



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 595-2006

**2006 RENEWAL OF THE HART WASTEWATER PUMPING STATION FORCEMAIN
RED RIVER CROSSING AND STATION PIPING MODIFICATIONS – CONTRACT 10**

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PART B - BIDDING PROCEDURES

B1. PROJECT TITLE

B1.1 2006 RENEWAL OF THE HART WASTEWATER PUMPING STATION FORCEMAIN RED RIVER CROSSING AND STATION PIPING MODIFICATIONS – CONTRACT 10

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, October 17, 2006.

B2.2 Bid Submissions 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 GC:3.1, the Bidder may view the Site without making an appointment.

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 shall 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 SUBMISSION

B7.1 The Bid Submission consists 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 All components of the Bid Submission 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 in ink, to constitute a responsive Bid.

B7.3 The Bid Submission shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.

B7.3.1 Samples or other components of the Bid Submission 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 Submission.

B7.4 Bid Submissions submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B7.5 Bid Submissions 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 shall be original and shall 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 Submission and the Contract, when awarded, shall be both joint and several.

B9. PRICES

- B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B9.1.1 Notwithstanding GC.12.2.3(c), prices on Form B: Prices shall not include the Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable.
- 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;
 - (b) be responsible and not be suspended, debarred or in default of any obligation to the City;
 - (c) be financially capable of carrying out the terms of the Contract;
 - (d) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract;
 - (e) have successfully carried out work, similar in nature, scope and value to the Work;
 - (f) employ only Subcontractors who:
 - (i) are responsible and not suspended, debarred or in default of any obligation 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>); and

- (ii) have successfully carried out work similar in nature, scope and value to the portion of the Work proposed to be subcontracted to them, and are fully capable of performing the Work required to be done in accordance with the terms of the Contract;
 - (g) have a written workplace safety and health program in accordance with The Workplace Safety and Health Act (Manitoba);
- B10.2 Further to B10.1(g), 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 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 - Option 1 administered by the Manitoba Heavy Construction Association's Safety, Health and Environment Program; or
 - (b) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association; or
 - (c) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt.>)
- B10.3 The Bidder shall be prepared to 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.
- B10.4 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.
- B11.2 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 Bid Submissions 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 Bid Submissions 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 After the public opening, the names of the Bidders and their Total Bid Prices as read out (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 Submission 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 GC:23.3, 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 shall:
- (a) retain the Bid Submission until after the Submission Deadline has elapsed;
 - (b) open the Bid Submission 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 Submission 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 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 Submission 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 by way of a letter of intent, or will give notice that no award will be made.
- B16.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.

- B16.2.1** Without limiting the generality of B16.2, the City will have no obligation to award a Contract where:
- (a) the prices exceed the available City funds for the Work;
 - (b) the prices are materially in excess of the prices received for similar work in the past;
 - (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
 - (d) only one Bid is received; or
 - (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.
- B16.3** Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid.

PART C - GENERAL CONDITIONS

C1. GENERAL CONDITIONS

C1.1 The *General Conditions for Construction Contracts* (Revision 2000 11 09) are applicable to the Work of the Contract.

C1.1.1 The *General Conditions for Construction Contracts* 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>.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

- D1.1 In addition to the *General Conditions for Construction Contracts*, these Supplemental Conditions are applicable to the Work of the Contract.
- D1.2 The General Conditions are amended by striking out "The City of Winnipeg Act" wherever it appears in the General Conditions and substituting "The City of Winnipeg Charter".
- D1.3 The General Conditions are amended by striking out "Tender Package" wherever it appears in the General Conditions and substituting "Bid Opportunity".
- D1.4 The General Conditions are amended by striking out "Tender Submission" wherever it appears in the General Conditions and substituting "Bid Submission".
- D1.5 The General Conditions are amended by deleting GC:6.16 and GC:6.17. The City of Winnipeg is now within the jurisdiction of the Manitoba Ombudsman pursuant to The Ombudsman Act.

D2. SCOPE OF WORK

- D2.1 The Work to be done under the Contract shall consist of the renewal of the Hart Wastewater Pumping Station Red River forcemain crossing and station piping modifications.
- D2.2 The major components of the Work are as follows:
- (a) Installation of 2 approximately 275m long each, dual containment forcemains consisting of 450mm dia. (IPS) HDPE containment pipe with 300mm dia. (IPS) HDPE carrier pipe beneath the Red River using the horizontal directional drilling method.
 - (b) Installation of approximately 50m of 300mm dia. (IPS) HDPE forcemain pipe using the open cut installation method.
 - (c) Installation of approximately 106m of 300mm dia. AWWA C900 PVC forcemain pipe using trenchless methods.
 - (d) Modifications to the system piping inside the Hart Wastewater Pumping Station.
 - (e) Abandonment of the existing 300mm dia. steel forcemain.
 - (f) Cleanup and restoration of all disturbed pavement and boulevard areas.

D3. DEFINITIONS

- D3.1 Notwithstanding GC:1.1, when used in this Bid Opportunity:
- (a) "HDPE" means high density polyethylene;

D4. CONTRACT ADMINISTRATOR

- D4.1 The Contract Administrator is:
- Mr. Terry whiteside, C.E.T.
Design and Specifications Coordinator
849 Ravelston Avenue West, R3W 1S8
- 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 GC:23.2.2, 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 attention of the Chief Financial Officer at the following address or facsimile number:

The City of Winnipeg
Chief Administrative Officer Secretariat
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
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. SAFE WORK PLAN

D8.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in GC:4.1 for the return of the executed Contract.

D8.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

D9. INSURANCE

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

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

D9.2 Deductibles shall be borne by the Contractor.

D9.3 The Contractor shall provide the City Solicitor with a certificate of insurance of each policy, in a form satisfactory to the City Solicitor, 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 GC:4.1 for the return of the executed Contract.

D9.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least fifteen (15) Calendar Days prior written notice to the Contract Administrator.

D10. PERFORMANCE SECURITY

D10.1 The Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:

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

D10.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.

D10.2 If the bid security provided in his Bid Submission 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 GC:4.1 for the return of the executed Contract.

D11. DETAILED WORK SCHEDULE

- D11.1 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 GC:4.1 for the return of the executed Contract.
- D11.2 The detailed work schedule shall consist of the following:
- (a) a Gantt chart for the Work;
all acceptable to the Contract Administrator.
- D11.3 Further to D11.2(a), the Gantt Chart shall show the time on a weekly basis, required to carry out the Work of each activity or task. The time shall be on the horizontal axis, and the activity or task shall be on the vertical axis.

SCHEDULE OF WORK

D12. COMMENCEMENT

- D12.1 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.
- D12.2 The Contractor shall not commence any Work on the Site until:
- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence that the Contractor is 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;
 - (ii) evidence of the workers compensation coverage specified in GC:6.14;
 - (iii) the Safe Work Plan specified in D8;
 - (iv) evidence of the insurance specified in D9;
 - (v) the performance security specified in D10;
 - (vi) the detailed work schedule specified in D11; 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.
- D12.3 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the letter of intent.
- D12.4 The City intends to award this Contract by October 26, 2006.

D13. WORK BY OTHERS

- D13.1 Beginning January 15, 2007, work will begin under Bid Opportunity 747-2005 for riverbank stabilization on the west bank of the Red River along limits of St. John's Park.
- D13.2 The limits of the Work will be from the top of the riverbank to the river.
- D13.3 The riverbank stabilization contractor will generally be working along the riverbank but may need to access the riverbank from St. John's Park from time to time and every effort should be made to cooperate with them.
- D13.4 The riverbank stabilization contractor will be advised of the forcemain installation and advised to cooperate as well.

D13.5 Drawings for the riverbank stabilization work can be viewed on the City of Winnipeg, materials Management web site at the following web site
<http://www.winnipeg.ca/finance/findata/matmgt/bidres/Past/2006.asp>

D14. SEQUENCE OF WORK

D14.1 Work on the forcemain installation, new discharge manhole and piping modifications inside the Hart Wastewater Pumping Station shall be done concurrently to ensure one new forcemain is in operation before the Critical Stage date indicated in D16.1(a).

D15. CRITICAL STAGES

D15.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

(a) One of the new forcemains must be in operation by January 12, 2007.

D16. SUBSTANTIAL PERFORMANCE

D16.1 The Contractor shall achieve Substantial Performance by March 16, 2007.

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

D16.3 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.

D17. TOTAL PERFORMANCE

D17.1 The Contractor shall achieve Total Performance by June 1, 2007.

D17.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D17.3 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.

D18. LIQUIDATED DAMAGES

D18.1 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) One new forcemain in operation by January 12, 2007 – Two Thousand dollars (\$2,000.00);

(b) Substantial Performance by March 16, 2007 – One Thousand dollars (\$1,000.00);

(c) Total Performance by June 1, 2007 – Five Hundred dollars (\$500.00).

- D18.2 The amounts specified for liquidated damages in D18.1 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.
- D18.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D19. SCHEDULED MAINTENANCE

- D19.1 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.
- D19.2 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

D20. JOB MEETINGS

- D20.1 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.
- D20.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

D21. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

- D21.1 Further to GC:6.26, 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).

FORM H1: PERFORMANCE BOND
(See D10)

KNOW ALL MEN BY THESE PRESENTS THAT

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

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

_____ dollars (\$_____)

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

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

_____ day of _____, 20____, for:

BID OPPORTUNITY NO. 595-2006

2006 RENEWAL OF THE HART WASTEWATER PUMPING STATION FORCEMAIN RED RIVER
CROSSING AND STATION PIPING MODIFICATIONS – CONTRACT 10

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 D10)

(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. 595-2006

2006 RENEWAL OF THE HART WASTEWATER PUMPING STATION FORCEMAIN RED RIVER
CROSSING AND STATION PIPING MODIFICATIONS – CONTRACT 10

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, STANDARD DETAILS AND DRAWINGS

- E1.1 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.1.1 *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>.
- E1.1.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.1.3 Further to GC:2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.2 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
	Cover Sheet
05961	Red River Crossing Plan and Profile
05962	Red River Crossing Site Plans
05963	Aerial Photo Site Plan
05964	Pumping Station Piping Modifications Plan and Section Views
05965	Pumping Station Piping Modifications Details

E2. SOILS INVESTIGATION REPORT

- E2.1 Further to GC:3.1, of the General Conditions, a geotechnical soils investigation has been done in the vicinity of the proposed Works to determine the character of the subsurface soil to facilitate the design of the Work and are shown on Drawing No. 05961. Copies of the soils investigation report can be provided upon request.
- E2.2 Bidders are responsible for any interpretation they place on the supplied information and are expected to make such additional investigation of the soil as they feel necessary to satisfy themselves.
- E2.3 Any test borings made by the Bidder shall be done in accordance with the requirements of the appropriate authorities of the City of Winnipeg. Bidders shall notify the Contract Administrator prior to starting any soil boring operation.

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. PROTECTION OF EXISTING TREES

- E4.1 The Contractor shall take the following precautionary steps prior to construction to avoid damage from his construction activities to existing boulevard trees within the limits of the construction area.
- E4.1.1 Do not stockpile materials and soil or park vehicles and equipment on boulevards within 2 metres of trees.
- E4.1.2 Strap mature tree trunks with 25 x 150 x 2400 wood planks. Smaller trees shall be similarly protected using appropriately sized wood planks.
- E4.1.3 Excavations shall be carried out in a manner to minimize damage to existing root systems. Where roots must be cut to facilitate an excavation they shall be neatly pruned at the face of the excavation.
- E4.1.4 Work on Site shall be carried out in a manner to minimize damage to existing tree branches. Where damage to tree branches does occur, the Contractor shall neatly prune the damaged branch.
- E4.1.5 American elm trees shall not be pruned between April 1st and August 1st and Siberian elm trees between April 1st and July 1st of any year under provisions of The Dutch Elm Disease Act.
- E4.2 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.
- E4.3 No separate measurement or payment will be made for protection of trees.

E5. DANGEROUS WORK CONDITIONS

- E5.1 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.
- E5.2 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.
- E5.3 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.
- E5.4 The Contractor shall ventilate all confined spaces including underground chambers, tunnels, pipes and shafts as required and approved by the Manitoba Workplace Safety and Health Act (the "Act"). If no ventilation is supplied, a worker must wear a respirator or supplied air to enter the confined space.
- E5.5 Workers must wear a respirator or supplied air at all times when entering a chamber, manhole or sewer where live sewage is present.
- E5.6 The Contractor shall provide a photoionization detector (PID) on Site at all times to monitor potential hydrocarbon vapours in the confined spaces. The gas detector and safety equipment conforming to the Act shall be made available to the Contract Administrator for his use during inspections.

- E5.7 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.
- E5.8 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).
- E5.9 The Contractor shall 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.

E6. SURFACE RESTORATION

- E6.1 Prior to construction, inspect the grassed, pavement and gravel surfaces within and adjacent to the Site with the Contract Administrator to record the current condition. After construction and Site cleanup is complete, re-inspect the condition with the Contract Administrator.
- E6.2 Restoration of grassed areas damaged as result of construction activities will 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.
- E6.3 Pavement damaged as a result of construction activities will 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.
- E6.4 Gravel surfacing damaged as a result of construction activities will 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.

E7. TEMPORARY SURFACE RESTORATIONS

- E7.1 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.
- E7.1.1 Temporarily restore disturbed surfaces as follows:
- (a) Boulevards and grassed areas: backfill to match existing surface elevation and level area.
 - (b) Sidewalks and pathways: 50 millimetre thick layer of cold mix asphalt or stabilized cement fill.
- E7.1.2 Maintain temporary surface restoration until permanent surface restoration is completed.
- E7.1.3 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.
- E7.2 Measurement and Payment
- E7.2.1 Costs for temporary surface restoration and maintenance will not be measured for payment and will be included with the Work being done.

E8. MOBILIZATION AND DEMOBILIZATION

- E8.1 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.
- E8.2 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.
- E8.3 50% of the Mobilization and Demobilization unit price will be paid on the first progress payment.
- E8.4 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.

E9. SITE ACCESS

- E9.1 St. John's Park
 - E9.1.1 Access St. John's Park from the intersection of St. John's Avenue and Fowler Street as shown on Drawing No. 05963.
 - E9.1.2 Access the temporary set-up area in St. John's Park generally following the route shown on Drawing No. 05963.
 - E9.1.3 Follow the same route in and out of the park to not disturb any more of the grounds than necessary.
 - E9.1.4 Provide flag persons for traffic and pedestrian control when entering or leaving the park and crossing the asphalt pathway in the park.
 - E9.1.5 Maintain the asphalt path in a passable condition for pedestrians (eg. remove wheel ruts and clear snow if required).
- E9.2 Hart Wastewater Pumping Station
 - E9.2.1 Transport large excavation and other equipment to the west side of the Hart Wastewater Pumping Station by barge from the Red River.
 - E9.2.2 Pull HDPE pipe into river crossing bore hole from Hart Avenue. The Contract Administrator will arrange to have Glenwood Crescent closed to traffic while the pipe is being pulled in.
 - E9.2.3 Maintain driveway access for #170 Glenwood Crescent during the construction period.

E10. TEMPORARY USE OF CITY EQUIPMENT

- E10.1 City facilities, systems and equipment shall not be used during construction without the Contract Administrator's written permission. The Contract Administrator reserves the right to withdraw said permission if, in his opinion, proper care and maintenance are not provided.

E11. EXISTING PUMPING STATION OPERATION DURING CONSTRUCTION

- E11.1 The Contractor is advised that the existing Hart Wastewater Wastewater Pumping Station and Flood Pumping Station will remain in operation while the Work is being completed and the Contractor shall plan his activities around the continued operation of the stations.
- E11.2 The Contractor shall cooperate with and provide full access at all times for City personnel to carry out maintenance and operational duties.

E12. TEMPORARY SHUTDOWN OF THE WASTEWATER PUMPING STATION

- E12.1 Temporary shutdown of the wastewater pumping station will be allowed for the following work activities.
- (a) Connecting the new station system piping to the existing system piping.
 - (b) Final benching and grouting of the new discharge manhole in St. John's Park.
- E12.2 Temporary station shutdown will include closing the sluice gate in the trunk sewer, pump turn off, forcemain draining, pump start up and opening the sluice gate.
- E12.3 Allowable shutdown time under peak dry weather flow (PDWF) conditions will be approximately 8 hours. Allowable shutdown time may be less due to unforeseen flow conditions due to groundwater conditions, watermain breaks, snow melt and other unforeseen sources.
- E12.4 The Contract Administrator will provide a paint mark indicating the critical basement elevation in a manhole at a convenient upstream location for reference. The critical basement elevation in the Hart Sewer District is 223.66
- E12.5 The Contractor must monitor the upstream system at all times during a shutdown to ensure the stored level of wastewater will not exceed the critical basement elevation.
- E12.6 More than the approximate 8 hours of allowable shutdown time may be available during the night when flows are generally reduced.
- E12.7 Schedule Work activities requiring more than the allowable station shutdown time to be done at night when more time may be available.
- E12.8 Provide temporary by-pass pumping in accordance with E13 where Work cannot be completed during the allowable shutdown time available.
- E12.9 Water and Waste Department, Collection System personnel will be available to provide assistance to the Contractor for temporary shutdown of the wastewater pumping station to facilitate completion of the Work.
- E12.10 There will be no charge to temporarily shutdown the wastewater pumping station for each Work activity listed.
- E12.11 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 Collection System personnel may be charged to the Contractor and deducted from future Progress Payments.
- E12.12 The Contract Administrator reserves the right to cancel a planned station shutdown if in his 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.
- E12.13 Consecutive back-to-back station shutdowns will not be allowed until the sewer system has returned to normal.

E13. TEMPORARY BY-PASS PUMPING

E13.1 Description

- E13.1.1 This specification covers temporary by-pass pumping of existing flow using submersible pumps if required to complete the Work.

E13.2 Materials

E13.2.1 Temporary By-Pass Pumping Equipment

- (a) Two (2) non-clog, submersible pumping units each sized to meet or exceed the expected peak dry weather flow (PDWF) of 60 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.

E13.3 Construction Methods

E13.3.1 By-Pass Pumping Plan

- (a) If by-pass pumping is required to complete the Work the procedure shall be generally as follows.
 - (i) Install both submersible pumps in the pumping station wet well. One pump will act as a backup in the event the first pump fails or the flow exceeds the capacity of one pump.
 - (ii) Run the discharge pipes into the wastewater pumping station and connect to the existing forcemain at the 250 mm dia. gate valve or wall flange in the pump room.
- (b) Be aware of and contend with the wastewater in the existing forcemain and station piping when connecting temporary by-pass pumping piping. Pump out and clean-up all wastewater spilt into the pump room.
- (c) Water and Waste Collection System staff will close the suction inlet valves from the wet well to facilitate by-pass pumping from the wet well.
- (d) Remove existing manhole frame, cover and risers as required to fit temporary by-pass pumping equipment into the wet well.
- (e) Locate the power supply for the temporary pumps where the noise and fumes will not adversely affect local residences and will not impede City staff from operating the pumping station during construction. Location to be approved by the Contract Administrator before construction starts.
- (f) Connect both pumps to a common discharge pipe.
- (g) 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.
- (h) 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.
- (i) Protect the discharge pipe from freezing using methods approved by the Contract Administrator.
- (j) Replace manhole risers, frame and cover in accordance with CW 2130 and reconstruct gravel pavement in accordance with CW 3150 once temporary by-pass pumping is complete.

- (k) Provide a detailed by-pass pumping plan expanding on the above general procedures to the Contract Administrator for approval before construction starts.
- (l) 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.

E13.3.2 Monitoring Level of Sewage In Trunk Sewer

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

E13.4 Measurement and Payment

E13.4.1 Temporary by- pass pumping will be measured on a unit basis and paid for at the Contract Unit Price for "Temporary By-Pass Pumping". Only one unit will be paid for temporary by-pass pumping in accordance with this specification, accepted and measured by the Contract Administrator regardless of how many separate times it takes place.

E13.4.2 Payment for Temporary By-Pass Pumping will be paid upon completion of temporary by-pass pumping Work and restoration and clean up of all Sites.

E14. SHOP DRAWINGS

E14.1 Description

- (a) This Specification shall revise, amend and supplement the requirements of CW 1100.
 - (i) The term 'shop drawings' means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, which are to be provided by the Contractor to illustrate details of a portion of the Work.
 - (ii) The Contractor shall submit specified shop drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be show on all submissions for Engineering review.
- (b) Shop Drawings
 - (i) Original drawings are to be prepared by the Contractor, Subcontractor, Supplier, Distributor, or Manufacturer, which illustrate appropriate portion of Work; showing fabrication, layout, setting or erection details as specified in appropriate sections.
 - (ii) Shop drawings for the following structural components shall bear the seal of a registered Engineer of Manitoba experienced in the type of Work the drawings are prepared for.
 - (a) Excavation and shoring.
 - (b) Reinforcing steel placement.
- (c) Contractor's Responsibilities
 - (i) Review shop drawings, product data and samples prior to submission and stamp and sign drawings indicating conformance to the Contract requirements.
 - (ii) Verify:
 - (a) Field measurements
 - (b) Field construction criteria
 - (c) Catalogue numbers and similar data
 - (iii) Coordinate each submission with requirements of Work and Contract Documents. Individual shop drawings will not be reviewed until all related drawings are available.

- (iv) Notify Contract Administrator, in writing at time of submission, of deviations from requirements of Contract Documents.
 - (v) Responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator's review of submission, unless Contract Administrator gives written acceptance of specified deviations.
 - (vi) Responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.
 - (vii) The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the required number of corrected copies of Shop Drawings. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on previous submission.
 - (viii) After Contract Administrator's review and return of copies, distribute copies to sub-trades as appropriate.
 - (ix) Maintain one (1) complete set of reviewed shop drawings, filed by Specification Section Number, at the Site of the Work for use and reference of the Contract Administrator and Subcontractors.
- (d) Submission Requirements
- (i) Schedule submissions at least 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.
 - (ii) Submit five (5) paper prints of shop drawings. The Contractor is advised that the Contract Administrator will retain three (3) copies of all submittals and return two (2) copies to the Contractor.
 - (iii) Accompany submissions with transmittal letter, containing:
 - (a) Date
 - (b) Project title and Bid Opportunity number
 - (c) Contractor's name and address
 - (d) Number of each shop drawing, product data and sample submitted
 - (e) Specification Section, Title, Number and Clause
 - (f) Drawing Number and Detail/Section Number
 - (g) Other pertinent data
 - (iv) Submissions shall include:
 - (a) Date and revision dates.
 - (b) Project title and Bid Opportunity number.
 - (c) Name of:
 - (i) Contractor
 - (ii) Subcontractor
 - (iii) Supplier
 - (iv) Manufacturer
 - (v) Separate detailer when pertinent
 - (d) Identification of product of material.
 - (e) Relation to adjacent structure or materials.
 - (f) Field dimensions, clearly identified as such.
 - (g) Specification section name, number and clause number or drawing number and detail/section number.
 - (h) Applicable standards, such as CSA or CGSB numbers.
 - (i) Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.
- (e) Other Considerations

- (i) Fabrication, erection, installation or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent shop drawings and resubmit.
- (ii) Material and equipment delivered to the Site of the Works will not be paid for at least until pertinent shop drawings have been submitted and reviewed.
- (iii) Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.
- (iv) No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of shop drawings.

E14.2 Measurement and Payment

- (a) Preparation and submittal of Shop Drawings will be included in the cost of the Work they are required for.

E14.2.1 Silt Fence and Containment Berm

E14.2.2 Install silt fencing satisfactory to the Contact Administrator between the excavation at the Montcalm Pumping station and the river to ensure drilling fluids and sediment from excavation do not enter the riverbank and river.

E14.2.3 Install a containment berm satisfactory to the Contract administrator around the excavation at the discharge manhole to ensure drilling fluids and sediment from the excavation do not enter private property, the riverbank and The Red River.

E15. SILT FENCING

E15.1.1 Install silt fencing and construction a containment berm satisfactory to the Contract Administrator around the excavation and set up area in St. John's Park before beginning horizontal directional drilling operation to ensure drilling fluids and sediment from the excavation do not enter the park, the riverbank and the Red River.

E15.1.2 Install silt fencing satisfactory to the Contract Administrator between the excavation area and the Red River at the Hart Wastewater Pumping Station before beginning excavation and directional drilling to ensure drilling fluids and sediment from excavation do not enter private property, the riverbank and the Red River.

E15.1.3 Remove silt fencing and containment berm after excavations have been backfilled.

E15.1.4 Costs for silt fencing and containment berm will not be measured for payment and will be included with the Work being done.

E16. FRAC-OUT MONITORING AND RESPONSE PLAN

E16.1 To avoid or minimize the potential for drilling fluids and drill cuttings from entering the Floodway channel because of a frac-out, the following monitoring and response plan will be followed.

E16.1.1 On-Site Monitoring

- (a) Maintain a record of drilling progress to always know the location of the drill head relative to the point of entry.
- (b) Maintain a record of drilling component usage (type and quantity) throughout each drilling operation.
- (c) 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.

- (d) 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.
- (e) 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.

E16.1.2 Loss of Fluid and Frac-out Response Plan

- (a) 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.
- (b) Inform the Contract Administrator of the frac-out condition or potential condition and decide on the appropriate action as follows:
 - (i) Assign a person to monitor (visual or using a turbidity meter) for the presence of a muddy plume;
 - (ii) 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);
 - (iii) 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.

E16.1.3 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.

E16.1.4 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.

E17. INSTALLATION OF HDPE AND PVC FORCEMAINS

E17.1 Description

E17.1.1 This specification covers the joining and installation of HDPE and PVC wastewater forcemains, connecting HDPE forcemain pipe to PVC forcemain pipe, connecting PVC forcemains to new discharge manhole, hydrostatic testing of forcemains and related Work.

E17.2 Materials

E17.2.1 HDPE Pipe

- (a) The City of Winnipeg, Water and Waste Department will provide the following materials at no expense for the Work.

- (i) 610 metres of dual containment HDPE plain end pipe consisting of a 450mm diameter (IPS) DR 11 containment pipe with a 300mm diameter (IPS) DR 17 carrier pipe.
 - (ii) 20 metres of 300mm diameter (IPS) DR 11 plain end HDPE pipe.
 - (iii) 6 – 300mm diameter (IPS) DR 11 HDPE plain end 45 degree bends.
 - (iv) 6 – 300mm diameter (IPS) DR 11 HDPE plain end wall anchor pipe.
 - (v) 2 – 300mm diameter (IPS) DR 11 HDPE electrofusion couplings.
- (b) All other material required for the completion of the Work shall be supplied by the Contractor.

E17.2.2 PVC Pipe

- (a) PVC forcemain pipe to be in accordance with AWWA C900, Class 150.
- (b) Use only those products listed in AT - 4.1.1.10 of Approved Products for Underground Use in the City of Winnipeg found on the City of Winnipeg, Materials management web site at <http://www.winnipeg.ca/matmgt/spec/>

E17.2.3 Forcemain Valves and Valve Boxes

- (a) Direct bury, non rising stem, bronze trim wedge gate valves rated at 1MPa in accordance with AWWA C500.
- (b) Valve body to be epoxy coated in accordance with AWWA C550.
- (c) Valve ends to be push-on type with full insertion depth.
- (d) Direction of closing to be clockwise.
- (e) Valve boxes to be ASTM A48 cast iron, bituminous coated, two-piece sliding type adjustable over a minimum of 450 millimetres with hinged lid complete with valve stem extension in accordance with AP-001 found on the City of Winnipeg, Materials management web site at <http://www.winnipeg.ca/matmgt/spec/>
- (f) Valve box covers to be marked with an “S”.
- (g) Use only those valve products listed in AT - 4.1.1.80 of Approved Products for Underground Use in the City of Winnipeg found on the City of Winnipeg, Materials management web site at <http://www.winnipeg.ca/matmgt/spec/>
- (h) Use only those valve box products listed in AT - 4.1.1.81 of Approved Products for Underground Use in the City of Winnipeg found on the City of Winnipeg, Materials management web site at <http://www.winnipeg.ca/matmgt/spec/>
- (i) Use only those valve stem products listed in AT - 4.1.1.83 of Approved Products for Underground Use in the City of Winnipeg found on the City of Winnipeg, Materials management web site at <http://www.winnipeg.ca/matmgt/spec/>

E17.2.4 Adapter Couplings

- (a) Adapter couplings for HDPE pipe to AWWA C900 PVC pipe to be only those epoxy coated, wide range, ductile iron couplings listed in AT - 4.1.1.63 of Approved Products for Underground Use in the City of Winnipeg found on the City of Winnipeg, Materials management web site at <http://www.winnipeg.ca/matmgt/spec/>
- (b) Internal stiffener for HDPE pipe to be ASTM 240 Type 304 stainless steel able to withstand up to 1.0 MPa pressure.

E17.2.5 Concrete

- (a) Concrete to be in accordance with CW 2160.

E17.3 Construction Methods

- E17.3.1 Delivery and Acceptance of HDPE Pipe and Fittings
- (a) Provide the Contract Administrator with a minimum of 48 hours notice of when the HDPE pipe and fittings are required to allow arrangements to be made for delivery to the Site.
 - (b) Pipe will be offloaded along the boulevard of Hart Avenue east of the pumping station for temporary storage until fusing operations start.
 - (c) Assist the Contract Administrator with an inspection of the pipe once it arrives on Site to confirm pipe is not damaged and is acceptable for fusing and installation.
 - (d) Assume responsibility for HDPE pipe and fittings from the time it is unloaded until it is installed and accepted by the City.
- E17.3.2 Handling of 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.
- E17.3.3 Joining HDPE Pipe Sections
- (a) Join dual containment HDPE pipe sections together by means of thermal butt-fusion in general accordance with the manufacturer's instructions.
 - (b) Join non-dual containment HDPE pipe sections and fittings together by means of thermal butt-fusion or electrofusion in general accordance with the manufacturer's instructions.
 - (c) Fusion shall produce a joint weld with strength equal to or greater than the tensile strength of the pipe itself.
 - (d) Join pipe sections together on-Site and temporarily store the full length along the boulevard of Hart Avenue east of the pumping station.
 - (e) Perform hydrostatic testing of the entire length of each dual containment forcemain after fusion joining and before installation in directional drilling bore hole. Hydrostatic test procedure to be in accordance with CW 2125 to a pressure of 0.70 MPa.
- E17.3.4 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 with the following information before beginning installation.
 - (i) Equipment specifications and capabilities
 - (ii) Size of pilot hole.
 - (iii) Number and size of pre-reams.
 - (iv) Calculations showing determination of the appropriate back-ream rate for each pre-ream and product pullback.
 - (v) Method of suspending, supporting and directing pipe during pullback.
 - (vi) Type and capabilities of tracking system.
 - (vii) Drilling fluid and cuttings management plan including type of drilling fluid, drilling fluid pressure, fluid containment storage recycling, and transport and disposal.
 - (viii) Management plan for “frac-outs” as specified herein.
 - (ix) 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) Continuously monitor and track the drill bore in the pilot hole. 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. Indicate the location the depth was recorded by spray paint, marker buoy or other method to allow the Contract Administrator to obtain the coordinates of the location.
- (f) 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.
- (g) 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.
- (h) Operate and maintain a closed loop drilling fluid system if possible.
- (i) 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.
- (j) Provide a swivel when pulling pipe into bore hole to reduce torsional loads transmitted to the pipe.
- (k) Cap end of pipe before pulling into bore hole to prevent matter and fluids from entering the pipe.
- (l) Provide pipe rollers, side booms or other devices to support and protect pipe while pulling into bore hole.

(m) If required, fill pipe with water when pulling into bore hole to help prevent against flotation.

(n) Provide a strain gauge or “weak link” between the reamer and pipe to continuously measure or ensure the pull back force on the pipe does not exceed the maximum force allowed by the pipe manufacturer.

E17.3.5 Installation of 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.

E17.3.6 Installation of PVC Pipe

(a) Install PVC forcemain pipe using trenchless methods in accordance with Section 3.4 of CW 2110.

(b) Backfill excavations using Class 5 backfill in accordance with CW 2030 and SD-002.

E17.3.7 Connecting HDPE Forcemain Pipe to PVC Forcemain Pipe

(a) Connect HDPE forcemain pipe to PVC forcemain pipe at locations shown on the drawings using an approved adapter coupling. Install internal stiffener in HDPE pipe end in accordance with coupling manufacturer’s instructions.

(b) Allow HDPE forcemain pipe sufficient time to recover and rebound after pull-in before connecting to PVC pipe.

E17.3.8 Connecting PVC Forcemain Pipe to New Discharge Manhole

(a) Connect the PVC forcemain pipe to the new discharge manhole in accordance with Clause 3.8.4 of CW 2130.

E17.3.9 Forcemain Valves

(a) Install forcemain valves at the location shown on Drawing 05962 and in accordance with Section 3.9 of CW 2110.

E17.3.10 Concrete Restraining Blocks

(a) Construct reinforced concrete restraining blocks on HDPE 45 degree bends as shown on Drawing No. 05962.

E17.3.11 Hydrostatic Testing of Forcemain After Installation

(a) Perform hydrostatic testing of the entire length of each forcemain after installation in directional drilling bore hole. Hydrostatic test procedure to be in accordance with CW 2125 to a pressure of 0.70 MPa.

E17.4 Measurement and Payment

E17.4.1 Joining HDPE Pipe Sections

(a) Fusion joining of HDPE sections will not be measured for separate payment and will be included with “Installation of HDPE Forcemain Pipe”.

E17.4.2 Installation of HDPE Forecmain Pipe

(a) HDPE forcemain 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) Measurement for installation of HDPE forcemain pipe will be made at grade along the centreline of each forcemain pipe, through fittings, from the connection to the 300 millimetre diameter PVC pipe in St. John's Park to the connection to the 300 millimetre PVC at the Hart Wastewater Pumping Station.
- (c) Installation of HDPE fittings not be measured for separate payment and will be included with "Installation of HDPE Forcemain Pipe".

E17.4.3 Installation of PVC Forcemain Pipe

- (a) PVC forcemain installation will be measured for payment on a length basis for each size of pipe, method of installation and type of backfill and paid for at the Contract Unit Price per metre for "Installation of PVC Forcemain Pipe". Length to be paid for will be the total number of linear metres of PVC forcemain pipe installed in accordance with this specification, accepted and measured by the Contract Administrator.

E17.4.4 Connecting HDPE Forcemains to PVC Forcemains

- (a) Connecting HDPE forcemains to PVC forcemains will not be measured for separate payment and will be included with "Installation of HDPE Forcemain Pipe".

E17.4.5 Connecting PVC Forcemain to New Discharge Manhole

- (a) Connecting PVC forcemain pipe to the new discharge manhole will not be measured for separate payment and will be included in "Installation of PVC Forcemain Pipe".

E17.4.6 Installation of Forcemain Valves

- (a) Forcemain valve installation will be measured on a unit basis for each size and type and paid for at the Contract Unit Price for "Forcemain Valves". Number of units to be paid for will be the total number of forcemain valves installed in accordance with this specification, accepted and measured by the Contract Administrator.

E17.4.7 Concrete Reinforced Restraining Blocks

- (a) Construction reinforced concrete restraining blocks will not be measured for separate payment and will be included with "Installation of HDPE Forcemain Pipe".

E17.4.8 Hydrostatic Testing

- (a) Hydrostatic testing of the forcemains will not be measured for separate payment and will be included with "Installation of HDPE Forcemain Pipe".

E18. HART WASTEWATER PUMPING STATION PIPING MODIFICATIONS

E18.1 Description

- E18.1.1 This specification covers the modifications to the existing piping inside the Hart Wastewater Pumping Station.

E18.2 Materials

E18.2.1 Large Diameter Piping and Fittings

- (a) Ductile iron pipe: to AWWA C151, thickness Class 52.
- (b) Steel pipe: schedule 40, seamless black carbon steel to ASTM A53 Grade A, or ASTM A106 Grade A.
- (c) Cast iron fittings: to ANSI/AWWA C110/A21.10, 1.0 Mpa working pressure complete with integrally cast flanges.
- (d) Steel fittings: schedule 40, seamless carbon steel to ASTM A234 Grade WPB, dimensions to ANSI B16.9.

E18.2.2 Flanges and Adaptor Flanges

- (a) Thread-on flanges for ductile iron pipe: to AWWA C115 or ASME B16.1.
- (b) Weld on steel flanges for steel pipe: to ASTM A181 Grade 1, flat faced, slip-on style, 1.0 Mpa working pressure, dimensions to ANSI B16.5.
- (c) Adaptor flanges: ductile-iron, Grade 65-45-12, conforming to the current ASTM Standard A536 Standard for Ductile-iron Castings. Bolt holes shall be drilled in accordance with AWWA C115 or ASME B16.1.
- (d) Adaptor flanges to be Unit-Flange Series 400 for ductile iron pipe and Series 400-S for steel pipe or approved equal.
- (e) Clamping screws on adapter flanges shall be zinc-plated, heat treated steel with a minimum tensile strength of 28 Mpa.

E18.2.3 Large Diameter Pipe Supports and Hangers

- (a) Pipe supports and hangers to be as shown on the Drawings.

E18.2.4 Nuts, Bolts and Fasteners

- (a) Flange nuts and bolts: to ASTM A307 carbon steel sized to requirements of flange. Threads on bolts to extend past nut a maximum of 6 millimetres.
- (b) Concrete anchor bolts shall be Type 316 Stainless Steel, Hilt Kick-Bolt or Raw Stud of the size shown on the Drawings. Embedment depth and size where not shown on the Drawings to be as required for load being carried or resisted.

E18.2.5 Gaskets

- (a) Flange gaskets: full faced red rubber, 3millimetres in thickness.
- (b) Rubber gaskets for adapter flanges shall conform to AWWA C111, Standard for Rubber-Gasket Joints for Cast Iron and Ductile-iron Pressure Pipe and Fittings.

E18.2.6 Modular Rubber Seals Around Pipes Through Concrete Walls

- (a) Modular, mechanical type, consisting of inter-locking synthetic rubber links shaped to continuously fill the annular space between the pipe and the wall opening.
- (b) Rubber links to be EPDM to ATSM D2000 M3 BA510 suitable for temperatures from -40 °C to +121°C. Color to be black.
- (c) Modular seal pressure plates to be moulded of glass reinforced Nylon Polymer with the following properties:
 - (i) Izod Impact - Notched = 2.05ft-lb/in. per ASTM D-256
 - (ii) Flexural Strength @ Yield = 30,750 psi per ASTM D-790 Flexural Modulus = 1,124,000 psi per ASTM D-790
 - (iii) Elongation Break = 11.07% per ASTM D-638
 - (iv) Specific Gravity = 1.38 per ASTM D-792
- (d) Fasteners to be Type 316 Stainless Steel
- (e) Acceptable product: Link-Seal or approved equal.

E18.2.7 Magnetic Flow Meter and Transmitter

- (a) Rosemount Magnetic Flow Meter system comprising of a Rosemount Model 8705TSA180C1W0N0 Magnetic Flow Meter Flow Tube coupled with a Rosemount Model 8712DR12N0M4 Magnetic Flow Meter transmitter.
- (b) Flow tube size to be as shown on the Drawings.
- (c) The flow tube and transmitter shall be certified for use in a hazardous area by a recognized authority (FM/CSA Class 1, Div. 2 Approval) and the enclosures shall be Nema 4X rated.

- (d) Magnetic flow meter system shall be powered by 120V ac, 60 Hz, and not consume more than 30 watts.
- (e) The magnetic flow meter system shall be accurate to 0.5% of flow rate between 1 and 30ft/sec and be capable of reading flow rates as low as 0.04 ft/sec, and the accuracy includes the combined effects of linearity, hysteresis, repeatability, and calibration uncertainty.
- (f) Flow tube to be In-line with ANSI Class 150# carbon steel flanged ends and PTFE (Teflon) liner. Flow tube body to be welded steel design and must not rely on gaskets to fully protect the coils and electrode wiring.
- (g) Flow tubes to be hydrostatically tested to 1.5 times their rated pressure.
- (h) All local operator interfaces must be accessible without opening covers.
- (i) The transition between the flow tube and the junction box must be potted to prevent process fluids from reaching the electronics or conduit in the event of a lining or electrode failure.
- (j) Flow tube electrode material shall be 316L Stainless Steel.
- (k) The electronics must be temperature compensated to maintain system accuracy of 0.5% or better across the stated temperature range.
- (l) The field termination and electronics must be in separate, fully isolated compartments to prevent moisture or contamination to enter these compartments.
- (m) The transmitter shall be a DC microprocessor based magnetic flow meter transmitter with HART based digital communications capabilities, 4-20 mA o/p and independently scalable pulse/frequency output.
- (n) The transmitter shall be powered by 120vac, 60 Hz. and remote mounted (wall- mount or 2" pipe mounting configurations)
- (o) The transmitter shall have an illuminated LCD indicating meter for indicating flow rates, flow totalizer, etc., and display 2 lines of a minimum of 20 characters.
- (p) The transmitter shall have non-volatile memory for all data, including the totalizer.
- (q) The remote mounted transmitter shall utilize readily available Beldon cables between the flow tube and the transmitter.

E18.2.8 Gate Valves

- (a) Bronze mounted, iron body with flanged ends
- (b) Flanges to conform in dimension and drilling to ASME B16.1, Class 150.
- (c) Outside rising stem, screw and yoke
- (d) Bronze trimmed cast iron wedge
- (e) Bronze stem
- (f) Double O-ring stem seals
- (g) Cast iron hand wheel with finger grips
- (h) Direction of opening to be counter-clockwise and be clearly stamped or indicated with raised letters and arrow on the hand wheel.
- (i) Manufacturer's nameplate shall be attached to the valve body with stainless steel fasteners.
- (j) As manufactured by Crane, Jenkins, Kennedy, Mueller, Clown or approved equal.

E18.2.9 Check Valves

- (a) Ductile iron body with flanged ends and removable inspection cover manufactured and tested in accordance with AWWA C508.
- (b) Flanges shall conform in dimension and drilling to ASME B16.1, Class 125.
- (c) ASTM D2000-BG, Buna - N (NBR) sewage resistant rubber flap and Type 302 stainless steel disc accelerator.
- (d) Manufacturer's nameplate shall be attached to the valve body with stainless steel fasteners.
- (e) As manufactured by Val-Matic or approved equal.

E18.3 Construction Methods

E18.3.1 Installation of Fittings and Pipe

- (a) Sequence installation of new piping, valves and fittings to start from the top down to the pump room to have the shortest shutdown time necessary to make the final connection to the existing fittings.
- (b) Approximately 10 hours of shutdown time will be available to complete the connection of the new piping and fittings to the existing fittings.
- (c) Existing forcemain and piping must stay in service until at least one the new HDPE forcemains has been hydrostatically tested and new station piping and fittings are ready to be connected to the existing fittings.
- (d) Pre-measure and pre-fit new fabricated steel header pipe as much as possible before starting station shutdown.
- (e) Remove existing concrete support as shown on the Drawings and temporarily support the existing piping before starting station shutdown to connect new piping to existing piping.
- (f) Remove existing concrete pipe support completely to 25 millimetres below the floor and neatly grout the area. Finish with a smooth surface similar in texture to the surrounding concrete floor. Apply approved bonding agent in accordance with manufacturer's instructions.
- (g) Field measure pipes lengths marked +/- on Drawings before cutting and attaching flanges in place.
- (h) Be aware of and contend with the wastewater in the existing forcemains and station piping when preparing to disassemble the existing piping. Pump out and clean-up all wastewater spilt into the pump room.
- (i) Remove existing flanged pipe and fittings and install new fittings and pipe as indicated on the Drawings.
- (j) Provide temporary support and bracing for piping while concrete support is formed, poured and curing.
- (k) Drill holes in existing concrete floor for dowels for concrete support and grout dowels in place.
- (l) Cut holes in existing concrete walls and floor slabs using concrete coring equipment. Core hole should be left with smooth surface to accept pipe seal.

E18.3.2 Installation of Flow Tube

- (b) Install flow tube at location shown on Drawings in accordance with the manufacturer's instructions.
- (c) City of Winnipeg staff will make the wiring connection from the flow tube to the remote mounted transmitter.

E18.4 Installation of Stainless Steel Saddles

- E18.4.1 Install stainless steel saddle on the HDPE in accordance with manufacturer's instructions. Do not over tighten to cause a point load on the HDPE pipe.
- E18.4.2 Neatly drill a 25 millimetre diameter hole into the HDPE pipe.
- E18.4.3 Ensure the opening in the saddle is aligned with the hole in the pipe.

E18.5 Installation of Air Release Piping

- E18.5.1 Install air release piping as shown on Drawing No. 0534. Final location of the piping and air release valve will be determined by the Contract Administrator in the field.
- E18.5.2 Cut holes in existing concrete walls and floor slabs using concrete coring equipment. Core hole should be left with smooth surface to accept pipe seal.

E18.6 Measurement and Payment

- E18.6.1 Piping modifications will be measured for payment on a unit basis and paid for at the Contract Unit Price for "Hart Wastewater Pumping Station Piping Modifications" installed in accordance with this specification, accepted and measured by the Contract Administrator.
- E18.6.2 Measurement for piping modifications will be from the connection to the existing 250 millimetre diameter flanged header pipe in the pump room to the connection to the new HDPE forcemain pipes.

E19. FIBREGLASS LANDING

E19.1 Description

- E19.1.1 This specification covers the installation of the fibreglass grating in the Hart Wastewater Pumping Station and associated work.

E19.2 Materials

E19.2.1 Fibreglass Grating

(a) Design

- (i) Grating to be moulded or cultured type made of continuous fibreglass reinforcement.
- (ii) Fibreglass reinforcement and resin shall be in such qualities, quantities, properties, arrangements and dimensions as necessary to meet the loading requirements for dimensions shown on the Drawings.
- (iii) Depth: as required to suit design loading, minimum 38 millimetres.
- (iv) Mesh Configuration: minimum 38 millimetres x 38 millimetres.
- (v) Grating shall be designed for a minimum uniform load of 489 kg/sum (100 puff) or minimum concentrated load of 227 kg (500 lb). Deflection is not to exceed 6 millimetres (0.25") or $L/D = 120$, whichever is less.

(b) Resin

- (i) Resin shall be Isophthalic Polyester, with chemical formulations as necessary to provide the corrosion resistance, strength and other physical properties as required.

(c) Finish

- (i) Finished surfaces shall be smooth, resin-rich, free of voids and without dry spots, cracks, crazes or un-reinforced areas. All glass fibers shall be well covered with resin to protect against their exposure due to wear or weathering.

- (ii) Provide a gritted, skid resistant coating bonded to the top of each bar.

(d) Moulded Grating

- (i) Grating shall be of a one piece moulded construction with tops and bottoms of bearing bars and cross bars in the same plane.
- (ii) Grating shall have a square mesh pattern providing bi-directional strength.
- (iii) Grating shall be reinforced with continuous rovings of equal number of layers in each direction. The top layer of reinforcement shall be no more than 3 millimetres below the top surface of the grating so as to provide maximum stiffness and prevent resin chipping of unreinforced surfaces.
- (iv) Percentage of glass (by weight) shall not exceed 35% so as to achieve maximum corrosion resistance, and as required to maintain the structural requirements.
- (v) After moulding, no dry glass fibers shall be visible on any surface of bearing bars or cross bars. All bars shall be smooth and uniform with no evidence of fiber orientation irregularities, interlaminar voids, porosity, resin rich or resin starved areas.
- (vi) Grating bar intersections to be filleted to a minimum radius of 1.5 millimetres to eliminate local stress concentrations and the possibility of resin cracking at these locations.
- (vii) Grating shall be fire retardant with a tested flame spread rating of 25 or less when tested in accordance with ASTM E 84. Data performed only on the resin shall not be acceptable.

- (e) Acceptable products: Fibergrate, IKG Borden, Ryerson Plastics, Chemgrate, Canadian Composite Structures or approved equal.

E19.2.2 Support Brackets

- (a) Support brackets to be as recommended by fibreglass grating manufacturer for use intended.
- (b) Must be capable of supporting same loading a fibreglass grating plus weight of the fibreglass grating.

E19.2.3 Wall Anchors

- (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.

E19.3 Construction Methods

E19.3.1 Shop Drawings

- (a) Submit Shop Drawings of fibreglass grating to Contract Administrator for review before installation.

E19.3.2 Fibreglass Grating and Support Brackets

- (a) Install support brackets and fibreglass grating in accordance with manufacturer's instructions.
- (b) Perform field cuts of fibreglass grating in accordance with manufacturer's recommendations.

E19.4 Measurement and Payment

- E19.4.1 Installation of fibreglass grating and support brackets will be measured for payment on a unit basis and paid for at the Contract Unit Price for "Fibreglass Grating" installed in accordance with this specification, accepted and measured by the Contract Administrator.

E20. PRESSURE MONITORING MANHOLE

E20.1 Description

E20.1.1 This specification covers the installation of a pressure monitoring manhole and associated work.

E20.2 Materials

E20.2.1 Manhole

- (a) Pre-cast concrete sections to CSA A257.4 and ASTM Standard C78 Class II and C478 (circular sections).
- (b) Use only those products listed in AT - 4.2.1.70 of Approved Products for Underground Use in the City of Winnipeg found on the City of Winnipeg, Materials management web site at <http://www.winnipeg.ca/matmgt/spec/>

E20.2.2 Stainless Steel Saddles

- (a) Shell made from heavy gauge 18-8 type 304 Stainless Steel 150 millimetres wide. Welds to be fully passivated to restore stainless steel characteristics.
- (b) Nuts and bolts to be 18-8 type 304 Stainless Steel with heavy hex nuts. Nuts to be fluorocarbon coated to prevent galling.
- (c) Tap to be 18-8 type 304 Stainless Steel TIG or MIG welded to shell. Threads to be as shown on Drawings.
- (d) Gasket to be Buna-N ASTM D2000 rubber, coined body with recessed O-Ring or flush body with tapered gasket.
- (e) Pressure rating to be 1.0 MPa (150psi).
- (f) Acceptable product: Ford Style FS 303 or approved equal.

E20.2.3 Pressure/Vacuum Gauges

- (a) The City will provide the pressure/vacuum gauges and associated wiring for the Work at no extra cost to the Contractor.

E20.2.4 Aluminium Plate

- (a) To CAN/CSA S157 and the Aluminium Association 'Specifications for Aluminium Structures'. Aluminium for plates shall be Type 6061-T651. Aluminium plate shall have an approved raised oval or multi-grip pattern.

E20.2.5 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.

E20.2.6 Grout

- (a) Grout to be water tight, non-shrink such as Sika Grout 212 or approved equal.

E20.2.7 PVC Conduit

- (a) Conduit shall be rigid PVC (Unplasticized) to CSA C22.2 No. 211.2-M1984. Minimum conduit size to be 38 millimetres

E20.3 Construction Methods

E20.3.1 Manhole Installation

- (a) Install the manhole in accordance with Section 3.8 of CW 2130 and as shown on the Drawings.

E20.3.2 Stainless Steel Service Saddles

- (a) Install stainless steel saddle on the HDPE in accordance with manufacturer's instructions. Do not over tighten to cause a point load on the HDPE pipe.
- (b) Neatly drill a hole of the required size for the pressure/vacuum gauges into the HDPE pipes.
- (c) Ensure the opening in the saddle is aligned with the hole in the pipe.

E20.3.3 Pressure/Vacuum Gauges

- (a) Install pressure/vacuum gauges as shown on the drawings.
- (b) Ensure transmission wiring has enough slack between the gauge and the PVC conduit to prevent stain of the wire.
- (c) Orient gauge faces to be easily read from the access ladder between the HDPE pipes.
- (d) Clean gauge faces after installation.

E20.3.4 PVC Conduit and Wire

- (a) 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.
- (b) Run conduit tight to manhole wall including bends at direction changes.
- (c) Run conduit up manhole riser to not interfere with access.
- (d) Core neat hole in manhole wall and pumping station wall where conduit passes through the wall slightly larger than OD of conduit using diamond coring equipment.
- (e) Provide expansion or settlement fitting on conduit outside of manhole and pumping station wall to allow for settlement of backfill without putting stain on or breaking conduit.
- (f) Run wiring for pressure monitoring gauges provided by the City inside conduit.
- (g) City forces will make final connection of pressure monitoring gauge wiring inside the pumping station and manhole.
- (h) If wiring is damaged during pull-in, replace at own expense with exactly the same wire as the City provided.

E20.3.5 Aluminium Fabrication

- (a) Provide Shop Drawings of access cover and support stands to Contract Administrator for review before beginning fabrication.
- (b) Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured. Assemble work in such a way that no disfigurements will show in the finished work, or impair the strength.
- (c) Confirm measurements for all fabrications before fabricating.
- (d) Cut aluminium plate with edges straight and true, and as far as practical, maintain continuity of the pattern at abutting edges.
- (e) Pieces shall be of the sizes indicated on the Drawings and shall not be built up from scrap pieces. Confirm sizes with field measurements.
- (f) Where possible, fit work and shop assemble, ready for erection.
- (g) Frames shall be of the same material as the cover plate, and cover plates shall be supplied with lifting handles, as shown on the Drawings.

- (h) Remove and grind smooth burrs, filings, sharp protrusions, and projections from metal fabrications to prevent possible injury. Correct any dangerous or potentially harmful installations as directed by Contract Administrator.
- (i) All aluminium welding shall conform to Welding shall be in accordance with the requirements of CSA W59.2. The fabricator shall be fully certified in conformance with CSA Standard W47.2. All welding shall be done in a licensed welding shop, and no field welding will be permitted unless approved in writing, in advance, by the Contract Administrator.
- (j) Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- (k) All aluminium surfaces in contact with concrete shall be isolated using alkali-resistant bituminous paint meeting the requirements of CGSB 31-GP-3M.

E20.3.6 Grouting Around Pipe

- (a) Grout around HDPE pipe and PVC conduit where pipes pass through the manhole hole to make watertight.

E20.4 Measurement and Payment

- E20.4.1 Pressure monitoring manhole installation will be measured for payment on a unit basis and paid for at the Contract Unit Price for "Pressure Monitoring Manhole" installed in accordance with this specification, accepted and measured by the Contract Administrator.
- E20.4.2 Installation of PVC conduit from pressure monitoring manhole into pumping station and pulling of wiring inside shall not be measured for separate payment and will be included with "Pressure Monitoring Manhole".

E21. DISCHARGE MANHOLE

- E21.1 Install new discharge manhole on existing 375 millimetre diameter secondary sewer in accordance with CW 2130 and SD-010.
- E21.2 Install the new discharge manhole in a manner to accommodate flow from the existing forcemain until at least one of the new forcemains is operational.
- E21.3 Approximately 10 hours of shutdown time will be available to complete the installation of the new discharge manhole on the existing secondary sewer.
- E21.4 Multiple shutdowns can be arranged to accommodate the installation provided the shutdowns are not back to back.
- E21.5 Once the existing forcemain can be abandoned, plug the opening for the 375 millimetre sewer upstream of the discharge manhole in accordance with CW 2130.

E22. ABANDONING EXISTING DISCHARGE MANHOLE, SECONDARY SEWER AND FORCEMAIN

- E22.1 Abandon the existing discharge manhole and secondary sewer at the locations shown on the Drawings in accordance with CW 2130.
- E22.2 Abandon the existing 300mm diameter forcemain by draining or blowing all remaining sewage from the pipe and plugging both ends with concrete as shown on the drawings.