winnipeg, Manitoba R3E 2L1.
- (c) The Contractor shall be solely responsible for all transportation to collect the cast iron flap gate, wall thimble, and accessories after being notified by the Contract Administrator of their availability. The Contractor is advised that the cast iron flap gate, wall thimble, and accessories will be available for pick-up from February 1, 2010.
- (d) The Contractor shall verify and confirm that the correct type and quantities of the cast iron flap gate, wall thimble, and accessories have been received. In addition, the Contractor shall verify that the cast iron flap gate, wall thimble, and accessories are free of any visible damage or defects. The Contractor shall inform the Contract Administrator of any visible damage or defects within 24 hours of receipt of the components.
- (e) The Contractor shall be solely responsible for the cast iron sluice gate, wall thimble, mechanical lift operator, stem, wall brackets and accessories in his possession from the time of receipt.

### E12.2 Materials

- (a) Cast Iron Pieces: ASTM A48 Cast Iron, Class 30
- (b) Seating Faces: ASTM B21 Bronze, Alloy 482
- (c) Links: Cast Iron or High Tensile Bronze B584 – C865
- (d) Bushings: Bronze B21, Alloy 482
- (e) Hinge Pins: ASTM A276, Type 316 Stainless Steel or Silicon Bronze B98-CA655
- (f) Fasteners: ASTM A276, Type 316 Stainless Steel

### E12.3 Construction Methods

#### (a) Installation

- (i) Install cast iron flap gate and wall thimble as shown on the drawings and in accordance with the manufacturer's recommendations.
- (ii) The Contractor will not be allowed to form a block-out in the wall for the installation of the wall thimble. The wall thimble shall be set in place prior to constructing any portion of the wall.
- (iii) Make arrangements to have a qualified field representative of the flap gate supplier/manufacturer inspect the installation during and after completion and provide a Certificate of Satisfactory Installation to the Contract Administrator.

#### (b) Field Testing

- (i) Perform leakage tests in the Contract Administrator's presence once flap gates have been installed to ensure compliance with the allowable leakage rate of 1.24 L/min per metre of seated perimeter at any head.
- (ii) Arrange for a qualified field representative of the flap gate supplier/manufacturer to be present during field testing.
- (iii) The test for seating head will be performed by closing the flap gate and sluice gate, filling the chamber between the gates with water to the specified head and measuring the leakage rate through the gates.
- (iv) The Contractor will be responsible to pump river water or supply water from a hydrant into the chamber for testing purposes.

- (v) If the gate fails the field leakage test, the supplier/manufacturer shall be responsible for the cost associated to repeat the test, and shall undertake all adjustments, replacements or other modifications necessary to facilitate the test at his own expense. The sequence shall be repeated until the gate passes the allowable leakage rate.

#### E12.4 Measurement and Payment

- (a) Supply, installation and testing of cast iron flap gates and wall thimbles shall be included in Gate Chamber Construction.

### **E13. FOUNDATION WATERPROOFING**

#### E13.1 Description

- (a) General
  - (i) This Specification shall cover the supply and placement of underground concrete gate chamber foundation waterproofing.

#### E13.2 Materials

- (a) Waterproofing membrane: Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, reinforced with non-woven polyester weighing 180 g/m<sup>2</sup>. Top surface polyethylene film. Bottom surface: thermofusible plastic film. Acceptable material: Soprema Sopralene Flam 180, IKO Aquabarrier TG or approved equal.
- (b) Primes, mastic sealant and accessories: as recommended by membrane manufacturer, applicable for substrate.
- (c) Protection board: insulating fibreboard to CAN/CSA-A247, Type II, 12 millimetres thick.

#### E13.3 Construction Methods

- (a) Quality Assurance
  - (i) Installation of waterproofing membrane shall be performed by workers approved and trained by manufacturer for application of its products. Applicators must have minimum 5 years proven experience. If requested, submit proof of experience, in writing, from manufacturer.
- (b) Warranty
  - (i) Provide written warranty, signed and issued in the name of The City of Winnipeg stating that the waterproofing is guaranteed against leaking, loss of adhesion, for a period of five (5) years from the date of acceptance.
- (c) Environmental Requirements
  - (i) Maintain air temperature and structural base temperature at installation area above membrane manufacturer's recommendations before, during and 72 hours after installation.
  - (ii) For applications in freezing weather do not commence application until authorized by membrane manufacturer.
  - (iii) For enclosed applications ensure adequate forced air circulation during curing period.
  - (iv) Install membrane on dry substrates, free of snow and ice. Use only dry materials and apply only during weather that will not introduce moisture beneath waterproofing membrane.
- (d) Preparation
  - (i) Examine substrates and site conditions to ensure acceptability for application of waterproofing membranes. Notify Contract Administrator, in writing, of unsuitable surfaces or working conditions.
  - (ii) Do not commence application until all other work that will penetrate membrane is complete.

- (iii) Clean substrates of all snow, ice, loose particles, oil, grease, dirt, curing compounds, or other foreign matter detrimental to application of primers and waterproofing membranes.
  - (iv) Ensure concrete surfaces are fully cured and dry using test methods recommended by membrane manufacturer.
  - (v) Repair defects in concrete surfaces such as spalled or poorly consolidated concrete. Remove sharp protrusions, sharp edges and form lines.
  - (vi) Patch rough areas with a weld-adhered parge coat to provide smooth surface. Allow to fully cure and dry.
- (e) Priming
- (i) Apply primer in accordance with manufacturer's instructions at recommended rate of application.
  - (ii) Do not apply primer to frozen or damp surfaces.
  - (iii) Apply primer only when air and surface temperatures are within manufacturer's recommended limits.
  - (iv) Avoid pooling of primer and allow to cure until tack-free.
  - (v) Prime only the area to be covered with membrane in a working day. Re-prime areas not covered with waterproofing within 24 hours of application of primer.
- (f) Membrane Application
- (i) Apply membrane in accordance with manufacturer's instructions and with good construction practice to maintain continuity of waterproofing over building elements below finished grade elevation.
  - (ii) Place membrane in position without stretching, taking care to avoid trapped air, creases or fish mouths.
  - (iii) Ensure membrane is totally bonded to substrate.
  - (iv) Apply membrane vertically in longest possible lengths to reduce number of end joints.
  - (v) Overlap side laps minimum 75 millimetres and end laps minimum 150 millimetres. Stagger end laps minimum 300 millimetres in adjacent rows.
  - (vi) Seal horizontal and vertical terminations by applying heavy pressure to edges with a roller to ensure positive bond. Apply a continuous bead of mastic sealant to all terminations. Make watertight. Seal daily terminations with mastic sealant.
  - (vii) Terminate membrane 300 millimetres below finished grade.
- (g) Membrane Application at Corners
- (i) Remove sharp or protruding edges from external corners prior to application of membrane.
  - (ii) Reinforce external corners with cushion strip of membrane minimum 300 mm wide at each corner. Install cushion strip below main membrane.
- (h) Membrane Application Over Protrusions and Penetrations
- (i) Apply two layers of membrane flashing around protrusions and extend at least 150 millimetres in all directions. Cut and fit membrane neatly and snug fitting, leave no gaps. Seal all terminations with mastic sealant. Flash protrusions with liquid mastic extending 150 millimetres along pipe or conduit.
  - (ii) Seal with liquid mastic all protrusions or difficult detail areas which do not allow easy installation of membrane. Make watertight.
- (i) Inspection and Repair
- (i) Inspect membrane thoroughly before covering and make corrections immediately.
  - (ii) Patch and repair misaligned or inadequately lapped seams, tears, punctures or fishmouths.
  - (iii) Patch with piece of waterproofing membrane and extend minimum 150 millimetres in all directions from fault and seal edges with mastic sealant.

- (j) Protection Board
  - (i) Install protection board against all waterproofing membranes to protect against backfilling operations.
  - (ii) Install boards vertically without fasteners or adhesives.
  - (iii) Install protection board during backfilling operations to allow backfill materials to hold protection board tight to waterproofing membrane.
  - (iv) Terminate protection board 600 millimetres below grade.

#### E13.4 Measurement and Payment

- (a) Supply and installation of waterproofing membrane and protection board shall be included in Gate Chamber Construction.

### **E14. MISCELLANEOUS METAL FABRICATIONS**

#### E14.1 Description

- (a) General
  - (i) This Specification shall cover the supply, fabrication, transportation, handling, delivery and placement of metal fabrications.

#### E14.2 Materials

- (a) All materials shall be of a type acceptable to the Contract Administrator, and shall be subject to inspection and testing by the Contractor Administrator.
- (b) Material intended for use in the various assemblies shall be new, straight, clean, with sharply defined profiles.
- (c) Steel Sections and Plates: to CAN/CSA G40.20/G40.21, Grade 300 W, except W, HP and HSS sections, which shall be Grade 350 W.
- (d) Steel Pipe: to ASTM A53/A53M, seamless, galvanized, as specified by item.
- (e) Welding materials: to CSA W59.
- (f) Hot dipped galvanized steel repair material: Galvalloy and Gal-Viz
- (g) Stud Anchors: to ASTM A108, Grade 1020.
- (h) Aluminum: to CAN/CSA S157 and the Aluminum Association 'Specifications for Aluminum Structures'. Aluminum for plates shall be Type 6061-T651. Aluminum plate shall have an approved raised oval or multi-grip pattern.
- (i) Isolating sleeves shall be "Nylite" – headed sleeve as manufactured by SPAE-Naur of Kitchener, Ontario, or approved equal in accordance with B5.
- (j) Anchor bolts and fasteners: ASTM A276, Type 316 stainless steel, of ample section to safely withstand the forces created by operation of the equipment or the load to which they will be subjected.
- (k) Steel posts, rails, pickets, gate, and fittings shall be Majestic Eagle as manufactured by Iron Eagle of Ontario, or approved equal in accordance with B5.

#### E14.3 Construction Methods

- (a) Submittals
  - (i) Submit the qualifications of the fabricator and welders to the Contractor Administrator for acceptance.
  - (ii) Submit shop drawings in accordance with E7 clearly indicating materials, core thickness, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and, accessories. Indicate field measurements on shop drawings.

(b) Fabrication

- (i) Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured. Assemble work in such a way that no disfigurements will show in the finished work, or impair the strength.
- (ii) Confirm measurements for all fabrications before fabricating.
- (iii) Cut aluminum plate with edges straight and true, and as far as practical, maintain continuity of the pattern at abutting edges.
- (iv) Pieces shall be of the sizes indicated on the Drawings and shall not be built up from scrap pieces. Confirm sizes with field measurements.
- (v) Where possible, fit work and shop assemble, ready for erection.
- (vi) Angle frames shall be of the same material as the cover plate, and cover plates shall be hinged and be supplied with lifting handles, as shown on the Drawings. Exterior covers shall be supplied with a hasp for a padlock.
- (vii) Remove and grind smooth burrs, filings, sharp protrusions, and projections from metal fabrications to prevent possible injury. Correct any dangerous or potentially harmful installations as directed by Contract Administrator.
- (viii) All steel welding shall conform to CSA Standard W.59. Fabricator shall be fully approved by the Canadian Welding Bureau, in conformance with CSA Standard W.47.1. Welding shall be done by currently licensed welders only.
- (ix) All aluminum welding shall conform to Welding shall be in accordance with the requirements of CSA W59.2. The fabricator shall be fully certified in conformance with CSA Standard W47.2. All welding shall be done in a licensed welding shop, and no field welding will be permitted unless approved in writing, in advance, by the Contract Administrator.
- (x) Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- (xi) All steel shall be hot-dip galvanizing after fabrication, in accordance with CAN/CSA-G164, to a minimum net retention of 600 gm/m<sup>2</sup>.
- (xii) Seal exterior steel fabrications to provide corrosion protection in accordance with CAN3-S16.1.
- (xiii) Use self-tapping shake-proof flat-headed screws on items requiring assembly by screws.

(c) Erection

- (i) Do steel welding work in accordance with CSA W59 and aluminum welding work in accordance with CSA W59.2
- (ii) Erect metalwork in accordance with reviewed shop drawings, square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- (iii) Provide suitable means of anchorage acceptable to Contract Administrator such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles where not specifically indicated on the Drawings.
- (iv) Provide components for building in accordance with shop drawings and schedule.
- (v) Make field connections with bolts to CAN/CSA-S16, or weld.
- (vi) Touch-up rivets, bolts and burnt or scratched surfaces that are to receive paint finish, with zinc primer after completion of erection.
- (vii) Repair damaged galvanized surfaces and field welds with self-fluxing, low temperature, zinc-based alloy rods in accordance with ASTM A780, Repair of Damaged Hot Dip Galvanizing Coatings. The general procedure shall be to allow a small amount of the repair alloy to flow then spread by brushing briskly with a wire brush. Brushing shall be sufficient to obtain a bright finish. Repeat process three times to ensure a proper thickness is achieved. Temperatures shall be kept below 177°C (350°F) at all times. All heating of structural steelwork shall be done in the presence of the Contract Administrator.

- (viii) Install access hatch frames square and level at the locations show on the Drawings. Embed anchors in concrete as shown on the Drawings. Install covers and adjust hardware to proper function.
- (ix) All aluminum surfaces in contact with concrete shall be isolated using alkali-resistant bituminous paint meeting the requirements of CGSB 31-GP-3M.
- (x) Install electrochemical isolation gaskets and sleeves to electrically isolate dissimilar metals.

**E14.4 Measurement and Payment**

- (a) Supply, fabrication, transportation, handling, delivery and placement of metal fabrications shall be included in Gate Chamber Construction.

**E15. TEMPORARY SURFACE RESTORATION AND MAINTENANCE**

E15.1 Further to CW 1130, if the Contractor fails to maintain disturbed surfaces as directed and within the time period given by the Contract Administrator, the City or its designate may perform the work required and the cost may be deducted from payments owed.

E15.2 Costs for temporary restoration and maintenance of disturbed surfaces will be included in gate chamber construction.

**E16. SURFACE RESTORATION**

E16.1 Restoration of all existing surface areas disturbed by construction activities including but not limited to areas disturbed by; construction equipment, placement of field office or equipment trailer, snow clearing and where construction materials were stockpiled, shall be restored as follows.

- (a) Grassed areas: sodding using imported topsoil in accordance with CW 3510.
- (b) Gravel surfaces: in accordance with CW 3150.
- (c) Asphalt surfaces: match existing base course and asphalt thickness or a minimum of 150 millimetres of base course and 75 millimetres of Type 1A Asphaltic concrete whichever is greater, in accordance with CW 3410.
- (d) Pavement slabs (including private approaches): in accordance with CW 3230.
- (e) Miscellaneous concrete slabs (median slab, sidewalk, bullnose: in accordance with CW3235).
- (f) Concrete curb and gutter: in accordance with CW 3240.

E16.2 Costs for surface restoration shall be included in Gate Chamber Construction.

**E17. REINSTATEMENT OF THE PRIMARY DYKE**

E17.1 Description

- (a) The works shall be done in accordance with this Specification, and the City Standard Specification CW 3170 as amended herein.

E17.2 Materials

- (a) Fill Material
  - (i) Approved clay material as per Clause 5.4 of CW 3170. Non-frozen material only.
- (b) Construction Methods
  - (i) The Contractor shall note that the Gate Chamber is located in the primary dyke of protection against high spring water levels.
  - (ii) Reinstatement of the primary dyke shall conform to CW 3170 and as amended herein. The Contractor shall be responsible to have sufficient portions of the primary

dyke in place prior to spring break up of the Red River to ensure that the integrity of the dyke is not compromised.

- (iii) Acceptable methods for temporary reinstatement of the primary dyke to accommodate the Spring 2010 Red River break up and crest shall be one of the following:
  - (a) Leaving a sufficient portion of the existing dyke in place. A sufficient portion shall generally be understood to be a minimum of 1200 mm top width of existing dyke complete with the entire west face intact and the east face left in such a manner so as not to compromise the structural integrity of the dyke. Material in this area shall not be disturbed during construction, except as required during permanent reinstatement. All excavated areas west of the remaining dyke cross section shall be temporarily backfilled with approved material;
  - (b) Sand bagging to temporarily reinstate any breach in the primary dyke. Sand bags shall be placed to a sufficient cross section as approved by the Contract Administrator so as not to compromise the hydrostatic or structural integrity of the dyke.
  - (c) Alternate methods may be approved during the course of construction provided they meet the above technical requirements and the approval of the Contract Administrator.
- (iv) Placement and compaction of frozen material will not be an acceptable method of temporary reinstatement.
- (v) Temporary reinstatement must be in place prior to Spring break up of the Red River.
- (vi) In addition to the above requirements, the Contractor shall maintain and repair the temporary dyke as is required to maintain its hydrostatic and structural integrity until final reinstatement of the dyke is complete.

#### E17.3 Measurement and Payment

- (a) Reinstatement of the primary dyke shall be included in gate chamber construction.

### **E18. TREE REMOVAL**

#### E18.1 General

- E18.1.1 Further to CW 3010, this specification shall cover the felling of trees and removal of stumps, limbs, roots, and tree debris.
- E18.1.2 Tree removal will be measured on a unit basis for each tree removed and paid for at the Contract Unit Price for "Tree Removal". The number of units to be paid for will be the total number trees removed and disposed of off site in accordance with CW 3010 and this specification, accepted and measured by the Contract Administrator.

### **E19. PATHWAY REALIGNMENT**

#### E19.1 Description

- (a) This specification shall cover the construction to realign the pathway as shown on the Drawings, and removal of the section of existing pathway. This specification shall also supplement, revise and amend CW 3110 and CW 3410.

#### E19.2 Measurement and Payment

- (a) Pathway realignment will be paid for at the Contract Lump Sum Price for "Realign Pathway", which price will be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification.



## **E20. LANDSCAPING**

### **E20.1 Description**

- (a) This specification shall cover the supply and installation of shrubs, sod and removal of existing trees.
- (b) The Work to be done by the Contractor under this Specification shall include the furnishing of all labour, materials, equipment and services necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified and as shown on the Drawings.

### **E20.2 References and Related Specifications**

- (a) All related specifications shall be current issue or latest revision at the first date of tender advertised.
- (b) Related Specifications
  - (i) Clearing and Grubbing CW 3010
  - (ii) Topsoil and Finish Grade for the Establishment of Turf Areas CW 3540
  - (iii) Sodding CW 3510

### **E20.3 Materials**

- (a) Water
  - (i) Water is to be potable and free of minerals that may be detrimental to plant growth.
- (b) Wood Chip Mulch
  - (i) Wood Chip Mulch pieces shall be no longer than 125mm in any one direction.
  - (ii) Wood Chip Mulch shall be locally supplied from tree specimens free from disease and fungus. Wood Chip Mulch shall be free of Poplar and Willow bark, wood, or root entities.
  - (iii) Wood Chip Mulch shall not contain soil, stone or any other deleterious material.
  - (iv) Wood Chip Mulch shall match existing.
- (c) Planting Soil
  - (i) As specified in CW 3540
- (d) Sod
  - (i) As specified in CW 3510
- (e) Root Ball Burlap
  - (i) Root ball burlap is to be 150 g Hessian burlap, biodegradable.
- (f) Wire Baskets
  - (i) Wire baskets are to be a horticulturally accepted product designed to carry the weight and to contain a burlap-covered root ball.
  - (ii) Minimum diameter basket size is to conform to the same minimum diameter of the tree root ball for the respective minimum tree calliper sizes.
- (g) Fertilizer
  - (i) Fertilizer shall be standard commercial brands meeting the requirements of the Canada Fertilizer Act and the Canadian Fertilizer Quality Assurance Program.
  - (ii) Fertilizer is to be a slow release formulation of low nitrogen and high phosphorus e.g. 10-50-12.
  - (iii) All fertilizers shall be granular, pelletized or pill form, and shall be dry and free flowing.
  - (iv) Apply quantities at rates stated by product manufacturer.

(h) Source Quality Control

- (i) The Contractor shall inform the Contract Administrator of the proposed source of plant material to be supplied. The Contract Administrator reserves the right to reject materials not conforming to the requirements of this Specification.
- (ii) Plant material is to be grown in nurseries under proper cultural practices as recommended by the Canadian Nursery Trades Association.
- (iii) Only those plants which have been grown in local Manitoba nurseries located in an Agriculture Canada Plant Hardiness Zone designation of 2(a or b) or 3(a or b) and within a 250 kilometre radius of Winnipeg will be accepted. Plants that have been grown in plant hardiness zones 1 and 4 or greater will be rejected.
- (iv) The Contract Administrator shall notify the contractor at least 24 hours prior to inspection.

(i) Plant Material

- (i) Nomenclature of specified plants is to conform to the International Code of Nomenclature for Cultivated Plants and is to be in accordance with the approved scientific names given in the latest edition of the Standardized Plant Names.
- (ii) All plants are to be supplied in accordance with the Work of this Contract and shall be inspected by the Contract Administrator at the nursery site.
- (iii) At the time of inspection, the Contractor shall permanently tag a suitable branch of each plant with a distinct code clearly indicating that the City of Winnipeg Water and Waste Department will be the intended recipient of that tree.
- (iv) The Contract Administrator must approve the tag and code at least two (2) weeks in advance of their use.
- (v) The tag must be kept on the tree at the time of planting, and removed only when authorized in writing by the Contract Administrator.
- (vi) The Contract Administrator will reject trees that are delivered without their tags intact at the planting site.
- (vii) Plants are to be characteristically developed for their species and structurally sound, well branched, healthy and vigorous and densely foliated when in leaf. The plant is to have a healthy, well developed, fibrous root system which may be verified through a testing procedure that destructively samples one or more randomly selected root balls.
- (viii) All parts of the plants, especially the lower branches, are to be moist and show live, green cambium tissue when cut.
- (ix) Plants are to be free of disease, insect infestation, rodent damage, sun scald, frost cracks, abrasions, unhealed scars, scars exceeding 5 cm in diameter, major forks or crooks in the trunk, broken branches, or angled leaders. Plants having the above defects will not be accepted.
- (x) Plants having a leader which has developed at a sharp angle to the trunk as a result of pruning or trunk damage will not be accepted.
- (xi) Plants exhibiting suppressed, weakly developed branches due to competition from other closely spaced trees in the nursery and trees exhibiting dead branches will not be accepted.
- (xii) Use of collected or native plants is not permitted.

(j) Plant Quantity and Size

- (i) Plants are to be planted at the quantities and sizes listed on Plant List (Table E20.3). Contractor to ensure that Table E20.3 Plant List matches the Plant List on drawings, and will notify the Contract Administrator of any discrepancies.
- (ii) Any variations to species, size or calliper of specified plants will require a request for approval from the Contract Administrator.
- (iii) Any changes in planting locations will be determined on-site by the Contract Administrator.

- (iv) Plants are to conform to the measurements specified in the Plant List, except that trees larger than specified may be used if approved by the Contract Administrator.

Table E20.3 - Plant List:

QUANTITY	COMMON NAME / BOTANICAL NAME	SIZE AND REMARKS
<b>SHRUBS</b>		
3	Flowering Almond / <i>Prunus tenella</i>	Min. 600mm ht., dense bushy plants, container.
10	Golden Princess Spirea / <i>Spirea japonica 'Golden Princess'</i>	Min. 300mm ht., dense bushy plants, container.

(k) Shipment and Pre-Planting Care

- (i) Coordinate shipping of plants and excavation of holes to ensure a minimum of ten (10) days time between digging and planting.
- (ii) Cover plant foliage with tarpaulin, and protect bare roots by means of dampened straw, peat moss, saw dust or other acceptable material to prevent loss of moisture during transit and storage.
- (iii) Remove broken and damaged roots with sharp pruning shears. Make clean cuts, and cover cuts over 10mm diameter with a wound dressing.
- (iv) Keep roots moist and protected from sun and wind. Heel-in plants which cannot be planted immediately in shaded areas and water well.

E20.4 Construction Methods

E20.4.1 Workmanship

- (a) Plant deciduous location of plants will be staked out or painted on Site, in accordance with the landscape drawings, by the Contractor. Locations shall be approved by the Contract Administrator prior to installation.
- (b) Keep site clean and planting holes drained. Immediately remove soil or debris spilled onto street pavement, grass or sidewalk.

E20.4.2 Planting Time

- (a) Plant during dormant period before buds have broken.
- (b) Plant only under conditions that are conducive to health and physical conditions of trees.
- (c) Provide planting schedule to Contract Administrator. Extending planting operations over long period using limited crew will not be accepted.
- (d) The Contractor must obtain all above and below ground clearances from all utilities in a timely manner so as not to jeopardize the schedule of the complete planting Contract.

E20.4.3 Excavation

- (a) Excavate planting pits as indicated by stakes or paint marks.
- (b) Protect bottom of excavations against freezing.
- (c) Remove water, which enters excavations prior to planting. Ensure source of water is not ground water or from broken City water main pipe.

#### E20.4.4 Installation

- (a) Planting shall be done during periods of suitable weather conditions and in accordance with locally accepted practice.
- (b) Plants are to be planted within forty-eight (48) hours of excavation from the nursery.
- (c) No pit is to be left open at the end of the Contractor's Work Day. Planting program is to be planned to ensure that all approved trees delivered to the Site at designated planting locations are installed and thoroughly watered the same day as delivery.
- (d) Loosen bottom and sides of planting hole to depth of 100 - 150mm.
- (e) Plant material vertically. Orient plants to give best appearance in relation to structure, roads and sidewalks.
- (f) Place plants to depth equal to depth they were originally growing in nursery.
- (g) With balled and burlapped root balls and root balls in wire baskets, loosen burlap and cut away the top 1/3 without disturbing root ball. Do not pull burlap or rope from under root ball. Non-biodegradable wrapping must be removed.
- (h) 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.

#### E20.4.5 Fertilizing

- (a) When planting is completed, give surface of planting saucer dressing of a fertilizer with an N-P-K ratio of 15-30-15 or approved equal. Mix fertilizer thoroughly with top layer of planting soil and water in well as per manufacturers specifications.

#### E20.4.6 Pruning

- (a) The Contractor shall provide a person with a Manitoba Certified Arborists Licence for each Work crew or Work Site.
- (b) Prune after planting to compensate for loss of roots suffered during transplanting. Postpone pruning of material where heavy bleeding may occur, until in full leaf. Employ clean sharp tools and make cuts flush with main and secondary branch collars, smooth and sloping to prevent accumulation of water.
- (c) Remove dead and injured branches and branches that rub causing damage to bark. Trim out crown of trees without changing their natural shape. Do not damage lead branches or remove smaller twigs along main branches.

#### E20.4.7 Watering

- (a) Trees are to be watered during the planting procedure as described previously, and once a week thereafter, or more frequently if required, during the growing season.
- (b) A complete record is to be kept of each series of waterings for all planted material noting:
  - (i) location
  - (ii) date of watering.

This record shall be sent bi-weekly to the Contract Administrator.

- (c) Apply 40 litres of water per 25mm calliper per application using deep root feeder or low/pressure nozzle and hose. The water stream must not gouge out a hole in the soil and mulch.

#### E20.5 Replacements

- (a) During the Maintenance Period, the Contractor shall remove from Site any plant material that has died or failed to grow satisfactorily as determined by the Contract Administrator and replace with the same as per Specifications within a maximum ten (10) day period from notification.

- (b) The Contractor shall extend Maintenance and Warranty on replacement shrub for a period equal to the original Maintenance and Warranty Periods.
- (c) The Contractor shall continue such replacement, Maintenance and Warranty until plants are acceptable.

#### E20.6 Maintenance

- (a) The Contractor shall be responsible for the maintenance of the planted material until Total Acceptance.
- (b) For areas planted after September 15th the maintenance period will commence on May 15th of the following year or such date as mutually agreed upon by the Contractor and Contract Administrator.
- (c) The Contractor shall replace defective plants within three (3) days of notification by the Contract Administrator.

See also E21 of this document.

#### E20.7 Warranty

- (a) The Contractor shall, at his own expense, maintain the Work against any and all defects or deficiencies resulting from insect infestation, disease and mechanical damage due to improper handling, installation or maintenance, for a period of one (1) years from the date of the Certificate of Substantial Performance.
- (b) Nursery stock damaged by vandalism or reasons beyond the control of the Contractor shall be replaced by the client.
- (c) End-of-Warranty inspection will be conducted by the Contract Administrator.
- (d) End-of-Warranty inspection will not take place in late fall, or early spring.
- (e) The Contract Administrator reserves the right to request material replacement or extend the Contractor's Maintenance responsibilities for an additional one (1) year if, at the end of the one (1) year Warranty Period, leaf development and growth are not sufficient to ensure future survival of the tree or shrub.

#### E20.8 Measurement and Payment

- (a) Shrubs will be measured on a unit basis and paid for at the Unit Price for "Landscaping", which price shall be payment in full for supplying all materials and for performing all operations herein described, and all other items incidental to the work included in this Specification.
- (b) Number of units to be paid for will be the total number of landscaping installations in accordance with this Specification, accepted and measured by the Contract Administrator.

### **E21. LANDSCAPE MAINTENANCE**

#### E21.1 Description

E21.1.1 This specification shall cover the maintenance of trees from the time of installation until Total Acceptance. The Contractor shall furnish all labour, materials, equipment and services necessary to perform the work according to the Drawings and Specifications. In general, work shall include:

- (a) Spring cleaning
- (b) Fertilizing
- (c) Watering
- (d) Weed Control
- (e) Pest and disease control

- (f) Pruning
- (g) Winter preparation
- E21.1.2 Protection
  - (a) Prevent damage to fencing, other trees, landscaping, benches, buildings, pavement, surface and underground utility facilities due to maintenance equipment and personnel.
- E21.1.3 Maintenance Schedule
  - (a) The Contractor shall provide a complete written Maintenance schedule to the Contract Administrator prior to the issuing of the Certificate of Substantial Performance.
  - (b) The Maintenance Schedule shall indicate days of week dedicated to on-site maintenance (weather dependant) subject to random inspection by Contract Administrator.
  - (c) The Maintenance Schedule shall indicate what maintenance practice will be performed weekly/monthly/seasonally.
  - (d) All maintenance of shrubs to be supervised by a Manitoba Certified Arborist.
- E21.1.4 Documentation and Reporting
  - (a) Record in a logbook the operations carried out and any conditions that require attention or monitoring. The arborist shall submit a summary of the information as a monthly report to the Contract Administrator. Conditions requiring attention should be brought to the Contract Administrator's attention immediately.
  - (b) The contractor should review the site regularly and adjust maintenance operations to suit observed conditions. A Site Maintenance Inspection Form (supplied by the Contract Administrator) should be used to record each site visit. Completed copies of these forms shall be sent to the Contract Administrator biweekly.
  - (c) Report in writing any major maintenance procedures intended, minimum one week in advance.
  - (d) If any damage, dangerous or potentially dangerous situations related to landscape works are observed, the Contractor shall notify the Contract Administrator immediately.
- E21.1.5 Failure to Document and Submit
  - (a) If the Contractor fails to submit a monthly report it shall be assumed the work was not performed for that time period. Payment for Landscape Maintenance shall be reduced by 1/6th for every month a report is not submitted.
- E21.1.6 Qualifications
  - (a) All landscape maintenance personnel shall be skilled in the tasks assigned to them.
- E21.1.7 Certificate of Acceptance
  - (a) The Certificate of Acceptance for landscape works will be issued upon completion of Total Acceptance, provided that shrubs are well established and rooted, properly pruned and showing vigorous growth satisfactory to the Contract Administrator.
  - (b) Unacceptable trees or shrubs shall be removed and replaced according to the required specifications. Maintenance of replacement items shall be extended for a period equal to the original Maintenance Period as specified herein. The Contract Administrator shall make further inspection after the additional Maintenance Period.
  - (c) Replacement and maintenance requirements shall continue until the material is accepted.
- E21.2 Materials
  - E21.2.1 Fertilizer
    - (a) Fertilizer shall be complete synthetic slow release fertilizer with maximum 35% water soluble nitrogen.

### E21.3 Construction Methods

#### E21.3.1 Spring Cleaning

- (a) Remove any dead vegetation, leaves and debris. Heavy raking shall be done with a flexible grass rake on areas with snow mold. Lightly roll areas where grass plants have lifted due to frost action.

#### E21.3.2 Fertilizing

- (a) Soil testing shall be carried out by a recognized testing facility prior to fertilizer application to ensure a properly formulated program.
- (b) Fertilizer shall be spread evenly at frequency, ratio and rates as recommended by Manufacturer. Use approved mechanical spreading equipment. Check calibration to ensure specified rate is spread evenly. Water immediately after fertilizing. Rectify uneven spreading as soon as it becomes apparent.

#### E21.3.3 Watering – General

- (a) Water shall be applied as required to supplement rainfall and to maintain optimum growing conditions. Allow soil to adequately dry between watering to prevent over saturation without creating water stress.
- (b) Water shall be applied in a soft spray to avoid packing of soil.
- (c) Use of the installed irrigation system is prohibited unless approved by the Contract Administrator.
- (d) Do not impede use of sidewalk and other paved areas.
- (e) Water every third day for first and second month after planting. Thereafter, water once per week between May 1 and October 15.

#### E21.3.4 Weed Control

- (a) Surface shall be maintained free of weeds. Do not allow weeds to establish for a period longer than one (1 week).
- (b) Obtain written approval of Contract Administrator prior to using any herbicides.
- (c) Do not use dicamba and picloram solutions.

#### E21.3.5 Pests and Disease Control

- (a) Obtain written approval of Contract Administrator prior to using any pesticide.
- (b) Control pests and disease through pruning or application of pesticides. Use species-specific pesticides where possible. Use only pesticides of low mammalian toxicity. Strictly follow manufacturer's written instructions.

#### E21.3.6 Cultivating Planting Beds

- (a) Cultivate whenever required to keep top layer of soil, loose, friable and free from weeds. Any operation must be continuous without interruption.
- (b) Cultivate surface of planting bed, and soil areas around trees.
- (c) Remove weeds including their roots.
- (d) Take care not to damage roots of shrubs or flowers. Use small hand tools for areas of closely planted shrubs and/or perennials.
- (e) Collect and dispose of paper and refuse. Remove dead plants, leaves, branches, dead flowers and seed pods.
- (f) Clean, by hand, areas that are covered with mulch. Loosen top layer of mulch without mixing it with soil underneath.
- (g) Add mulch as required to maintain specified thickness.

**E21.3.7 Shrub Pruning**

- (a) The Contractor shall provide a person with a valid Manitoba Arborist's License for each Work crew or Work Site.
- (b) Prune as required to remove dead, broken or damaged limbs. Prune back to healthy growth while maintaining balanced crown shape.
- (c) Employ clean sharp tools. Make cuts co-incident with the branch collar near the main stem or branch. Cuts must be smooth and sloping to prevent accumulation of water on cut. Do not leave little stumps ("horns") on trunks or main branches.

**E21.3.8 Winter Preparation**

- (a) Rake and assemble leaves after they have been shed. Remove from site.
- (b) Protect plant material from rodent damage using fine wire mesh or approved plastic protector beyond snow line or by applying rodent repellent sprays.
- (c) Ensure adequate moisture in root zones of material prior to freeze-up.

**E21.4 Measurement and Payment**

- (a) The work of this Specification is to be included in the Unit Price for "Landscaping", which price shall be payment in full for supplying all materials and for performing all operations herein described, and all other items incidental to the work included in this Specification.