



**THE CITY OF WINNIPEG**

# **BID OPPORTUNITY**

**BID OPPORTUNITY NO. 885-2007**

**RENEWAL OF THE WILLOW – CRANE INTERCEPTOR SEWER RED RIVER  
CROSSING CONTRACT 31**

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## **PART B - BIDDING PROCEDURES**

### **B1. CONTRACT TITLE**

B1.1 RENEWAL OF THE WILLOW – CRANE INTERCEPTOR SEWER RED RIVER CROSSING CONTRACT 31

### **B2. SUBMISSION DEADLINE**

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, January 11, 2008.

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

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

### **B3. SITE INVESTIGATION**

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

B3.2 The Bidder is advised that the gate to the Crescent Drive Golf Course is closed and locked to vehicle access.

### **B4. ENQUIRIES**

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

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

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

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

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

### **B5. ADDENDA**

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

B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

B5.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

B5.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Branch internet site for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B5.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

**B6. SUBSTITUTES**

B6.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.

B6.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B6.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.

B6.4 The Bidder shall ensure that any and all requests for approval of a substitute:

- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
- (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
- (c) identify any anticipated cost or time savings that may be associated with the substitute;
- (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
- (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.

B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.

B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.

B6.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.

B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B15.

B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

## **B7. BID COMPONENTS**

- B7.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
  - (b) Form B: Prices;
  - (c) Form G1: Bid Bond and Agreement to Bond, or Form G2: Irrevocable Standby Letter of Credit and Undertaking, or a certified cheque or draft;
- B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.
- B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.
- B7.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.
- B7.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.
- B7.5 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.
- B7.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, may result in the Bid being determined to be non-responsive.
- B7.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B7.8 Bids shall be submitted to:
- The City of Winnipeg  
Corporate Finance Department  
Materials Management Branch  
185 King Street, Main Floor  
Winnipeg MB R3B 1J1
- ## **B8. BID**
- B8.1 The Bidder shall complete Form A: Bid, making all required entries.
- B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his 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.
- B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.

- B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B8.4 Paragraph 12 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his 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.
- B8.4.1 The name and official capacity of all individuals signing Form A: Bid shall be printed below such signatures.
- B8.4.2 All signatures should be witnessed, except where a corporate seal has been affixed.
- B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

## **B9. PRICES**

- B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.
- B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

## **B10. QUALIFICATION**

- B10.1 The Bidder shall:
- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba; and
  - (b) be financially capable of carrying out the terms of the Contract; and
  - (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.
- B10.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:
- (a) be responsible and not be suspended, debarred or in default of any obligations to the City (a list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>).
- B10.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:
- (a) have successfully carried out work similar in nature, scope and value to the Work; and

- (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and
- (c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);
- (d) have experienced personnel operating the HDD and tracking equipment who have successfully completed at least two projects of similar pipe size and length.

B10.4 Further to B10.3(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 Branch internet site at <http://www.winnipeg.ca/matmgt>.)

B10.5 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B10.6 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

## **B11. BID SECURITY**

B11.1 The Bidder shall provide bid security in the form of:

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

B11.1.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.

B11.1.2 All signatures on bid securities shall be original, and shall be witnessed or sealed as required.

B11.2 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly executed by the successful Bidder and the performance security furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B11.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B11.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.



B11.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.

B11.3 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Bid Opportunity.

## **B12. OPENING OF BIDS AND RELEASE OF INFORMATION**

B12.1 Bids will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Branch, or in such other office as may be designated by the Manager of Materials.

B12.1.1 Bidders or their representatives may attend.

B12.1.2 Bids determined by the Manager of Materials, or his designate, to not include the bid security specified in B11 will not be read out.

B12.2 Following the submission deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

B12.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract Amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

B12.4 The Bidder is advised that any information contained in any Bid may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

## **B13. IRREVOCABLE BID**

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

B13.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the performance security furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid.

## **B14. WITHDRAWAL OF BIDS**

B14.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B14.1.1 Notwithstanding C23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.

B14.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid, and only such person, has authority to give notice of withdrawal.

B14.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:

- (a) retain the Bid until after the Submission Deadline has elapsed;

- (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid; and
- (c) if the notice has been given by any one of the persons specified in B14.1.3(b), declare the Bid withdrawn.

B14.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B13.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

## **B15. EVALUATION OF BIDS**

B15.1 Award of the Contract shall be based on the following bid evaluation criteria:

- (a) compliance by the Bidder with the requirements of the Bid Opportunity (pass/fail);
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B10 (pass/fail);
- (c) Total Bid Price;
- (d) economic analysis of any approved alternative pursuant to B6.

B15.2 Further to B15.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities, if the interests of the City so require.

B15.3 Further to B15.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid or in other information required to be submitted, that he is responsible and qualified.

B15.4 Further to B15.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.

B15.4.1 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.

## **B16. AWARD OF CONTRACT**

B16.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B16.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.

B16.2.1 Without limiting the generality of B16.2, the City will have no obligation to award a Contract where:

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

**B16.3** Subject to B16.2, 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.

**B16.3.1** Following the award of contract, a Bidder will be provided with information related to the evaluation of his Bid upon written request to the Contract Administrator.

## **PART C - GENERAL CONDITIONS**

### **C0. GENERAL CONDITIONS**

- C0.1 The *General Conditions for Construction* (Revision 2006 12 15) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.
- 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 renewal of the Willow-Crane Interceptor Sewer Red River crossing and associated works.

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

- (a) Installation of 2, approximately 317 metre long each, dual containment gravity siphon pipes each consisting of an 800 millimetre diameter (IPS) DR 11HDPE containment pipe with a 600 millimetre diameter (IPS) DR 17 HDPE carrier pipe beneath the Red River using the horizontal directional drilling method (HDD).
- (b) Installation of approximately 111 metres of 750 millimetre diameter reinforced concrete pipe interceptor sewer by trenchless methods.
- (c) Installation of approximately 17 metres of 750 millimetre diameter reinforced concrete pipe interceptor sewer by open-cut methods.
- (d) Installation of 2 – 2400 millimetre diameter pre-cast manholes approximately 3.5 metres deep on the existing 750 millimetre diameter interceptor sewer.
- (e) Installation of 2 – 2400 millimetre diameter pre-cast manholes approximately 3.5 metres deep
- (f) Installation of 4 – 1800 millimetre diameter pre-cast manholes approximately 3.5 metres deep.
- (g) Installation of 5 - 750 millimetre x 750 millimetre stainless steel sluice gates complete with stems, stem guides, pedestals and operators and accessories in the new manholes.
- (h) Installation of approximately 130 metres of 50 millimetre diameter PVC conduit by trenchless methods from the siphon inlet manholes to a control panel.
- (i) Abandonment of two existing cast-in-place concrete gate chambers on either side of the river.
- (j) Abandonment of approximately 200 metres of the existing 750mm diameter concrete interceptor sewer.
- (k) Cleanup and restoration of all disturbed pavement and boulevard areas.

#### D3. DEFINITIONS

D3.1 When used in this Bid Opportunity:

- (a) "HDPE" means High Density Polyethylene Pipe;
- (b) "HDD" means Horizontal Directional Drilling;

#### D4. CONTRACT ADMINISTRATOR

D4.1 The Contract Administrator is:

Mr. Terry Whiteside, C.E.T.  
Design and Specifications Coordinator  
110-1199 Pacific Avenue  
Winnipeg, MB

R3E 3S8

Telephone No. (204) 986-4451

Facsimile No. (204) 986-5345

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

**D5. CONTRACTOR'S SUPERVISOR**

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

**D6. NOTICES**

- D6.1 Except as provided for in C23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.
- D6.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D6.3, D6.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the address or facsimile number identified in D4.1.
- D6.3 All notices of appeal to the Chief Administrative Officer shall be sent to the following address or facsimile number:

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

- D6.4 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  
Corporate Services Department  
Legal Services Division  
Attn: City Solicitor  
185 King Street, 3rd Floor  
Winnipeg MB R3B 1J1  
Facsimile No.: (204) 947-9155

**D7. FURNISHING OF DOCUMENTS**

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

## **SUBMISSIONS**

### **D8. AUTHORITY TO CARRY ON BUSINESS**

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

### **D9. SAFE WORK PLAN**

D9.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D9.2 The Safe Work Plan 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 Branch internet site at <http://www.winnipeg.ca/matmgt>.

### **D10. INSURANCE**

D10.1 The Contractor shall provide and maintain the following insurance coverage:

- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability 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;

D10.2 Deductibles shall be borne by the Contractor.

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

D10.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least fifteen (15) Calendar Days prior written notice to the Contract Administrator.

### **D11. PERFORMANCE SECURITY**

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

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

- (c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.

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

D11.2 If the bid security provided in his Bid was not a certified cheque or draft pursuant to B11.1(c), the Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

## **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;  
all acceptable to the Contract Administrator.

D12.3 The C.P.M. schedule shall clearly identify the start and completion dates of all of the following activities/tasks making up the Work as well as showing those activities/tasks on the critical path:

D12.4 Further to D12.2(a), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of activity or task. The time shall be on the horizontal axis, and the type of work 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 D8;
  - (ii) evidence of the workers compensation coverage specified in C6.15;
  - (iii) the Safe Work Plan specified in D9;
  - (iv) evidence of the insurance specified in D10;
  - (v) the performance security specified in D11;
  - (vi) the detailed work schedule specified in D12; and
- (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.

D13.3 The Contractor shall commence the Work on the Site at such a date that will allow for the achievement of Substantial Performance by the date specified taking into account days where work cannot be performed due to adverse weather conditions.



#### **D14. CRITICAL STAGES**

D14.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

- (a) The following work is to be completed by April 1, 2008.
  - (i) Installation of manhole #9 on the existing interceptor sewer except for the final connection to and plugging of the existing interceptor sewer.
  - (ii) Installation of the 750mm diameter interceptor sewer from manhole #9 to manhole #8 including backfilling, compaction and levelling of excavations
- (b) Restoration of excavations made for the installation of the 750mm diameter sewer from manhole #9 to manhole #8 is to be completed by May 15, 2008 or sooner if sod is available.

#### **D15. SUBSTANTIAL PERFORMANCE**

D15.1 The Contractor shall achieve Substantial Performance by November 1, 2008

D15.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.

D15.3 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.

#### **D16. TOTAL PERFORMANCE**

D16.1 The Contractor shall achieve Total Performance by November 15, 2008.

D16.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.

D16.3 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.

#### **D17. LIQUIDATED DAMAGES**

D17.1 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 Calendar Day for each and every Calendar 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).

D17.2 The amounts specified for liquidated damages in D17.1 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.

D17.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

## **D18. SCHEDULED MAINTENANCE**

- D18.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:
- (a) Landscape maintenance as specified in CW 3510
- D18.2 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**

### **D19. JOB MEETINGS**

- D19.1 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.
- D19.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

### **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 and drives in St. Vital Park and Crescent Drive Golf Course 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.
- D20.5 Maintain one lane of traffic on all streets and Drive at all times.

### **D21. WATER SUPPLY**

- D21.1 Further to Section 3.14 of CW 2140 and Section 3.7 of CW 1120 of the General Requirements water supply for the Work may be taken from City of Winnipeg hydrants.
- D21.2 Charges incurred for the permits and water meters shall be paid for by the Contractor when the permit is taken out. The Contractor shall forward the invoice to the Contract Administrator for reimbursement. The billing for water usage sent to the Contractor shall be forwarded to the Contract Administrator for payment. The Bid Opportunity number shall be noted on each permit.
- D21.3 The Contractor shall make the following arrangements for hydrant turn on and turn off.
- (a) Contact the City of Winnipeg Water Services Division (WSD) for hydrant turn on and turn off required between 0800 hours and 1500 hours Monday to Friday. Notice for turn on and turn off shall be provided on the previous business day.

- (b) Contact Emergency Services Branch (986-2626) with a minimum of 2 hours notice for hydrant turn on and turn off required outside of the above hours.
- (c) The Contractor shall wait at the hydrant from the requested turn on or turn off time until the City arrives to turn on or turn off the hydrant.

- D21.4 Hydrants shall be considered to be “in the Contractor’s control” from the time the City has turned the hydrant on until the City has turned the hydrant off.
- D21.5 Between November 1 and April 30 of any year the Contractor shall take all necessary precautions to prevent freezing of hydrants and related appurtenances for hydrants in their control and shall be responsible to pump out hydrants turned off by Emergency Services.
- D21.6 If a hydrant or appurtenance is damaged due to freezing or improper turn on or turn off procedures while in the Contractor’s control, WSD will assess the damage and determine if WSD will repair the damage or if the Contractor will be responsible to repair the damage. Costs for repairs completed by WSD will be deducted from payments owing the Contractor. Repairs completed by the Contractor will be at the Contractor’s expense.
- D21.7 The Contractor shall provide a traffic ramp for hydrant connection hoses that cross roadways. The ramp shall be designed and constructed to not present a hazard to vehicles travelling over it and to ensure that no part of the hose is run over by a motor vehicle. Traffic ramps shall be satisfactory to the Contract Administrator.

**D22. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)**

- D22.1 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).

**MEASUREMENT AND PAYMENT**

**D23. PAYMENT**

- D23.1 Further to C12, effective January 1, 2007 the City may at its option pay the Contractor by direct deposit to the Contractor’s banking institution.

**FORM H1: PERFORMANCE BOND**  
(See D11)

KNOW ALL MEN BY THESE PRESENTS THAT

\_\_\_\_\_ ,  
(hereinafter called the "Principal"), and

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

\_\_\_\_\_ dollars (\$\_\_\_\_\_)

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

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

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, for:

BID OPPORTUNITY NO. 885-2007

RENEWAL OF THE WILLOW – CRANE INTERCEPTOR SEWER RED RIVER CROSSING

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

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

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

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

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

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

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

**SIGNED AND SEALED**  
in the presence of:

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Name of Principal)

Per: \_\_\_\_\_ (Seal)

Per: \_\_\_\_\_

\_\_\_\_\_  
(Name of Surety)

By: \_\_\_\_\_ (Seal)  
(Attorney-in-Fact)

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

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

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 885-2007

RENEWAL OF THE WILLOW – CRANE INTERCEPTOR SEWER RED RIVER CROSSING

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

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
(Address of Contractor)

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

\_\_\_\_\_ Canadian dollars.

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

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

Partial drawings are permitted.

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

\_\_\_\_\_  
(Address)

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

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

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

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

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

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

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

\_\_\_\_\_  
(Name of bank or financial institution)

Per: \_\_\_\_\_  
(Authorized Signing Officer)

Per: \_\_\_\_\_  
(Authorized Signing Officer)

## 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 Branch 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>Drawing No.</u>	<u>Drawing Name/Title</u>
	Cover Sheet
06892	2007 Renewal of the Willow – Crane Interceptor Sewer Red River Crossing Crescent Drive to St. Vital Park Plan and Profile
06893	2007 Renewal of the Willow – Crane Interceptor Sewer Red River Crossing Siphon Inlet Gate Chamber Plan and Section Views
06894	2007 Renewal of the Willow – Crane Interceptor Sewer Red River Crossing Siphon Outlet Gate Chamber Plan and Section Views
06895	2007 Renewal of the Willow – Crane Interceptor Sewer Red River Crossing Miscellaneous Details

#### E2. SOILS INVESTIGATION REPORT

- E2.1 Further to C3.1, 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. Soil test hole logs are shown and Drawing No. 06892 and a complete copy of the soils investigation report is included in Appendix A.
- E2.2 Samples recovered from the soil test holes can be viewed in the Winnipeg offices of the geotechnical consultant who performed the study. Provide 48 hours notice to the Contract Administrator to allow arrangements to be made to view the test hole samples. Do not contact the geotechnical consultant directly.
- E2.3 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.
- E2.4 Any test borings made by the Bidder shall be done in accordance with the requirements of the appropriate authorities of the City of Winnipeg. Bidders shall notify the Contract Administrator prior to starting any soil boring operation.

### GENERAL REQUIREMENTS

#### E3. WATERWAY BY-LAW

- E3.1 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.

- E3.2 Under no circumstances will stockpiling of any material be permitted on within 107 metres of a riverbank or dyke.

#### **E4. OFFICE FACILITIES**

- E4.1 Provide office facilities for the Contract Administrator's use meeting the following requirements:
- (a) Conveniently located at or near the job site at a location approved by Contract Administrator.
  - (b) Minimum floor area of 20 square metres, with window and a door entrance complete with suitable lock.
  - (c) Suitable for all-weather use and capable of maintaining a temperature range between 20 and 25 degrees C.
  - (d) Equipped with fluorescent lights and 120 volt ac electrical wall outlets
  - (e) Furnished with one desk, one drafting table, one filing cabinet and six chairs, all satisfactory to the Contract Administrator.
  - (f) Stabilize all of the temporary structures provided for this project in a sufficient manner to prevent the temporary structure from being overturned by wind forces as defined in the National Building Code (NBC). The stabilization provided shall be designed by a Professional Engineer registered in the Province of Manitoba. Detailed drawings and design notes for the stabilization works bearing the Engineer's seal shall be provided to the Contract Administrator for review.
  - (g) No separate measurement or payment will be made for installation, maintenance, removal, operating costs and service installation costs for providing office facilities for the Contract Administrator's use for this project.

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

- E5.1 Take the following precautionary steps prior to construction to avoid damage to existing trees from construction activities.
- E5.1.1 Do not stockpile materials and soil, park or operate vehicles and equipment within 2 metres of trees.
  - E5.1.2 Strap mature tree trunks with 25 x 150 x 2400 wood planks. Protect smaller trees similarly using appropriately sized wood planks.
  - E5.1.3 Carry out excavations 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 Carry out Work on Site 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 Do not prune American Elm trees 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 the Contractor's construction activities shall be repaired to the requirements and satisfaction of the City of Winnipeg, Public Works Department, Forestry Branch.
- E5.3 No separate measurement or payment will be made for protection of trees.

## **E6. DANGEROUS WORK CONDITIONS**

- E6.1 Further to clause GC 6.26 of the General Conditions, the Contractor shall be aware that underground chambers, manholes, sewers and pumping stations are considered a confined space and shall follow the "Guidelines for confined Entry Work" as published by the Manitoba Workplace Safety and Health Division.
- E6.2 The Contractor shall be aware of the potential hazards that can be encountered in manholes, sewers and pumping stations such as explosive gases, toxic gases and oxygen deficiency.
- E6.3 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.
- E6.4 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.
- E6.5 Workers must wear a respirator or supplied air at all times when entering a chamber, manhole or sewer where live sewage is present.
- E6.6 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.
- E6.7 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.
- E6.8 The Contractor's attention is drawn to the Province of Manitoba Workplace Safety and Health Act ("the Act"), and the Regulations and Guidelines thereunder pertaining to confined entry work, and in particular the requirements for conducting hazard/risk assessments and providing personal protective equipment (PPE).
- E6.9 Provide supplied air breathing apparatus conforming to the requirements of the Act, Regulation and Guidelines for the use of the Contract Administrator where confined entry is required to allow for inspection of the Work.

## **E7. SHOP DRAWINGS**

- E7.1 Description
- E7.1.1 This Specification shall revise, amend and supplement the requirements of CW 1100.
- (a) The term 'shop drawings' means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, which are to be provided by the Contractor to illustrate details of a portion of the Work.
  - (b) The Contractor shall submit specified shop drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be shown on all submissions for Engineering review.
- E7.1.2 Shop Drawings
- (a) 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.

- (b) Shop drawings for the following structural components shall bear the seal of a registered Engineer of Manitoba experienced in the type of Work the drawings are prepared for.
  - (i) Excavation and shoring.
  - (ii) Reinforcing steel placement.

#### E7.1.3 Contractor's Responsibilities

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

#### E7.1.4 Submission Requirements

- (a) Schedule submissions at least 7 Calendar days before dates reviewed submissions will be needed, and allow for a 7 Calendar day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.
- (b) Submit 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.
- (c) Accompany submissions with transmittal letter, containing:
  - (i) Date
  - (ii) Project title and Bid Opportunity number
  - (iii) Contractor's name and address
  - (iv) Number of each shop drawing, product data and sample submitted
  - (v) Specification Section, Title, Number and Clause
  - (vi) Drawing Number and Detail/Section Number
  - (vii) Other pertinent data
- (d) Submissions shall include:
  - (i) Date and revision dates.
  - (ii) Project title and Bid Opportunity number.

- (iii) Name of: Contractor, Subcontractor, Supplier and Manufacturer
- (iv) Separate detailer when pertinent
- (v) Identification of product of material.
- (vi) Relation to adjacent structure or materials.
- (vii) Field dimensions, clearly identified as such.
- (viii) Specification section name, number and clause number or drawing number and detail/section number.
- (ix) Applicable standards, such as CSA or CGSB numbers.
- (x) Contractor's stamp, initialled or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.

**E7.1.5 Other Considerations**

- (a) Fabrication, erection, installation or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent shop drawings and resubmit.
- (b) 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.
- (c) Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.
- (d) No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of shop drawings.

**E7.2 Measurement and Payment**

- E7.2.1** Preparation and submittal of Shop Drawings will not be measured for separate payment and will be included in the Work they are required for.

**E8. SITE ACCESS**

**E8.1 Crescent Drive Golf Course**

- E8.1.1** Crescent Drive Golf Course is closed during winter months, generally beginning of November to beginning of April. The exact date the golf course will open in the spring for use is dependant on the weather.
- E8.1.2** Access work areas in Crescent Drive Golf Course other than the setup site for HDD operations, from the main gate off Crescent Drive. Replace the existing City lock on the gate with a new lock and provide the existing lock and 3 keys to the new lock to the Contract Administrator. Replace the City's gate lock once golf course operation starts in spring. The Contract Administrator will provide keys to the City lock for after hours access.
- E8.1.3** Ensure gate is shut and locked when leaving the Site for the day.
- E8.1.4** Access for the HDD set-up area is to be directly from Crescent Drive at the location shown on Drawing No. 06892.
- E8.1.5** Carefully remove the existing wooden post and chain fence and construct a temporary crossing for the ditch on the north side of Crescent Drive. Install temporary security fence across access opening during construction.
- E8.1.6** When on golf course property restrict construction activities to the immediate work areas and do not disturb more ground than is necessary.
- E8.1.7** Remove temporary crossing for access to HDD setup area, regrade ditch to original line, grade and side slopes and replace fence posts and chain after removing the HDD equipment. Restore ditch surface and disturbed boulevard area as specified in E9 of this specification.
- E8.1.8** Once the golf course opens for use in the spring, maintain driveway access for patrons during the remainder of the construction period.

E8.1.9 Permanently restore disturbed surface areas in accordance with E9 of this specification.

**E8.2 St. Vital Park**

E8.2.1 St. Vital Park remains open year round. The north and south main gates are open from 7:00am to 10:00 pm. Gates are locked outside of these hours.

E8.2.2 Access work areas in St. Vital Park from the north gate off River Road. Once in the park, follow River Drive to the work site. Traffic on River Drive is one way westbound.

E8.2.3 The north gate is normally open from 7:00am to 10:00pm. The Contract Administrator will provide two keys for the gate for access during times when the gate is closed and locked.

E8.2.4 Ensure the gate is closed and locked after leaving the site during times when gate would normally be closed.

E8.2.5 When in the park restrict construction activities to the immediate work areas and do not disturb more ground than is necessary.

E8.2.6 Provide snow clearing on River Drive as required for access to the Site during winter months.

E8.2.7 Maintain River Drive in a passable condition for vehicles during construction once River Drive is open in the spring and provide flag persons for traffic and pedestrian control when required.

E8.2.8 Permanently restore disturbed areas in accordance with E9 of this specification.

**E9. SURFACE RESTORATION**

E9.1 Prior to construction, inspect the grassed, pavement and gravel surfaces within and adjacent to the Site at the Crescent Drive Golf Course and in St. Vital Park with the Contract Administrator to record the current condition. After construction and Site cleanup is complete, re-inspect the condition with the Contract Administrator.

E9.2 Restoration of grassed areas damaged as result of construction activities are to be restored in accordance with CW 3510. Restoration of grassed areas will not be measured for payment and will be included as part of the Work being done.

E9.3 If the area disturbed from the installation of manhole #9 and the 750mm interceptor sewer from manhole #9 to manhole #8 is not restored by the date indicated in D14 of this Specification, the Contract Administrator will arrange to have restoration completed by others and will deduct the costs for the restoration from future progress payments.

E9.4 Asphalt and concrete pavement damaged as a result of construction activities are to be restored in accordance with CW 3230 and CW 3410. Restoration of the pavement will not be measured for payment and will be included as part of the Work being done.

E9.5 Gravel surfacing damaged as a result of construction activities are to be restored in accordance with CW 3150. Restoration of the gravel surfacing will not be measured for payment and will be included as part of the Work being done.

**E10. TEMPORARY SURFACE RESTORATIONS**

E10.1 Further to clause 3.3 of CW 1130, the Contractor shall temporarily restore surfaces to a safe condition to the satisfaction of the Contract Administrator until permanent restoration can be completed.

E10.1.1 Temporarily restore disturbed surfaces as follows:

- (a) Boulevards and grassed areas: backfill and level excavation to match existing surface elevation and level area.
- (b) Asphalt and concrete pavement: 300mm thick layer of cement-stabilized fill.

- E10.1.2 Maintain temporary surface restorations until permanent surface restoration is completed.
- E10.1.3 If temporarily restored surfaces are not maintained within 24 hours of being notified to do so by the Contract Administrator, the Work may be directed to be done by City forces and the cost deducted from future payments to the Contractor.
- E10.1.4 Complete permanent surface restorations within 10 working days of being directed to do so by the Contract administrator.
- E10.1.5 If permanent surface restoration is not started within 2 working days of being notified to do so by the Contract Administrator, the Work may be directed to be done by City forces and the cost deducted from future payments to the Contractor.
- E10.2 Measurement and Payment
- E10.2.1 Costs for temporary surface restoration and maintenance will not be measured for payment and will be included with the Work being done.

## **E11. RED RIVER WATER LEVELS**

- E11.1 Normal Red River water levels are as follows.
- (a) Normal Summer Water Level (NSWL) (normally early June to late October) – 223.70 geodetic (approximate)
  - (b) Normal Winter Water Level (NWWL) (normally late November to late March) – 221.77 geodetic (approximate)
- E11.2 Red River water levels rise considerably in the spring (typically late March) due to ice break-up and snow melt. River crest elevation of 228.00 geodetic or higher are not unusual.
- E11.3 River elevation may also increase in the summer due to heavy rainfall in the areas south of Winnipeg. Summer river crests are usually lower and of shorter duration than spring crests.
- E11.4 The following web site link <http://winnipeg.ca/waterandwaste/sewage/riverlevels/pastYears.stm> lists historic Red River levels month by month back to 1999. The elevations shown are in imperial measurement and are referenced to “James Avenue Datum” which is elevation 221.76 geodetic. Red River levels at the location of this river crossing will be approximately 300 millimetres higher than the elevations listed at James Avenue Datum outside of NSWL and NWWL.
- E11.5 Construct dykes around Site if required to protect against high river levels. Costs for construction of dykes to protect the Site will not be measured for separate payment and will be included with the Work being done.
- E11.6 Work schedule and method of operation should take into account potential shut-down period(s) or difficulties due to high river levels. Occurrence of high river levels during construction of the Work will not be considered as a basis for claim for extra work or extra time.

## **E12. EXISTING INTERCEPTOR SEWER FLOW**

- E12.1 Flow in the Willow – Crane Interceptor Sewer must be maintained at all times during construction except during approved shutdown periods for work listed.
- E12.2 Flow in the interceptor sewer is primarily from the Willow and Crane Wastewater Pumping Stations. The expected dry weather flow rate in the interceptor sewer is as follows.
- E12.2.1 Average Dry Weather Flow (ADWF): 265 l/s (4205 USgpm)
  - E12.2.2 Peak Dry weather Flow (PDWF): 420 l/s (6685 USgpm)
- E12.3 The interceptor sewer may also receive flows of an unknown and variable amount from groundwater infiltration, snowmelt, watermain breaks and other unforeseen sources.

### **E13. TEMPORARY SHUTDOWN OF WASTEWATER PUMPING STATIONS**

- E13.1 Arrange with the Contract Administrator for The City of Winnipeg, Water & Waste Department, Wastewater Services, Collection System and Flood Control Branch (Collections) for temporary shutdown of the Willow and Crane Pumping Stations to allow the following work to be done.
- E13.1.1 Plugging of the existing 750mm diameter interceptor sewer at new manholes #1 and #9.
- E13.1.2 Final grouting and benching in new manholes #1 and #9.
- E13.1.3 Video Inspection of existing interceptor sewer from new manhole #1 to existing manhole at Sta 0+96.94.
- E13.1.4 Video Inspection of existing interceptor sewer from existing manhole at Sta 5+11.40 to new manhole #9.
- E13.2 Maximum temporary wastewater pumping station shutdown time available will be 3 hours during normal working hours.
- E13.3 Temporary shutdown of wastewater pumping stations will only be done once per day under dry weather flow conditions and at the sole discretion of Collections.
- E13.4 Only plan to for as much work as can be done within the maximum 3 hour shutdown period.
- E13.5 Schedule Work activities requiring more than the allowable station shutdown time to be done between 10:00 pm and 5:00 am when more shutdown time may be available or provide temporary by-pass pumping of interceptor sewer flows to complete Work.
- E13.6 Even with the Willow and Crane Pumping Stations shutdown it is possible there will be some flow in the existing interceptor sewer from groundwater infiltration, snowmelt, watermain breaks and other unforeseen sources. Provide flow control measures to contend with this flow including but not limited to diversions, flumes and by-pass pumping.
- E13.7 Wastewater flow is not permitted be directed to the ground, land drainage sewers, ditches or the river.
- E13.8 Be ready to terminate any work being done within 30 minutes of being notified by Collections that the Willow and Crane Pumping Stations have to be re-activated.
- E13.9 There will be no charge to temporarily shutdown the wastewater pumping stations for the Work activities listed.
- E13.10 If an unreasonable number of station shutdowns are required to complete the same Work activity due to the Contractor's method of operation, a fee of \$300.00 per hour for Collections may be charged to the Contractor and deducted from future Progress Payments.
- E13.11 Collections will have sole discretion to cancel a planned temporary shutdown of the wastewater pumping stations if in their opinion, flow conditions or the weather forecast would not allow for a shutdown of sufficient duration to complete the Work activity. The Contractor shall reschedule the Work activity to a more suitable time.

### **E14. TEMPORARY BY-PASS PUMPING**

- E14.1 Description
- E14.1.1 This specification covers temporary by-pass pumping of existing flow using submersible pumps if required to complete the Work.
- E14.2 Materials
- E14.2.1 Temporary By-Pass Pumping Equipment
- (a) Two (2) non-clog, submersible pumping units each sized to meet or exceed the expected ADWF of 265 litres per second (l/s).

- (b) Complete with power supply and all required, piping, fittings, floats and pump controls suitable for temporary installation.
- (c) Power supply generator to be suitably sized to operate both pumps at the same time complete with all required controls. Fuel to be in lockable, tamperproof container.
- (d) Pump control to be suitable to operate each pump separately or both together.
- (e) Provide Shop Drawings of temporary by-pass pumping equipment and power supply including pump capacity and dimensions, depth of submergence, pump controls, size of generator and installation and discharge pipe details to the Contract Administrator for review before construction starts.

#### E14.3 Construction Methods

##### E14.3.1 By-Pass Pumping Plan

- (a) Provide a detailed by-pass pumping plan to the Contract Administrator for review and approval prior to construction.
- (b) Locate the power supply for the temporary pumps where the noise and fumes will not adversely affect local residences. Location to be approved by the Contract Administrator before construction starts.
- (c) Connect both pumps to a common discharge pipe.
- (d) Provide a check valve between each pump and the common discharge pipe to prevent backflow or cycling in the event pump duty is switched or the existing wastewater pumps have to be turned on while the temporary by-pass pumping is still in place.
- (e) Provide suitable traffic ramps approved by the Contract Administrator where the temporary by-pass pumping discharge pipe and power supply cables are laid across vehicle or pedestrian traffic areas.
- (f) Protect the discharge pipe from freezing.
- (g) Diversion of wastewater flow directly or indirectly to the environment, Land Drainage Sewers, Storm Relief Sewers and the river will not be allowed at any time.

##### E14.3.2 Monitoring Level of Sewage In Trunk Sewer

- (a) Continuously monitor and maintain level of sewage in the interceptor sewer at all times when temporary by-pass pumping is being done.
- (b) Provide additional pumps as required to maintain flow levels in interceptor sewer.

#### E14.4 Measurement and Payment

- E14.4.1 Temporary by-pass pumping will not be measured for separate payment and will be included with the Work being done.

### **E15. SECURITY FENCE, SILT FENCE AND CONTAINMENT BERMS OR PITS**

- E15.1.1 Install silt fencing around the designated set up area in the Crescent Drive Golf Course and construct a containment berm or pit inside the silt fencing satisfactory to the Contract Administrator before beginning the HDD operation to ensure drilling fluids and sediment from excavations do not enter the golf course.
- E15.1.2 Install silt fencing around the exit location for the HDD operation in St. Vital Park and construct a containment berm or pit before inside the silt fencing satisfactory to the Contract Administrator before beginning the HDD operation to ensure drilling fluids and sediment from excavations do not enter the park and the Red River.
- E15.1.3 Install silt fencing around the existing gate chambers to be abandoned satisfactory to the Contract Administrator before beginning demolition and excavation of the gate chambers to ensure sediment from the operation does not enter the riverbank and the Red River.
- E15.1.4 Remove silt fencing and containment berm and backfill pits after work is completed.



- E15.1.5 Erect and maintain a security fence around HDD setup area in the Crescent Drive Golf Course and the work area in St. Vital Park generally in accordance with the following.
- (a) Minimum 1.80 metres high, chain link fabric or approved equal with metal support posts embedded far enough into the ground and spaced close enough together so the fence will not sag or collapse.
  - (b) Attach fencing securely to posts.
  - (c) Secure the gate or end of the fencing to a post with chain and a padlock.
  - (d) Provide alternate security fence proposal to Contract Administrator for approval.
- E15.1.6 Silt fencing, containment berms and pits will not be measured for separate payment and will be included with the Work being done.

## **E16. FRAC-OUT MONITORING AND RESPONSE PLAN**

- E16.1 Take all precautions to avoid the potential for drilling fluids and drill cuttings from entering the Red River because of a frac-out during horizontal directional drilling (HDD).
- E16.2 Follow the requirements of the Manitoba Operational Statement Habitat Management Program for High Pressure Directional Drilling by the Department of Fisheries and Oceans.
- E16.3 The drilling fluid pressure shall not exceed the overburden pressure at any location within the bore hole.
- E16.4 Conduct on-site monitoring as follows.
- E16.4.1 Maintain a record of drilling progress to always know the location of the drill head relative to the point of entry.
  - E16.4.2 Maintain a record of drilling component usage (type and quantity) throughout each drilling operation.
  - E16.4.3 Maintain a record of drilling fluid volume used and returned to detect any significant fluid losses. Continuously monitor drilling fluid pump pressure. Cease drilling operations and immediately report abnormal loss of returned fluid or loss of fluid pressure that may be indicative of a frac-out to the Contract Administrator and to discuss the next course of action.
  - E16.4.4 Continuously check the river for appearance of a muddy plume indicating signs of mud escapement to the watercourse. Also check for muddy plume in river when any significant loss of returns or drop in pump pressure occurs.
  - E16.4.5 Use a turbidity meter with a 'down-hole' sensor where water turbidity prevents visual detection of a potential frac-out. Turbidity monitoring with the meter will only be initiated if an abnormal loss of fluid or pressure indicates that a frac-out may be occurring. Make arrangements with an external consultant familiar with turbidity measurement to use of the turbidity meter. If turbidity must be monitored, the consultant will complete a "Turbidity Monitoring Data Sheet (TMDS)", provided by the Contract Administrator.
- E16.5 Include a Loss of Fluid and Frac-out Response Plan that includes the following.
- E16.5.1 Follow the "Measures to Protect Fish and Fish Habitat when High Pressure Directional Drilling" listed in the Manitoba Operational Statement Habitat Management Program for High Pressure Directional Drilling by the Department of Fisheries and Oceans. If necessary, implement the "Measures to Protect Fish and Fish Habitat for Isolated Trenched Crossings in the Event of a Frac-Out".
  - E16.5.2 Stop drilling immediately if an abnormal loss of fluid, drop in pressure, or visible plume is observed indicating a frac-out or possible frac-out.
  - E16.5.3 Inform the Contract Administrator of the frac-out condition or potential condition and decide on the appropriate action as follows:

- (a) Assign a person to monitor (visual or using a turbidity meter) for the presence of a muddy plume;
- (b) Make adjustments to the mud mixture (e.g., add lost circulation material (LCM) to the drilling fluid in an attempt to prevent further loss of fluid to the ground formation and/or the watercourse);
- (c) Where conditions warrant and permit (i.e., readily accessible by a vacuum truck, shallow depth, clear water, potentially sensitive habitat, and low water velocity) and where a frac-out has been visually detected, attempt to isolate the fluid release using a large diameter stand-pipe such as a 45 gallon drum with both ends cut out, or a short piece of culvert. Prior to commencing any pumping to deliver LCM to plug the fracture, have the vacuum truck in position to recover any fluids that otherwise may escape to the watercourse.

E16.5.4 Under circumstance where a frac-out has occurred (and has been confirmed visually or by turbidity meter measurements), and where conditions do not permit containment and the prevention of drilling fluids release to the watercourse, attempts to plug the fracture by pumping LCM are not to continue for more than 10 minutes of pumping time.

E16.5.5 If the frac-out is not contained within this time, the Contract Administrator will halt any further attempts until a corrective course of action is decided upon.

E16.5.6 Frac-out Monitoring and Response Plan will not be measured for separate payment and will be included with the Work being done.

## **E17. MOBILIZATION AND DEMOBILIZATION**

E17.1 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 and removal and Site cleanup.

E17.2 Mobilization and demobilization will be measured on a unit basis and paid for at the Contract Unit Price for "Mobilization and Demobilization" in accordance with this specification, accepted and measured by the Contract Administrator.

E17.3 50% of the Mobilization and Demobilization unit price will be paid in the progress payment immediately following the arrival of HDD equipment and crews on site.

E17.4 The remaining 50% of the Mobilization and Demobilization unit price will be paid subsequent to the completion of the Work and restoration and clean up of all sites.

## **E18. INTERCEPTOR SEWER INSTALLATION**

E18.1 Install the new 750 millimetre diameter reinforced concrete pipe interceptor sewer in accordance with CW 2130 by Trenchless methods.

E18.2 Bedding and initial backfill for interceptor sewer installations in an open trench or shaft to be sand in accordance with CW 2030.

E18.3 Excavation and trench backfill to be Class 5 in accordance with CW 2030.

E18.4 Cages or shoring shall be lifted above the pipe zone before compaction of the initial backfill or cut and permanently left in place or otherwise installed in such a way as to not disturb the bedding and initial backfill during removal.

E18.5 Install 750 millimetre diameter interceptor sewer from manhole #9 to manhole #8 as well as manhole #8 before setting up HDD equipment. Install riser sections for manhole #8 to approximately 600 millimetres below grade, cover opening with plates or planks and backfill to match surrounding ground elevation and to provide a level surface for HDD equipment to be setup on. Complete manhole construction after HDD operation is complete.

- E18.6 Have the entire new river crossing and interceptor sewer piping, including manholes and sluice gate in place and operational before connecting the new interceptor sewer to the existing interceptor sewer in Manholes #1 and #9.
- E18.7 Sequence Work so that the new 750mm diameter interceptor sewer is connected to the existing interceptor sewer in Manhole #1 before making final connection of new interceptor sewer to existing interceptor in Manhole #9.

## **E19. HDPE INTERCEPTOR SEWER RIVER CROSSING**

### **E19.1 DESCRIPTION**

- E19.1.1 This specification covers the supply, joining, testing and installation of a dual contained High Density Polyethylene (HDPE) interceptor sewer river crossing pipe by HDD methods.

### **E19.2 MATERIALS**

#### **E19.2.1 HDPE Pipe**

- (a) HDPE pipe to be made from polyethylene resin compound with a minimum cell classification of PE 345464C for PE 3408 materials in accordance with ASTM D3350.
- (b) Material to have a long term hydrostatic strength of 1600 psi when tested and analyzed by ASTM D2837 and shall be a Plastic Pipe Institute (PPI) listed compound.
- (c) The raw material shall contain a minimum of 2%, well dispersed, carbon black. Additives which can be conclusively proven not to be detrimental to the pipe may also be used, provided the pipe produced meets the requirements of the standard.
- (d) Manufacture pipe to ASTM F714.
- (e) Pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material.
- (f) The following markings shall be continuously printed on the pipe spaced at 1.5m intervals.
  - (i) Name and/or trademark of the pipe manufacturer.
  - (ii) Nominal pipe size (OD).
  - (iii) Dimension Ratio.
  - (iv) The letters PE followed by the polyethylene grade per ASTM D3350, followed by the Hydrostatic Design basis in 100's of psi.
  - (v) Manufacturing reference standard ASTM F 714.
  - (vi) Production code from which the date and place of manufacture can be determined.
- (g) Dual containment pipe configuration to be as follows.
  - (i) Containment pipe – Minimum 800mm diameter (IPS) DR 11.
  - (ii) Carrier pipe – Minimum 600mm diameter (IPS) DR 17.
- (h) Finish pipe ends for joining using the butt fusion method.
- (i) Ensure the annulus between the carrier pipe and the containment pipe is not obstructed by the butt fusion bead on the carrier pipe to such an extent that would preclude the monitoring of pressure in the annulus area with a single pressure sensor as noted herein.
- (j) Provide a sample of fused end joint for the dual containment pipe for this project to the Contract Administrator for verification that the annular space is not obstructed by the fusion bead starting production fabrication production run.

#### **E19.2.2 HDPE Dual Containment Fittings**

- (a) Fittings if approved for use by the Contract Administrator are to be in accordance with requirements for HDPE dual containment pipe.

E19.2.3 Material Certification

- (a) At least two (2) weeks prior to commencing Work, submit Manufacturer's test data and certification that pipe materials meet requirements of this Section. Include Manufacturer's Drawings, information and Shop Drawings where pertinent.

E19.2.4 Shop Drawings

- (a) Provide shop drawings of the dual containment HDPE pipe in accordance with E14 of this specification.

E19.3 CONSTRUCTION METHODS

E19.3.1 Dual Containment HDPE Pipe

- (a) Pre-fabricate dual containment pipe sections in a factory prior to delivery to Site, consisting of HDPE carrier pipe, containment pipe, centralizers, and fittings. Each containment pipe section shall have the carrier pipe and centralizers in place.
- (b) Pipe manufacturer shall provide documentation that the fabricator/welders have a minimum of two (2) years experience fabricating dual containment systems.
- (c) Field fabrication of the dual contained pipe sections is not acceptable.
- (d) Provide centralizers between the containment and carrier pipes as follows.
  - (i) Locate centralizers 1.20 metres apart to support the carrier pipe within the containment pipe.
  - (ii) Install end centralizer a sufficient distance from pipe section end to allow for facing of the pipe end and fusing such that the bead created when fusing two pipe sections does not seal the ports in the centralizer.
  - (iii) Install centralizers hydraulically using a minimum pressure of 0.83 MPa (120 psi) pressure on a fusion machine.
  - (iv) Back-weld centralizers to both the carrier and containment pipe.
- (e) Pipe sections needing field splicing for fit-up purposes shall use press fit centralizers recommended and provided by the pipe manufacturer.
- (f) End seals used for terminating the containment pipe shall be manufactured with a one-foot long section of carrier pipe on one end and simultaneously butt fused pipe on the other end of the dual containment pipe system.
- (g) The manufacturer of the Dual-containment system shall have demonstrated successful installations for a period no less than 10 years. The pipe material used shall be DRISCOPEX 4100 series Model # DCS-SF.
- (h) Arrange with the HDPE pipe manufacturer to provide a representative to provide technical training on the butt fusion process and installation of the pipe. Installation instructions must be provided to the Contract Administrator prior to installation. These instructions are to be used on every fusion joint with no exceptions.

E19.3.2 Handling of Dual Containment HDPE Pipe

- (a) Handle pipe in a manner that will not damage or deform the pipe.
- (b) Replace at own expense pipe that has been kinked or has scratches, cuts or gouges deeper than 10% of the total wall thickness.
- (c) Lift pipe sections using at least two slings spread far enough apart to balance the load. Use pads under chains or cables if used to lift pipe. Do not position slings on butt fused joints.
- (d) Ensure ground where pipe is placed is level and free of sharp objects that may damage the pipe. Limit stacking of pipe to a maximum height as recommended by the manufacturer to prevent excessive deformation of pipes on the bottom.
- (e) Take precautions to ensure joined sections of pipe are not damaged or over-stressed when dragging into position to install in bore hole. Do not drag pipe over sharp and cutting objects. Do not insert chains, cables and ropes into pipe ends to drag pipe.

- (f) Temporarily plug ends of pipe with suitable plugs or stoppers until pipe is joined and installed.

#### E19.3.3 Joining of Dual Containment HDPE Pipe Sections

- (a) Join factory fabricated dual containment pipe sections into one continuous length on site following the guidelines of ASTM Standard Practice F 2620 for "Heat Fusion Joining of Polyethylene Pipe and Fittings".
- (b) Ensure that fusion machine selected for use is compatible with simultaneous fusion of containment pipe and carrier pipe at maximum DR's noted.
- (c) Check the temperature and uniformity of temperature over the heating surface of the heating tool with a pyrometer on the first joint of the day and periodically during the day in accordance with Section 6.3 of ASTM Standard Practice F 2620 for "Heat Fusion Joining of Polyethylene Pipe and Fittings". Select multiple checkpoints to ensure uniform surface temperature.
- (d) Use a data logging device with the hydraulic joining equipment to record fusion parameters of pressure, temperature, and time for each joint.
- (e) Fusion shall produce a joint weld with strength equal to or greater than the tensile strength of the pipe itself.
- (f) Maintain a continuous annular space between the carrier pipe exterior and containment pipe interior for the full length of the pipe section when the pipe sections are butt fused during the full pipe length assembly.
- (g) Join pipe sections together on-Site and temporarily store the full length in St. Vital Park to facilitate pressure testing before installation. Do not block roadways with the full length of pipe.

#### E19.3.4 Pressure Testing of Dual Containment HDPE Pipe Before Installation

- (a) Perform pressure testing of both the carrier pipe and containment pipe for the entire length of each dual containment HDPE pipe after fusion joining and before installation in directional drilling borehole to determine if there are any obvious leaks in the pipe.
- (b) Confirm the proposed testing procedure is acceptable to the pipe manufacturer.
- (c) Provide an above ground pressure testing methodology outlining the proposed procedure in detail to the Contract Administrator for review prior to commencing the pressure tests.
- (d) Determine cause of any leaks found, repair and re-conduct test until successful pressure test carried out.

#### E19.3.5 Installation of HDPE Pipe Using Horizontal Directional Drilling

- (a) Install HDPE pipe using the horizontal directional drilling method in general accordance with ASTM Standard Guide F 1962 for "Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings".
- (b) Employ experienced personnel to operator the directional drilling and tracking equipment.
- (c) Provide the Contract Administrator an HDD method statement including the following information before beginning installation.
  - (i) HDD method statement.
  - (ii) Equipment specifications and capabilities
  - (iii) Size of pilot hole.
  - (iv) Number and size of pre-reams.
  - (v) Calculations showing determination of the appropriate back-ream rate for each pre-ream and product pullback.
  - (vi) Method of suspending, supporting and directing pipe during pullback.

- (vii) Type and capabilities of tracking system.
  - (viii) Drilling fluid and cuttings management plan including type of drilling fluid, drilling fluid pressure, fluid containment storage recycling, and transport and disposal.
  - (ix) Management plan for “frac-outs” as specified herein.
  - (x) Sketch of Work Site including equipment layout, slurry containment pits and entry and exit locations.
- (d) Maintain alignment of directional drilling as close as possible to the proposed plan and profile shown on the drawings taking into account the capabilities of drilling equipment and the allowable stresses of HDPE pipe and drilling rods. Advise the Contract Administrator of deviations to line and grade as they occur for discussion and approval.
  - (e) Provide electronic survey equipment in the drill head to continuously monitor and track the drill bore in the pilot hole. The electronic survey equipment shall transmit the azimuth, vertical inclination and orientation of the drill head to a computer that can convert this information to UTM coordinates.
  - (f) Record the depth to the nearest 0.10 metres from ground surface at major changes in surface elevation, at maximum 10 metre intervals along flat surfaces and at horizontal and vertical changes in alignment.
  - (g) Provide the drill path coordinate information to the Contract Administrator on a daily basis.
  - (h) Begin reaming operations to enlarge pilot hole after the Contract Administrator has accepted the pilot bore. The number and size of reaming heads is at the discretion of the Contractor.
  - (i) Continuously monitor and track the following during boring operation.
    - (i) Thrust and pullback pressure.
    - (ii) Rotational torque.
    - (iii) Times when drilling fluid circulation was lost.
    - (iv) Drilling fluid composition.
    - (v) Ground conditions encountered.
  - (j) Operate and maintain a closed loop drilling fluid system if possible.
  - (k) Ensure drilling fluids and cuttings are contained and stored at entrance and exit hole locations in accordance with the management plan. Drilling fluid shall at no time be directed to the river, sewers, manholes or catch basins. Drilling fluid and cuttings shall be loaded, hauled from the Site and disposed of at a Site approved by the Contract Administrator.
  - (l) Provide a swivel when pulling pipe into bore hole to reduce torsional loads transmitted to the pipe.
  - (m) Cap end of pipe before pulling into bore hole to prevent matter and fluids from entering the pipe.
  - (n) Provide pipe rollers, side booms or other devices to support and protect pipe while pulling into bore hole.
  - (o) If required, fill pipe with water when pulling into bore hole to help prevent against flotation and excessive pull-back pressures.
  - (p) Provide a strain gauge or “weak link” between the reamer and pipe to continuously measure and ensure the pull back force on the pipe does not exceed the maximum force allowed by the pipe manufacturer.
  - (q) Allow HDPE forcemain pipe a minimum 24 hours to recover and rebound after pull-in before making connections to manholes. Measure location of both pipe ends to ensure pipe recovery is complete.

- E19.3.6 HDPE Dual Containment Fittings
- (a) Obtain written approval from the Contract Administrator to use dual containment fittings of any type for the interceptor sewer river crossing.
- E19.3.7 Installation of Dual Containment HDPE Pipe in Open Excavations
- (a) Bed pipe using Type 3 granular bedding in accordance with specification CW 2030 and SD-001.
  - (b) Backfill excavations using Class 5 backfill in accordance with CW 2030 and SD-002.
- E19.3.8 Connecting Dual Containment HDPE Pipe to Pre-Cast Concrete Manholes
- (a) Connect dual containment HDPE to manholes at locations shown on the drawings.
  - (b) Allow HDPE forcemain pipe sufficient time to recover and rebound after pull-in before connecting to manhole. Measure location of both pipe ends to ensure pipe recovery is complete.
- E19.3.9 Record Information
- (a) Provide copies of HDD tracking information for each pipe to the Contract Administrator on a daily basis for a review of the drill path and for the preparation of as-constructed drawings.
  - (b) Tracking information should be referenced to the City's UTM coordinates based on reference points which will be provided to the Contractor before HDD commences.
- E19.3.10 Pressure Testing of Dual Containment HDPE Pipe After Installation
- (a) Perform hydrostatic testing of the carrier and containment pipe of each entire length of dual containment pipe after installation in the directionally drilled bore hole.
  - (b) Hydrostatic test procedure to consist of an initial expansion phase followed by a test phase.
  - (c) Test pressure to be 0.70 MPa (100psi) at the lowest elevation under test.
  - (d) Testing is to be witnessed by the Contract Administrator. Notify the Contract Administrator at least two (2) days in advance of hydrostatic pressure testing.
  - (e) Record test results and deliver the final test report to the Contract Administrator within thirty (30) days of completing the tests.
  - (f) The following procedure shall be followed for the initial expansion phase.
    - (i) Fill entire carrier pipe with clean water. Bleed any trapped air from the pipe.
    - (ii) The initial expansion phase is to last 3 hours.
    - (iii) Pressurize the pipe to the test pressure of 0.70 MPa.
    - (iv) Add make-up water to the pipe at 1, 2, and 3 hour intervals to restore pressure to 0.70 MPa test pressure.
  - (g) The test phase shall commence 4 hours after initial pressurization and after the initial expansion phase.
  - (h) The following procedure shall be followed for the test phase for the carrier pipe.
    - (i) The test phase shall last for 3 hours.
    - (ii) Add make-up water at the 3 hour interval to restore the pressure to the 0.70 MPa test pressure.
    - (iii) If the volume of make-up water added at the 3 hour interval does not exceed 50.3 litres per 30.5 m of pipe, leakage is not indicated and the pipe is considered to have passed the hydrostatic pressure test.
    - (iv) If the volume of make-up water added at the 3 hour interval exceeds 50.3 litres per 30.5 m of pipe, leakage is indicated and the pipe has failed the hydrostatic pressure test. Locate and repair the leak. Repeat hydrostatic test procedure.
    - (v) Regardless of volume of make-up water required, repair any known leaks.

- (vi) If the hydrostatic pressure test is not completed after the carrier pipe has been initially pressurized, allow the pipe to relax for at least 8 hours before pressurizing for the next test.
- (i) Once the carrier pipe has passed hydrostatic leak testing, perform hydrostatic leak testing of the containment pipe as follows.
  - (i) Release pressure on carrier pipe but do not drain water out.
  - (ii) Follow initial expansion phase outlined above.
  - (iii) Follow test phase outlined above.
  - (iv) If the volume of make-up water added at the 3 hour interval does not exceed 81.3 litres per 30.5 m of pipe (based on 800mm dia. IPS), leakage is not indicated and the pipe is considered to have passed the hydrostatic pressure test.
  - (v) If the volume of make-up water added at the 3 hour interval exceeds 81.3 litres per 30.5 m of pipe, leakage is indicated and the pipe has failed the hydrostatic pressure test. Locate and repair the leak. Repeat hydrostatic test procedure.
  - (vi) Regardless of volume of make-up water required, repair any known leaks.
  - (vii) If the hydrostatic pressure test is not completed after the containment pipe has been initially pressurized, allow the pipe to relax for at least 8 hours before pressurizing for the next test.
- (j) Remove all water added to the containment pipe for hydrostatic leak testing after successful testing of pipe.

#### E19.4 MEASUREMENT AND PAYMENT

##### E19.4.1 Joining HDPE Dual Containment Pipe Sections

- (a) Fusion joining of HDPE dual containment pipe sections will not be measured for separate payment and will be included with "Installation of HDPE Dual Containment Pipe".

##### E19.4.2 Installation of HDPE Dual Containment Pipe

- (a) HDPE dual containment pipe supply and installation will be measured for payment on a length basis for each type and size of pipe, method of installation and type of backfill and paid for at the Contract Unit Price per metre for "Installation of HDPE Forcemain Pipe". Length to be paid for will be the total number of linear metres of HDPE forcemain pipe installed in accordance with this specification, accepted and measured by the Contract Administrator.
- (b) Supply of HDPE dual containment pipe will not be measured for separate payment and will be included with "Installation of HDPE Dual Containment Pipe".
- (c) Measurement for installation of HDPE dual containment pipe will be made along the centreline of each pipe from the connection to Manhole #3 and #4 in St. Vital Park to the connection to Manhole #5 and #6 respectively in Crescent Drive Golf Course.
- (d) Installation of HDPE fittings if used, will not be measured for separate payment and will be included with "Installation of HDPE Dual Containment Pipe".

##### E19.4.3 Pressure Testing

- (a) Pressure testing of the dual containment pipes before and after installation will not be measured for separate payment and will be included with "Installation of HDPE Dual Containment Pipe".

#### **E20. INSTALLATION OF RIVER CROSSING PRESSURE MONITORING SYSTEM**

##### E20.1 DESCRIPTION

- E20.1.1 This specification covers the supply, testing and installation of a pressure monitoring system for leak detection in the dual contained HDPE river crossing pipes.



## E20.2 MATERIALS

### E20.2.1 HDPE Electrofusion Service Saddles

- (a) HDPE electrofusion service saddles to meet same requirements as specified for HDPE dual contained pipe.

### E20.2.2 Pressure Transmitter

- (a) Winters PTP premium series pressure transmitter Model No. PTP60.
- (b) 6mm NPT male connection.
- (c) Stainless steel housing and wetted parts.
- (d) 4-20mA digital signal.

### E20.2.3 Wires

- (a) Wires to be rated 600V, CSA Approved.
- (b) Wires in conduit to be stranded copper, RW90, cross-linked polyethylene insulated.
- (c) Solid copper not permitted unless required by code.
- (d) Conductor size to be minimum 14ga.

### E20.2.4 Pressure Monitoring Display Enclosure

- (a) Complies with NEMA 4 enclosure.
- (b) Suitable for mounting inside the existing communications cabinet in Crescent Drive Wastewater Pumping Station control panel.
- (c) Formed 14 or 16 gauge steel body and door.
- (d) Bonding stud provided on door and grounding stud provide in enclosure.
- (e) Removable inner panel.
- (f) Permanently secured oil resistant gaskets.
- (g) Full view UV resistant polycarbonate window to allow checking of readout on pressure gauges without opening the enclosure door.
- (h) Continuous stainless steel hinges on door.
- (i) Sized to accommodate two pressure gauge readouts and associated wiring.
- (j) Surfaces finished with re-coatable powder coating inside and out.
- (k) Hammond Eclipse Series or approved equal.

### E20.2.5 Pressure Display Gauges

- (a) Powered by 115 VAC.
- (b) 4 digit, 9 segment LED display panel, minimum 20mm in height.
- (c) Provided with NEMA 4 face.
- (d) Able to accept 0-20mA input from pressure transmitter.
- (e) Winters Premium Series Digital Indicator or approved equal.

### E20.2.6 Circuit Breaker

- (a) 15A bolt on type breaker compatible with existing panel board in the Control Panel.

### E20.2.7 PVC Conduit

- (a) Conduit shall be rigid Schedule 40 PVC (Unplasticized) to CSA C22.2 No. 211.2-M1984. Minimum conduit size to be 50 millimetre diameter.

### E20.2.8 Anchor Bolts

- (a) ASTM A276, Type 316 stainless steel, of ample section to safely withstand the forces created by the load to which they will be subjected.

## E20.3 CONSTRUCTION METHODS

### E20.3.1 HDPE Electro-fusion Service Saddles

- (a) Install electrofusion saddle on each dual containment HDPE pipe in the gate chamber manhole #5 and #6 as shown in the Drawings and in accordance with manufacturer's instructions.
- (b) Neatly drill a hole into the HDPE containment pipes through the connection outlet on the HDPE electrofusion saddles of the required size for the pressure/vacuum tubing and pressure transmitter tubing. Ensure the hole does not extend into the HDPE carrier pipe.

### E20.3.2 Pressure Transmitter

- (a) Mount pressure transmitters to HDPE electrofusion saddles using adapter as required.
- (b) Complete installation of pressure transmitter in accordance with manufacturer's written instructions.
- (c) Run wires from pressure transmitter to PVC conduit mounted on manhole wall. Leave slack in wires to prevent pull-out.

### E20.3.3 PVC Conduit and Wiring

- (a) Make timely application to the authority having jurisdiction for all permits and certificates necessary to carry out the work, supply and submit all drawings, application forms and fees payable to the relevant authority.
- (b) Form conduit to shape of manhole radius and attach to wall with support clips and anchor bolts at 1.2 metre intervals. Provide support clip within 300 millimetres of a direction change.
- (c) Run conduit tight to manhole wall including bends at direction changes. Locate conduit to not interfere with access of Collections personnel.
- (d) Core neat hole in manhole wall where conduit passes through the wall slightly larger than OD of conduit using diamond coring equipment.
- (e) Grout around PVC conduit where pipes pass through manhole wall with grout to make watertight.
- (f) Install conduit from Manhole #6 to Manhole #5 and then on to the control panel for the Crescent Drive Wastewater Pumping Station as shown on the drawings using Trenchless installation methods.
- (g) Run signal wire from pressure transmitters inside the conduit in a continuous length from each pressure transmitter to the control panel for the Crescent Drive Water Pumping Station.
- (h) Hand excavate beneath the existing concrete pad for the Crescent Drive Wastewater Pumping station and run PVC conduit to slab.
- (i) Core hole through concrete slab a maximum of 12 millimetres larger than the PVC conduit. Grout opening around PVC conduit.
- (j) Provide expansion in vertical leg of conduit to allow for future ground or slab settlement.
- (k) Use existing knockout in bottom of Control Panel to enter Control Panel with conduit. If no knockout exists drill hole in bottom of Control Panel at location approved by the Contract Administrator.
- (l) Make final wiring connections for pressure transmitter signal wires and power source to display panels including installation of the circuit breaker in the circuit panel board.
- (m) Coordinate with Contract Administrator to shutdown power in Control Panel to allow connections to be made.

- (n) Power shutdown will be limited to 2 hours. If required work cannot be done within the 2 hour shutdown period, sequence work in stages so that power can safely be turned back on after 2 hours. Power will not be shutdown again until sewer system has returned to normal.
- (o) Provide Contract Administrator with proposed schedule of electrical work for approval prior to commencing work in Control Panel.

**E20.3.4 Pressure Monitoring Display Enclosure**

- (a) Mount pressure monitoring display panel into a vacant location in the Communications Cabinet of the Control Panel for the Crescent Drive Wastewater Pumping Station.
- (b) Install cabinet in accordance with manufacturer's written instructions.

**E20.3.5 Testing**

- (a) Test pressure monitoring system over a range of 50 psi to 10 psi vacuum.
- (b) Attach an air supply/vacuum source complete with certified pressure/vacuum gauge readout accurate to 0.1psi to each pressure transmitter for test.
- (c) Calibrate digital display readout to gauges on air source.

**E20.4 MEASUREMENT AND PAYMENT**

- (a) Supply and installation of river crossing pressure monitoring system will be measured for payment on a unit basis for the complete installation as described and paid for at the Contract Unit Price "Installation of River Crossing Pressure Monitoring System". Amount to be paid for will be the total number of river crossing pressure systems installed in accordance with this specification, accepted and measured by the Contract Administrator.

**E21. SUPPLY AND INSTALLATION OF STAINLESS STEEL SLUICE GATES**

**E21.1 DESCRIPTION**

**E21.1.1** This Specification shall cover the supply and installation of fabricated stainless steel sluice gates, operators and mechanical accessories for the inlet and outlet gate chamber manholes as shown on the Drawings.

**E21.2 MATERIALS**

**E21.2.1 General**

- (a) Sluice gates shall be a fabricated stainless steel flush bottom gate. The sluice gate shall be complete with frame suitable for attaching directly to a pre-cast concrete manhole wall, gaskets, rising stem, stem guides, geared operator, operator pedestal, anchor bolts and all mechanical accessories.
- (b) The fabricated stainless steel sluice gate shall meet the following leakage rates.
  - (i) Under seating head leakage not to exceed 0.60 litres per minute per meter (0.05 USgpm per foot) of seating perimeter.
  - (ii) Under unseating head leakage not to exceed 1.25 litres per minute per metre (0.1 USgpm per foot) of perimeter.
- (c) The gates shall be capable of withstanding seating and unseating heads of up to 4 meters (13.6 feet).

**E21.2.2 Materials of Construction**

- (a) Gate: ASTM A-276 Type 304 Stainless Steel
- (b) Frame and Extensions: ASTM A-276 Type 304 Stainless Steel
- (c) Guides: ASTM A-276 Type 304 Stainless Steel
- (d) Fasteners: ASTM A-276 Type 316 Stainless Steel

- (e) Wall Thimble: ASTM A-276 Type 304 Stainless Steel
- (f) Stem: ASTM A-276 Type 304 Stainless Steel, Solid Round Bar
- (g) Bottom Seal: Neoprene Grade 2BC 510
- (h) Wall gasket: Full face, resilient Neoprene, minimum 10 millimetres thick
- (i) Lateral and Top Seals: ASTM D-2000 UHMW Polyethylene and Neoprene
- (j) Threaded Stem Nut: Manganese Bronze, ASTM B584, Alloy 432
- (k) Stem Block: ASTM A-276 Type 304 Stainless Steel
- (l) Stem Coupling: ASTM A-276 Type 304 Stainless Steel
- (m) Stem Guide: ASTM A-276 Type 304 Stainless Steel
- (n) Stem Cover: ASTM A-276 Type 304 Stainless Steel with ASTM A-707 Clear Polycarbonate sight glass
- (o) Pedestal: Tenzaloy Aluminium
- (p) Anchor Bolts: ASTM A-276 Type 316 Stainless Steel suitable for fastening the sluice gate to a circular wall pre-cast concrete manhole wall.

#### E21.2.3 Manufacturer's Experience

- (a) 'The sluice gate, and manual geared operator is to designed and manufactured by a company having at least seven years prior experience in manufacturing these types of products in the size and to the heads specified.

### E21.3 CONSTRUCTION METHODS

#### E21.3.1 Sluice Gate Construction

- (a) General
  - (i) The gates shall be open frame with rising stem and wall thimble. All structural parts shall be sized and apportioned to withstand the structural loads to which they will be subject without buckling, warping, bending, or otherwise failing. Welding shall be done in accordance with ASME Standards Section IX. Gates and wall thimbles shall be water and sand blasted after fabrication to remove all weld splatter and to polish scratches. After blasting the entire surface shall be of uniform colour and sheen.
- (b) Frame
  - (i) The frame shall be of structural members or formed plate welded to form a rigid one piece unit. The frame shall be of the flange back design suitable for mounting on a round pre-cast concrete wall with extra wide flange. The guide slot shall be of UHMWPE and engage the slide plate a minimum width of 25 millimetres.
  - (ii) The frame configuration shall be of the flush bottom type and shall allow for the replacement of the top and side seals without removing the gate frame from the wall thimble.
- (c) Slide
  - (i) The slide shall consist of flat plate reinforced with formed plates or structural members to limit its deflection to 1/720 of the span of the gate under the design head.
- (d) Guides and Seals
  - (i) The guides shall be of such length as to retain and support at least two thirds of the vertical height of the slide in the full open position.
  - (ii) UHMWPE side and top seals shall be of the self adjusting type and shall maintain an efficient seal in any position of the slide.
  - (iii) The resilient neoprene bottom seal shall be fastened to the face of the bottom edge of the slide and extend 6 millimetres beyond the bottom edge to make a

- watertight seal with bottom channel when fully closed. The bottom seal shall be readily replaceable by removing the fasteners.
- (iv) Holes in wall gasket to be pre-punched to match the gate frame and form a seal on either side of the anchor bolts.
- (e) Stem and Couplings
- (i) The operating stem shall be sized and designed to transmit in compression at least two times the rated output of the manual geared operator with an 18 kg (40lb) effort on the crank.
  - (ii) The stem shall be solid and have a slenderness ratio ( $L/r$ ) of less than 100 and be able to transmit the loads and torque applied to it.
  - (iii) The threaded portion of the stem shall be furnished with right-hand, 29 degree modified Acme single threads of sufficient length to allow for full opening of the gate.
  - (iv) The bottom end of the stem shall be threaded to a connection block on the gate and fitted with double bolts of ample proportion to resist loads applied to the stem during opening and closing operation. The connection shall be of greater strength than the stem.
  - (v) Connect all multi-sectioned stems with a solid coupling. The coupling shall be shall internally threaded or grooved, keyed and fitted with bolts for locking. Couplings shall be of greater strength than the stem.
  - (vi) Fit the stem above the operator with an adjustable stop for the fully closed position.
- (f) Stem Guides
- (i) Fabricate stem guides of Type 304 Stainless Steel with UHMW Polyethylene bushings and be adjustable in both the horizontal and vertical directions.
  - (ii) Spacing to be as recommended by the gate manufacturer with a minimum of two stem guides provided.
- (g) Stem Cover
- (i) Provide a 50 millimetre wide slot in the stem extension cover to allow viewing of the position of the gate stem. Fit the slot with a clear polycarbonate cover and clear mylar position indicating tape. Apply the tape in the field after the gate has been installed and positioned.
  - (ii) Provide a cap and condensation vents on the stem extension cover.
- (h) Thrust Nut
- (i) Provide a thrust nut at the operator collar.
- (i) Enclosed Manual Geared Operator
- (i) Provide a pedestal mounted, hand crank operated, enclosed gear operator for the gate.
  - (ii) All bearings and gears shall be grease lubricated enclosed in a watertight housing. Provide suitable nipples on the housing for the addition of grease.
  - (iii) Construct pinion shaft of stainless steel and support by roller or needle bearings.
  - (iv) Design the operator to operate the gate under the maximum seating or unseating condition by not more than a 18 kg (40 lb.) effort on the crank and be able to withstand without damage, an effort of 36 kg (80 lb.).
  - (v) Provide standard 50mm x 50mm square AWWA operating nut on the operator to facilitate use of portable electric operators.
  - (vi) Provide removable crank to fit over 50mm x 50mm operating nut. Handle to be corrosion resistant. The maximum crank radius shall be 380 millimetres.
  - (vii) Indicate the direction of rotation to open the gate on the operator housing in a permanent manner.
- (j) Acceptable Product

- (i) H. Fontaine Series 20 (RMX) fabricated stainless steel sluice gate with Type MNEP operator or approved equal.
- (k) Shop Drawings
  - (i) Submit Shop Drawings of the gate, operator and accessories to the Contract Administrator for review prior to manufacture. Submit Drawings in accordance with E14.
  - (ii) Drawings shall clearly indicate general design, materials and arrangement complete with mounting details and dimensions, materials list for gate, frame, stem, seals, slides, operator and all other parts and complete details of operators including type, torque, capacity, gear ratio and number of turns to close.
- (l) Shop Testing
  - (i)
- (m) Operating and Maintenance Manuals
  - (i) Provide five (5) copies of all the manufacturer's brochures and technical literature detailing correct installation procedure and recommended operating and maintenance instructions.
  - (ii) Manuals shall be bound with the project title and gate description identified on the front cover.
  - (iii) Final payment for sluice gates will not be made until the above information has been provided to the Contract Administrator.

#### E21.3.2 Shop Testing

- (a) Shop inspect, adjust and test each fully assembled sluice gate for operation and leakage at the design head before shipping.
- (b) Provide the following information to the Contract Administrator prior to delivery of the gate and operator:
  - (i) A certified copy of the Chemical and Physical Analysis on all materials used in the manufacture of the gate, operator and accessories or certification that the materials used are in strict accordance with this specification.
  - (ii) Copies of the test reports for Performance and Leakage Tests. Included in the report shall be the signature of the official who is responsible for the gate assembly and testing.

#### E21.3.3 Inspection of Sluice Gates Before Installation

- (a) Arrange with the Contract Administrator for inspection of the sluice gates immediately after delivery.
- (b) The Contract Administrator will examine the gates, operators and accessories and will reject any equipment that is found to be damaged to the extent that, in the Contract Administrator's opinion, it cannot be put to the use for which it was intended.
- (c) Arrange with the gate supplier to repair any superficially damaged equipment to the satisfaction of the Contract Administrator.
- (d) Arrange to have any rejected equipment replaced as soon as possible so as to not hold up the project schedule at no extra expense to the City.

#### E21.3.4 Installation of Sluice Gate, Operator and Accessories

- (a) Install gates, operators, stem guides, stems and accessories as shown on the drawings and in accordance with the manufacturer's recommendations.
- (b) Ensure sluice gates are installed plumb, square and centred on pipe opening.
- (c) Install anchor bolts in accordance with the manufacturer's written instructions. Anchor bolts should not become loose under repeated installation and removal of the sluice gate.

- (d) Make arrangements to have a qualified field representative of the gate supplier/manufacture inspect the gate installations during and after completion and provide a Certificate of Satisfactory Installation to the Contract Administrator.

#### E21.3.5 Field Testing

- (a) Perform leakage tests at the design head for both seating and unseating conditions in the Contract Administrator's presence once the gates have been installed to ensure compliance with the allowable leakage rate.
- (b) Ensure that a qualified field representative of the gate manufacturer is present for the testing to assist in correcting any deficiencies to the satisfaction of the Contract Administrator.
- (c) Perform leakage tests on all sluice gates before making final upstream and downstream connections to the existing interceptor sewer.
- (d) Use water from river, tanker, City hydrant or other source approved by Contract Administrator for field testing of sluice gates.
- (e) Perform seating and unseating head tests by closing the gate, plugging sewer pipes as required with inflatable plugs, filling the chamber or sewer pipe with water to the specified head.
- (f) Measure the leakage rate through the gate by determining the volume of the fill water and calculating how much fill water leaked through the gate over a period of 1 hour.
- (g) Any deficiencies shall be corrected as soon as possible by the Contractor to the satisfaction of the Contract Administrator and retested as described in this specification.

#### E21.4 MEASUREMENT AND PAYMENT

- (a) Supply and installation of fabricated stainless steel sluice gates, operators and mechanical accessories will be measured for payment on a unit basis for each size and paid for at the Contract Unit Price for "Installation of Fabricated Stainless Steel Sluice Gates". The amount to be paid for will be the total number of fabricated stainless steel sluice gates installed in accordance with this specification, accepted and measured by the Contract Administrator.

### **E22. ABANDONING EXISTING INTERCEPTOR SEWER, MANHOLES AND GATE CHAMBERS**

E22.1 Abandon the existing 750mm diameter interceptor sewer as follows.

E22.1.1 Plug pipe ends at location of new manholes #1 and #9 with a minimum 300mm thick layer of concrete.

E22.1.2 Completely fill the section of the 750mm diameter interceptor sewer that crosses beneath the pavement of Crescent Drive with flowable cement-stabilized fill in accordance with CW 2130.

E22.1.3 Plug open ends of 750mm diameter interceptor sewer with a minimum 300mm thick layer of concrete.

E22.2 Abandon the existing gate chambers in accordance with CW 2130 and as follows.

- (a) Remove the existing cast iron sluice gates, stems, stem guides, operators, pedestals and hatch covers.
- (b) Remove the cast-in-place concrete roof slab and walls to 1.2 meters below grade.
- (c) Plug the end of 750mm diameter and 525mm diameter interceptor sewers where connected to chamber with 2 rows of grouted concrete bricks or other approved method of plugging and fill the bottom 800mm of the chamber with cement-stabilized fill.
- (d) Fill the chamber and excavation with Class 3 Backfill in accordance with CW 2030 to within 1 metre of finish grade.

- (e) Fill remainder of excavation with Class 4 Backfill in accordance with CW 2030.
- (f) Restore excavation with sod using imported topsoil.

- E22.3 Abandon existing manhole at STA 3+47.44 in accordance with CW 2130 except fill the bottom 750mm of the manhole with cement-stabilized fill material.
- E22.4 Deliver salvaged material as determined by the Contract Administrator to the City of Winnipeg "Y" Yard located on Dawson Road.