THE CITY OF WINNIPEG

TENDER

TENDER NO. 237-2019

REHABILITATION OF THE ST. JAMES INTERCEPTOR FORCE MAIN SIPHON BY CIPP

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 REHABILITATION OF THE ST. JAMES INTERCEPTOR FORCE MAIN SIPHON BY CIPP

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, July 5, 2019.

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

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

B3. SITE INVESTIGATION

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

B3.2 Further to C3.1, a Site meeting will be held at 9:00 am on June 26, 2019 to provide Bidders access to the Site. Bidders to meet at the upstream valve chamber at 2610 Assiniboine Crescent.

B3.3 Although attendance at the Site Investigation is not mandatory, the City strongly suggests that Proponents attend.

B3.4 Proponents are required to register for the Site Investigation at least 48 hrs. prior by contacting the Contract Administrator identified in D4.

B3.5 The Bidder is advised that the valve chamber and discharge manhole are a confined entry spaces. City forces will open up both chambers for viewing from the surface, but entry will not be permitted.

B3.6 The Bidder is advised that the force main alignment is located on an easement on private property and Bidders are not permitted to enter private property during the bidding period.

B3.7 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.

B4. ENQUIRIES

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

B4.2 If the Bidder finds errors, discrepancies or omissions in the Tender, 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 Tender 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 Tender 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. CONFIDENTIALITY

B5.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:

(a) was known to the Bidder before receipt hereof; or

(b) becomes publicly known other than through the Bidder; or

(c) is disclosed pursuant to the requirements of a governmental authority or judicial order.

B5.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Tender to the media or any member of the public without the prior written authorization of the Contract Administrator.

B6. ADDENDA

B6.1 The Contract Administrator may, at any time prior to the Submission Deadline, issue addenda correcting errors, discrepancies or omissions in the Tender, or clarifying the meaning or intent of any provision therein.

B6.2 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.

B6.3 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/bidopp.asp

B6.4 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B6.5 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B6.6 Notwithstanding B4, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D4.

B7. SUBSTITUTES

B7.1 The Work is based on the Plant, Materials and methods specified in the Tender.

B7.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B7.3 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.

B7.4 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.

B7.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.

B7.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.

B7.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.

B7.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

B7.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B18.

B7.9 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.

B8. BID COMPONENTS

B8.1 The Bid shall consist of the following components:

(a) Form A: Bid;

(b) Form B: Prices;

(c) Form G1: Bid Bond and Agreement to Bond;

B8.2 Further to B8.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B7.

B8.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely.

B8.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Tender number and the Bidder's name and address.

B8.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Tender number, the Bidder's name and address, and an indication that the contents are part of the Bidder’s Bid.

B8.5 Bidders are advised not to include any information/literature except as requested in accordance with B8.1.

B8.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Tender document, including the General Conditions, will be evaluated in accordance with B18.1(a).

B8.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B8.8 Bids shall be submitted to:

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

B9. BID

B9.1 The Bidder shall complete Form A: Bid, making all required entries.

B9.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:

(a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her name shall be inserted;

(b) if the Bidder is a partnership, the full name of the partnership shall be inserted;

(c) if the Bidder is a corporation, the full name of the corporation shall be inserted;

(d) if the Bidder is carrying on business under a name other than his/her own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.

B9.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B9.2.

B9.3 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.

B9.4 Paragraph 13 of Form A: Bid shall be signed in accordance with the following requirements:

(a) if the Bidder is a sole proprietor carrying on business in his/her own name, it shall be signed by the Bidder;

(b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;

(c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, should be affixed;

(d) if the Bidder is carrying on business under a name other than his/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

B9.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.

B9.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B10. PRICES

B10.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B10.1.1 Notwithstanding C12.2.3(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.

B10.1.2 Prices stated on Form B: Prices shall not include any costs which may be incurred by the Contractor with respect to any applicable funding agreement obligations as outlined in D27. Any such costs shall be determined in accordance with D27.

B10.2 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.

B10.3 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.

B10.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B11. DISCLOSURE

B11.1 Various Persons provided information or services with respect to this Work. In the City's opinion, this relationship or association does not create a conflict of interest because of this full disclosure. Where applicable, additional material available as a result of contact with these Persons is listed below.

B11.2 The Persons are:

(a) Brian Ratchford (Capital Sewer Services)
  (i) Guidance on constructability.

(b) Ken Foster (Insituform Technologies Ltd.)
  (i) Guidance on constructability.

B12. CONFLICT OF INTEREST AND GOOD FAITH

B12.1 Bidders, by responding to this Tender, declare that no Conflict of Interest currently exists, or is reasonably expected to exist in the future.

B12.2 Conflict of Interest means any situation or circumstance where a Bidder or employee of the Bidder proposed for the Work has:

(a) other commitments;

(b) relationships;

(c) financial interests; or

(d) involvement in ongoing litigation;

that could or would be seen to:

(i) exercise an improper influence over the objective, unbiased and impartial exercise of the independent judgment of the City with respect to the evaluation of Bids or award of the Contract; or

(ii) compromise, impair or be incompatible with the effective performance of a Bidder's obligations under the Contract;

(e) has contractual or other obligations to the City that could or would be seen to have been compromised or impaired as a result of its participation in the Tender process or the Work; or

(f) has knowledge of confidential information (other than confidential information disclosed by the City in the normal course of the Tender process) of strategic and/or material relevance to the Tender process or to the Work that is not available to other bidders and that could or would be seen to give that Bidder an unfair competitive advantage.

B12.3 In connection with its Bid, each entity identified in B12.2 shall:

(a) avoid any perceived, potential or actual Conflict of Interest in relation to the procurement process and the Work;

(b) upon discovering any perceived, potential or actual Conflict of Interest at any time during the Tender process, promptly disclose a detailed description of the Conflict of Interest to the City in a written statement to the Contract Administrator; and

(c) provide the City with the proposed means to avoid or mitigate, to the greatest extent practicable, any perceived, potential or actual Conflict of Interest and shall submit any additional information to the City that the City considers necessary to properly assess the perceived, potential or actual Conflict of Interest.

B12.4 Without limiting B12.3, the City may, in its sole discretion, waive any and all perceived, potential or actual Conflicts of Interest. The City's waiver may be based upon such terms and conditions as the City, in its sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately avoided or mitigated, including requiring the Bidder to put into place such policies, procedures, measures and other safeguards as may be required by and be acceptable to the City, in its sole discretion, to avoid or mitigate the impact of such Conflict of Interest.

B12.5 Without limiting B12.3, and in addition to all contractual or other rights or rights at law or in equity or legislation that may be available to the City, the City may, in its sole discretion:

(a) disqualify a Bidder that fails to disclose a perceived, potential or actual Conflict of Interest of the Bidder or any of its employees proposed for the Work;

(b) require the removal or replacement of any employees proposed for the Work that has a perceived, actual or potential Conflict of Interest that the City, in its sole discretion, determines cannot be avoided or mitigated;

(c) disqualify a Bidder or employees proposed for the Work that fails to comply with any requirements prescribed by the City pursuant to B12.4 to avoid or mitigate a Conflict of Interest; and

(d) disqualify a Bidder if the Bidder, or one of its employees proposed for the Work, has a perceived, potential or actual Conflict of Interest that, in the City's sole discretion, cannot be avoided or mitigated, or otherwise resolved.

B12.6 The final determination of whether a perceived, potential or actual Conflict of Interest exists shall be made by the City, in its sole discretion.

B13. QUALIFICATION

B13.1 The Bidder shall:

(a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba; and

(b) be financially capable of carrying out the terms of the Contract; and

(c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

B13.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

(a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/debar.stm

B13.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

(a) have successfully carried out work similar in nature, scope and value to the Work; and

(b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and

(c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);

B13.4 Further to B13.3(a) the Bidder and/or any proposed Subcontractor completing CIPP lining of the force main shall demonstrate the following specific qualifications in accordance with B13.8:

(a) A minimum of three (3) examples of successful CIPP installations in low pressure pipelines (min internal pressure 10 psi).

(b) A minimum of three (3) examples of successful CIPP installations within inverted siphons.

B13.5 Further to B13.3(a) the Bidder shall demonstrate the following specific qualifications for key project personnel (proposed project manager and site foreman) in accordance with B13.8:

(a) A minimum of one (1) example of successful CIPP installations in low pressure pipelines (min internal pressure 10 psi).

(b) A minimum of three (3) examples of successful CIPP installations within inverted siphons.

B13.6 Further to B13.3(a), the Bidder and/or any proposed Subcontractor undertaking the cleaning of the force mains utilizing pigging methods shall demonstrate the following specific qualifications in accordance with B13.8:

(a) A minimum of three (3) examples of successful pipeline pigging using polyurethane foam pigs.

B13.7 Further to B13.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

(a) Written confirmation of a safety and health certification meeting SAFE Work Manitoba's SAFE Work Certified Standard (e.g., COR™ and SECOR™) in the form of:

(i) a copy of their valid Manitoba COR certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Certificate of Recognition (COR) Program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or

(ii) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or

(b) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/.

B13.8 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder or of any proposed Subcontractor and key project personnel. The Bidder shall utilize Form L: Contractor Experience or provide similar project sheets containing all information identified in Form L: Contractor Experience. Experience provided for key project personnel must be accompanied by a project specific submission for each referenced project, complete with all identified reference contact information.

B13.9 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.

B14. BID SECURITY

B14.1 The Bidder shall provide bid security in the form of 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).

B14.1.1 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.

B14.1.2 All signatures on bid securities shall be original.

B14.1.3 The Bidder shall sign the Bid Bond.

B14.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.

B14.2 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 contract securities are furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B14.3 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 Tender.

B15. OPENING OF BIDS AND RELEASE OF INFORMATION

B15.1 Bids will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Division, or in such other office as may be designated by the Manager of Materials.

B15.1.1 Bidders or their representatives may attend.

B15.2 Following the Submission Deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/default.stm

B15.3 After award of Contract, the name(s) of the successful Bidder(s), their address(es) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/default.stm

B15.4 The Bidder is advised that any information contained in any Bid may be released if required by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law or by City policy or procedures (which may include access by members of City Council).

B15.4.1 To the extent permitted, the City shall treat as confidential information, those aspects of a Bid Submission identified by the Bidder as such in accordance with and by reference to Part 2, Section 17 or Section 18 or Section 26 of The Freedom of Information and Protection of Privacy Act (Manitoba), as amended.

B16. IRREVOCABLE BID

B16.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.

B16.2 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 contract securities have been 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.

B17. WITHDRAWAL OF BIDS

B17.1 A Bidder may withdraw his/her Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B17.1.1 Notwithstanding C23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.

B17.1.2 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 13 of Form A: Bid, and only such person, has authority to give notice of withdrawal.

B17.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:

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

(b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 13 of Form A: Bid; and

(c) if the notice has been given by any one of the persons specified in B17.1.3(b), declare the Bid withdrawn.

B17.2 A Bidder who withdraws his/her Bid after the Submission Deadline but before his/her Bid has been released or has lapsed as provided for in B16.2 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.

B18. EVALUATION OF BIDS

B18.1 Award of the Contract shall be based on the following bid evaluation criteria:

(a) compliance by the Bidder with the requirements of the Tender, or acceptable deviation there from (pass/fail);

(b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B13 (pass/fail);

(c) Total Bid Price;

(d) economic analysis of any approved alternative pursuant to B7.

B18.2 Further to B18.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities, if the interests of the City so require.

B18.3 Further to B18.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his/her Bid or in other information required to be submitted, that he/she is qualified.

B18.4 Further to B18.1(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.

B18.4.1 Further to B18.1(a), in the event that a unit price is not provided on Form B: Prices, the City will determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B19. AWARD OF CONTRACT

B19.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B19.2 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 qualified, and the Bids are determined to be responsive.

B19.2.1 Without limiting the generality of B19.2, 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.

B19.3 If funding for the Work is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, Bidders are advised that the terms of D27 shall immediately take effect upon confirmation of such funding, regardless of when funding is confirmed.

B19.4 Where an award of Contract is made by the City, the award shall be made to the qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B18.

B19.4.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Bid upon written request to the Contract Administrator.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

C0.1 The *General Conditions for Construction* (Revision 2019 01 15) are applicable to the Work of the Contract.

C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm

C0.2 A reference in the Tender to a section, clause or subclause with the prefix "**C**" designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

D1.1 In addition to the *General Conditions for Construction*, these Supplemental Conditions are applicable to the Work of the Contract.

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of rehabilitation of the St. James Interceptor Force Main Siphon by CIPP.

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

(a) Developing access to the force mains;

(b) Force main cleaning, preparation, and inspection;

(c) Rehabilitation of the identified force mains by CIPP;

(d) Repair of CIPP liner defects (if required); and,

(e) Site restoration.

D3. DEFINITIONS

D3.1 When used in this Tender:

(a) "**ASTM**" means American Society for Testing and Materials;

(b) "**ACI**" means American Concrete Institute;

(c) "**AWWA**" means American Water Works Association;

(d) "**CSA**" means Canadian Standards Association;

(e) "**ISO**" means International Organization for Standardization;

(f) "**CIPP**" means cured-in-place pipe;

(g) "**SONAR**" means sound navigation and ranging;

(h) "**Partially Deteriorated (PD)**" means the host pipe can support the soil and surcharge loads throughout the design life of the rehabilitated pipe. Liners for partially deteriorated pipes are shall be designed to account for internal and external hydrostatic pressure only;

(i) "**Fully Deteriorated (FD)**" means the host pipe is not structurally sound and cannot support soil and live loads or is expected to reach this condition over the design life of the rehabilitated pipe. Liners for fully deteriorated pipes shall be designed to support all overburden loads, including: soil, live, external hydrostatic pressure and internal pressure;

D4. CONTRACT ADMINISTRATOR

D4.1 The Contract Administrator is AECOM, represented by:

Adam Braun
Municipal Engineer

Telephone No. 204 928-9216
Email Address adam.braun@aecom.com

D4.2 At the pre-construction meeting, Mr. Braun 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/her designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D6. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

D6.1 The Contract, all deliverables produced or developed, and information provided to or acquired by the Contractor are the property of the City and shall not be appropriated for the Contractors own use, or for the use of any third party.

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

D6.3 The following shall be confidential and shall not be disclosed by the Contractor to the media or any member of the public without the prior written authorization of the Contract Administrator;

(a) information provided to the Contractor by the City or acquired by the Contractor during the course of the Work;

(b) the Contract, all deliverables produced or developed; and

(c) any statement of fact or opinion regarding any aspect of the Contract.

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

D7. NOTICES

D7.1 Except as provided for in C23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.

D7.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D7.3, D7.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator identified in D4.

D7.3 Notwithstanding C21., all notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following:

The City of Winnipeg
Attn: Chief Financial Officer
Office of the Chief Administrative Officer
Susan A. Thompson Building
2nd Floor, 510 Main Street
Winnipeg MB R3B 1B9

D7.4 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 facsimile number:

The City of Winnipeg
Legal Services Department
Attn: Director of Legal Services

Facsimile No.: 204 947-9155

D7.5 Bids Submissions must not be submitted to the above facsimile number. Bids must be submitted in accordance with B8.

D8. FURNISHING OF DOCUMENTS

D8.1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Tender. If the Contractor requires additional sets of the Tender, they will be supplied to him/her at cost.

SUBMISSIONS

D9. AUTHORITY TO CARRY ON BUSINESS

D9.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

D10. SAFE WORK PLAN

D10.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D10.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/Safety/default.stm

D10.3 Notwithstanding B13.7 at any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require an updated COR Certificate or Annual Letter of good Standing. A Contractor, who fails to provide a satisfactory COR Certificate or Annual Letter of good Standing, will not be permitted to continue to perform any Work.

D11. INSURANCE

D11.1 The Contractor shall provide and maintain the following insurance coverage:

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

(b) if applicable, Automobile Liability Insurance covering all motor vehicles, owned and operated and used or to be used by the Contractor directly or indirectly in the performance of the Work. The Limit of Liability shall not be less than $2,000,000 inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence.

(c) The Contractor shall provide and maintain CPL insurance in the amount of at least one million dollars ($1,000,000) per occurrence and one million dollars ($1,000,000) aggregate insuring against claims for:

(i) Bodily injury;
(ii) Property damage including diminution in value, and Natural Resource Damages;
(iii) Clean-up costs;
(iv) Transported cargo and non-owned disposal sites (blanket basis); and,
(v) Sudden and gradual pollution conditions including the further disruption of pre-existing conditions from the services rendered by the Contractor.

(d) CPL insurance is to remain in place during the performance of the Work and during the warranty period.

D11.2 Deductibles shall be borne by the Contractor.

D11.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4.1 for the return of the executed Contract.

D11.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D12. CONTRACT SECURITY

D12.1 The Contractor shall provide and maintain the performance bond and the labour and material payment bond 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; and

(b) a labour and material payment bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H2: Labour and Material Payment Bond), in an amount equal to fifty percent (50%) of the Contract Price.

D12.2 The Contractor shall provide the City Solicitor with the required performance and labour and material payment bonds within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D12.3 The Contractor shall, as soon as practicable after entering into a contract with a Subcontractor:

(a) give the Subcontractor written notice of the existence of the labour and material payment bond in D12.1(b); and

(b) post a notice of the bond and/or a copy of that bond in a conspicuous location at the Site of the Work.

D13. SUBCONTRACTOR LIST

D13.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D14. EQUIPMENT LIST

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

D15. DETAILED WORK SCHEDULE

D15.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

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

(a) a Gantt chart for the Work based on the C.P.M. schedule.

D15.3 Further to D15.2(a), the C.P.M. schedule shall clearly identify the start and completion dates of all of the following activities/tasks making up the Work as well as showing those activities/tasks on the critical path:

D15.4 Further to D15.2(a), the C.P.M. schedule shall clearly identify the start and completion dates of all of the following activities/tasks making up the Work as well as showing those activities/tasks on the critical path:

(a) Mobilization to site;

(b) excavation;

(c) valve operations (by City forces);

(d) sewer cleaning and prep work per force main;

(e) CIPP lining per force main;

(f) pipeline closure, backfilling, and restoration; and

(g) planned breaks in the performed work pursuant to D17.7.

D15.5 The Contractor shall provide an updated detailed work schedule at least once per month or within two (2) Business Days of a request by the Contract Administrator.

SCHEDULE OF WORK

D16. COMMENCEMENT

D16.1 The Contractor shall not commence any Work until he/she is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.

D16.2 The Contractor shall not commence any Work on the Site until:

(a) the Contract Administrator has confirmed receipt and approval of:

(i) evidence of authority to carry on business specified in D9;

(ii) evidence of the workers compensation coverage specified in C6.15;

(iii) the Safe Work Plan specified in D10;

(iv) evidence of the insurance specified in D11;

(v) the contract security specified in D12;

(vi) the Subcontractor list specified in D13;

(vii) the equipment list specified in D14; and

(viii) the detailed work schedule specified in D15.

(b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.

D16.3 The City intends to award this Contract by August 15, 2019.

D16.3.1 If the actual date of award is later than the intended date, the dates specified for Commencement, Critical Stages, Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

D17. WORKING DAYS

D17.1 Further to C1.1(ll), the Contract Administrator's determination of whether or not atmospheric and Site conditions are such that a Working Day is deemed to have elapsed may be based at one time on one type of work while at another time a Working Day may be based on another type of work. When more than one type of major work is involved, the quantity of equipment

that must be able to work in order to meet the requirements of a Working Day may vary considerably from that specified in the General Conditions.

D17.2 In the event that incidental work is behind schedule which, in the opinion of the Contract Administrator, should have been or could have been carried out by the Contractor in conjunction with or immediately following work of a major type, the City hereby reserves the right to charge Working Days on the incidental work until such time as it is up to schedule.

D17.3 When the major type of work involves restoration of the site to the condition it was prior to rainfall, Working Days shall not be charged.

D17.4 The Contract Administrator will furnish the Contractor with a daily record for each major type of work showing various information concerning the equipment, the time it worked, could have worked and Working Days charged. This report is to be signed each day by an authorized representative of the Contractor.

D17.5 Notwithstanding C1.1(ll) if the Contractor chooses to work on a Saturday, Sunday, or statutory or civic holiday and is able to complete at least seven (7) hours of work during the period between 7:00 a.m. Winnipeg time or the time the Contractor's operations normally commence, whichever is earlier, and 7:00 p.m. Winnipeg time the day shall be considered a Working Day.

D17.6 Working Days shall be incurred by the Contractor for every Working Day as defined herein. Working days shall be incurred starting on the date the Contractor commences work on site, or the date of commencement identified on the Contractors submitted schedule (D15), whichever occurs first.

D17.7 Planned Breaks in Construction

(a) The Contractor will be permitted planned suspensions of on-site construction to facilitate crew breaks and seasonal weather breaks where contract work is not completed. Working Days will not be incurred during these periods.

(b) All planned breaks in on-site construction activity must be clearly identified in the Contractors detailed construction schedule (D15) and notice must be provided in writing a minimum of two (2) Business Days prior to the planned suspension of work. Failure of the Contractor to provide adequate notice, in the opinion of the Contract Administrator, may result in Working Days being incurred.

(c) During these periods, the Site must be made secure, roadways completely operational, and all existing facilities and work in progress be protected from weather or other potentially harmful effects.

(d) Upon recommencement of site activities after long breaks (greater than 1 month), the Contractor shall provide an updated schedule and notification to the Contract Administrator a minimum of five (5) Business Days prior to recommencement of work.

(e) No changes to Contract completion dates resulting from suspension of contract time as described herein will be considered.

(f) No additional costs associated with demobilization and remobilization resulting from suspension of contract time will be considered.

D18. CRITICAL STAGES

D18.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

(a) Completion of CIPP liner installations and hand over of both force mains to the City for return to service within twenty (20) consecutive Working Days.

D19. SUBSTANTIAL PERFORMANCE

D19.1 The Contractor shall achieve Substantial Performance within thirty-five (35) consecutive Working Days of the commencement of the Work as specified in D16 or by December 20, 2019, whichever comes first.

D19.2 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.

D19.3 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.

D20. TOTAL PERFORMANCE

D20.1 The Contractor shall achieve Total Performance within forty-five (45) consecutive Working Days of the commencement of the Work as specified in D16 or July 13, 2020, whichever comes first.

D20.2 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.

D20.3 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.

D21. LIQUIDATED DAMAGES

D21.1 If the Contractor fails to achieve Critical Stages, Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:

(a) Critical Stage: Completion of CIPP liner installation – two thousand dollars ($2,000.00);

(b) Substantial Performance - two thousand dollars ($2,000.00);

(c) Total Performance - five hundred dollars ($500.00).

D21.2 The amounts specified for liquidated damages in D21.1 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.

D21.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

CONTROL OF WORK

D22. JOB MEETINGS

D22.1 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.

D22.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

D23. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D23.1 Further to C6.24, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

D24. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D24.1 Further to B13.7, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B13.7.

D25. WORK PRACTICES ON ASBESTOS-CEMENT PIPE

D25.1 Further to C.6.26(d), the Contractor's attention is directed to the possible health dangers associated with working with asbestos cement pipe and all work associated with the existing asbestos cement (AC) watermains shall conform to the following publications:

D25.1.1 "Work Practices for Asbestos-Cement Pipe", AWWA No. M16, published by the American Water Works Association.

D25.1.2 "Recommended Work Practices for AC Pipe", 1977, published by the AC Pipe producers Association.

D25.2 The Contractor shall state in the "job specific safe work plan" the proposed procedure for working on AC pipe. The Contractor shall also provide proof of asbestos handling training or certification.

MEASUREMENT AND PAYMENT

D26. PAYMENT

D26.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D27. WARRANTY

D27.1 Warranty is as stated in C13.

D27.2 Notwithstanding C13.2 or D27.1, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Total Performance if:

(a) a portion of the Work cannot be completed because of unseasonable weather or other conditions reasonably beyond the control of the Contractor but that portion does not prevent the balance of the Work from being put to its intended use.

D27.2.1 In such case, the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in C13.2 for the warranty period to begin.

THIRD PARTY AGREEMENTS

D28. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

D28.1 In the event that funding for the Work of the Contract is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, the following terms and conditions shall apply, as required by the applicable funding agreements.

D28.2 Further to D28.1, in the event that the obligations in D28 apply, actual costs legitimately incurred by the Contractor as a direct result of these obligations ("Funding Costs") shall be determined by the actual cost to the Contractor and not by the valuation method(s) outlined in C7.4. In all other respects Funding Costs will be processed in accordance with Changes in Work under C7.

D28.3 For the purposes of D28:

(a) **"Government of Canada"** includes the authorized officials, auditors, and representatives of the Government of Canada; and

(b) **"Government of Manitoba"** includes the authorized officials, auditors, and representatives of the Government of Manitoba.

D28.4 Modified Insurance Requirements

D28.4.1 If not already required under the insurance requirements identified in D11, the Contractor will be required to provide wrap-up liability insurance in an amount of no less than two million dollars ($2,000,000) inclusive per occurrence. Such policy will be written in the joint names of the City, Contractor, Consultants and all sub-contractors and sub-consultants and include twelve (12) months completed operations. The Government of Manitoba and its Ministers, officers, employees, and agents shall be added as additional insureds.

D28.4.2 If not already required under the insurance requirements identified in D11, the Contractor will be required to provide builders' risk insurance (including boiler and machinery insurance, as applicable) providing all risks coverage at full replacement cost, or such lower level of insurance that the City may identify on a case-by-case basis, such as an installation floater.

D28.4.3 The Contractor shall obtain and maintain third party liability insurance with minimum coverage of two million dollars ($2,000,000.00) per occurrence on all licensed vehicles operated at the Site. In the event that this requirement conflicts with another licensed vehicle insurance requirement in this Contract, then the requirement that provides the higher level of insurance shall apply.

D28.4.4 Further to D11.3, insurers shall provide satisfactory Certificates of Insurance to the Government of Manitoba prior to commencement of Work as written evidence of the insurance required. The Certificates of Insurance must provide for a minimum of thirty (30) days' prior written notice to the Government of Manitoba in case of insurance cancellation.

D28.4.5 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.

D28.5 Indemnification by Contractor

D28.5.1 In addition to the indemnity obligations outlined in C17 of the General Conditions for Construction, the Contractor agrees to indemnify and save harmless the Government of Canada and the Government of Manitoba and each of their respective Ministers, officers, servants, employees, and agents from and against all claims and demands, losses, costs, damages, actions, suit or other proceedings brought or pursued in any manner in respect of any matter caused by the Contractor or arising from this Contract or the Work, or from the goods or services provided or required to be provided by the Contractor, except those resulting from the negligence of any of the Government of Canada's or the Government of Manitoba's Ministers, officers, servants, employees, or agents, as the case may be.

D28.6 Records Retention and Audits

D28.6.1 The Contractor shall maintain and preserve accurate and complete records in respect of this Contract and the Work, including all accounting records, financial documents, copies of contracts with other parties and other records relating to this Contract and the Work during the term of the Contract and for at least six (6) years after Total Performance. Those records bearing original signatures or professional seals or stamps must be preserved in paper form; other records may be retained in electronic form.

D28.6.2 In addition to the record keeping and inspection obligations outlined in C6 of the General Conditions for Construction, the Contractor shall keep available for inspection and audit at all reasonable times while this Contract is in effect and until at least six (6) years after Total Performance, all records, documents, and contracts referred to in D28.6.1 for inspection, copying and audit by the City of Winnipeg, the Government of Manitoba and/or the Government of Canada and their respective representatives and auditors, and to produce them on demand; to provide reasonable facilities for such inspections, copying and audits, to provide copies of and extracts from such records, documents, or contracts upon request by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada and their respective representatives and auditors, and to promptly provide such other information and explanations as may be reasonably requested by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada from time-to-time.

D28.7 Other Obligations

D28.7.1 The Contractor consents to the City providing a copy of the Contract to the Government of Manitoba and/or the Government of Canada upon request from either entity.

D28.7.2 If the Lobbyists Registration Act (Manitoba) applies to the Contractor, the Contractor represents and warrants that it has filed a return and is registered and in full compliance with the obligations of that Act, and covenants that it will continue to comply for the duration of this Contract.

D28.7.3 The Contractor shall comply with all applicable legislation and standards, whether federal, provincial, or municipal, including (without limitation) labour, environmental, and human rights laws, in the course of providing the Work.

D28.7.4 The Contractor shall properly account for the Work provided under this Contract and payment received in this respect, prepared in accordance with generally accepted accounting principles in effect in Canada, including those principles and standards approved or recommended from time-to-time by the Chartered Professional Accountants of Canada or the Public Sector Accounting Board, as applicable, applied on a consistent basis.

FORM H1: PERFORMANCE BOND
(See D12)

KNOW ALL MEN BY THESE PRESENTS THAT

_____
(hereinafter called the "Principal"), and

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

_____

_____ dollars ($_____.____)

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

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

TENDER NO. 237-2019

REHABILITATION OF THE ST. JAMES INTERCEPTOR FORCE MAIN SIPHON BY CIPP

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

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

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

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

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

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

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness as to Principal if no seal)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

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

FORM H2: LABOUR AND MATERIAL PAYMENT BOND
(See D12)

KNOW ALL MEN BY THESE PRESENTS THAT

_____
his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Principal"), and

_____ ,
his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), for the use and benefit of claimants as herein below defined, in the amount of

_____

_____ dollars ($_____.____)

of lawful money of Canada, for the payment whereof we, the Principal and the Surety jointly and severally bind ourselves firmly by these presents.

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

TENDER NO. 237-2019

REHABILITATION OF THE ST. JAMES INTERCEPTOR FORCE MAIN SIPHON BY CIPP

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 promptly make payment to all claimants as hereinafter defined, for all labour, service and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void, otherwise it shall remain in full force and effect subject, however, to the following conditions:

(a) A claimant is defined as one having a direct contract with the Principal for labour, service and material, or any of them, used or reasonably required for use in the performance of the contract, labour, service and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment (but excluding rent of equipment where the rent pursuant to an agreement is to be applied towards the purchase price thereof) directly applicable to the Contract;

(b) The above-named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant’s work, labour or service was done or performed, or materials were furnished by such claimant, may sue on this bond, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon;

(c) No suit or action shall be commenced hereunder by any claimant

(ii) unless claimant shall have given written notice to the Principal and the Surety above-named, within one hundred and twenty (120) days after such claimant did or performed the last of the work, labour or service, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work, labour or service was done or performed. Such notice shall be served by mailing the same by registered mail to the Principal, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the Province of Manitoba;

(iii) after the expiration of one (1) year following the date on which Principal ceased work on said Contract; including work performed under the guarantees provided in the Contract;

(iv) other than in a court of competent jurisdiction in the Province of Manitoba.

(d) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

(e) The Surety shall not be liable for a greater sum than the specified penalty of this bond.

The Principal and Surety hereby agree that The Guarantors' Liability Act (Manitoba) shall apply to this Bond.

IN TESTIMONY WHEREOF, the Principal has hereunto set its hand affixed its seal, and the Surety has caused these presents to be sealed and with its corporate seal duly attested by the authorized signature of its signing authority this

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness as to Principal if no seal)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

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

FORM J: SUBCONTRACTOR LIST
(See D13)

REHABILITATION OF THE ST. JAMES INTERCEPTOR FORCE MAIN SIPHON BY CIPP

Name	Address

FORM K: EQUIPMENT
(See D14)

REHABILITATION OF THE ST. JAMES INTERCEPTOR FORCE MAIN SIPHON BY CIPP

1. Category/type:

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

2. Category/type:

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

3. Category/type:

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

FORM K: EQUIPMENT
(See D14)

REHABILITATION OF THE ST. JAMES INTERCEPTOR FORCE MAIN SIPHON BY CIPP

4. Category/type:

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

5. Category/type:

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

6. Category/type:

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

FORM L: CONTRACTOR EXPERIENCE
(See B13)

REHABILITATION OF THE ST. JAMES INTERCEPTOR FORCE MAIN SIPHON BY CIPP

Attach additional resumes and documents as required. Indicate whether Projects/Project Personnel are for Contractor or Subcontractor, and if applicable include name of Subcontractor.

Project References:

Project Client/Contact: _____
(Name)

_____
(Address)

_____
(phone) (email)

Year	Description of Project, including type of pipe	Value

Project References:

Project Client/Contact: _____
(Name)

_____
(Address)

_____
(phone) (email)

Year	Description of Project, including type of pipe	Value

FORM L: CONTRACTOR EXPERIENCE
(See B13)

REHABILITATION OF THE ST. JAMES INTERCEPTOR FORCE MAIN SIPHON BY CIPP

Project Personnel:

Name and Title:_____
(Name)

Qualifications: (attach resume and fill out information below)

Year	Description of Past Project	For Whom Work Was Performed	Value

Project Personnel:

Name and Title: _____
(Name)

Qualifications: (attach resume and fill out information below)

Year	Description of Past Project	For Whom Work Was Performed	Value

Project Personnel:

Name and Title: _____
(Name)

Qualifications: (attach resume and fill out information below)

Year	Description of Past Project	For Whom Work Was Performed	Value

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

E1.1 These Specifications shall apply to the Work.

E1.2 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.

E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/Spec/Default.stm .

E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.

E1.2.3 Further to C2.4(d), Specifications included in the Tender shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B7. In every instance where a brand name or design specification is used, the City will also consider approved equals and/or approved alternatives in accordance with B7.

E1.4 The following are applicable to the Work:

Appendix No.	Appendix Title
A	Record Drawings
B	Site Photos
C	Steel Force Main Defect Maps

Drawing No.	Drawing Name/Title
12120	Cover Sheet
12121	Plan/Profile
12122	Details

GENERAL REQUIREMENTS

E2. CONFINED SPACE ENTRY

E2.1 Description

(a) This Specification shall outline minimum requirements for confined space operations and provision of support for third party inspections through the course of the work.

E2.2 General

E2.2.1 The Contractor shall be aware that Hydrogen Sulphide Gas is present in all underground structures connected to the City's sewer systems and has been known to accumulate in concentrations sufficient to cause serious harm or death to personnel who are not using adequate Personal Protective Equipment.

E2.2.2 The Contractor's attention is drawn to the Province of Manitoba Workplace Safety and Health Act ('the Act"), and the Regulations and Guidelines there-under pertaining to Confined Space Entry Work and in particular the requirements for conducting hazard/risk assessments and providing personal protective equipment (PPE).

E2.2.3 The Contractor is responsible for all safety and confined space support for both the work and third party inspections by the City and Contract Administrator throughout the project.

E2.3 Methods

E2.3.1 Hazard Assessment

(a) In conjunction with securing the site and obtaining underground clearances, the Contractor shall conduct a hazard assessment for each site requiring work within a sewer or manhole. The assessment shall identify and evaluate the hazards, including but not be limited to review of the following as it pertains to the work to be performed:

(i) nature of the defect;

(ii) location of the defect in the sewer/manhole;

(iii) structural condition and amount of debris in the remaining sewer/manhole;

(iv) condition of the manholes up and downstream of the required repair;

(v) atmospheric conditions in the manholes up and downstream of the required repair;

(vi) condition of adjacent downstream sewers; and,

(vii) flow in the sewer.

(b) The hazard assessment shall be based on the Contractors review of video for the sewer(s) and site inspection of the manholes, sewers and external conditions. Prior to the inspection, the Contractor shall conduct the necessary atmospheric monitoring of the affected manholes and sewers to establish acceptable entry conditions.

(c) Based on the results of the hazard assessment the Contractor shall determine if they can perform the stabilization repairs in a safe manner. If the Contractor decides to proceed with the internal repairs, they shall prepare a Safe Work Plan in accordance with E2.3.2 complete with the necessary controls and procedures required to maintain a safe working environment for the repair. Otherwise they shall notify the Contract Administrator and jointly the Contractor and the Contract Administrator shall review the nature of the work and determine alternative means of completing the work are required.

E2.3.2 Safe Work Plan

(a) Subsequent to performing a hazard assessment the Contractor shall develop a safe work plan to address the potential hazards associated with each site. In addition to addressing the potential hazards the safe work plan shall address but not be limited to the following:

(i) guidelines for confined space entry work established by The Manitoba Workplace Safety and Health Act;

(ii) provision for emergency response;

(iii) training and duties for entry personnel;

(iv) rescue and emergency services;

(v) requirement for purging, ingesting, flushing and/or continuous ventilation to eliminate or control atmospheric hazards;

(vi) requirement for and provision of supplied air;

(vii) communication between members of the repair crew in the pipe and on the ground's surface;

(viii) current and forecasted weather conditions;

(ix) isolating the workspace by plugging of upstream sewers and monitoring of upstream flow levels;

(x) provision of back-up equipment;

(xi) method of ingress into the sewer; and,

(xii) method of egress out of the sewer – forward and backwards.

(b) The Contactor shall not enter the sewer or manholes to begin the work until they have completed a hazard assessment and safe work plan for the specific repair and reviewed the plans with their designated safety officer for acceptance. The safe work plan procedures and practices shall conform to all federal, provincial and municipal

codes, regulations and guidelines including Manitoba Workplace Safety and Health Regulations.

E2.3.3 Enter the Manhole and Sewer

(a) The Contractor shall enter the manhole/sewer and complete the work in accordance with their safe work plan and requirements for the repair contained herein.

(b) If at any time during the repair the attendant and/or Contractor believes he cannot safely perform the work, they shall immediately stop the work and evacuate the sewer and manholes. The Contractor shall re-assess their safe work plan considering the reason for the work stoppage. The work shall only be resumed when the Contractor has deemed it safe to return by completing a re-assessment and safe work plan revision, where necessary.

(c) If the Contractor deems the work cannot be safely completed by internal stabilization, they shall notify the Contract Administrator and jointly the Contractor and the Contract Administrator shall review the nature of the defect and determine alternative means of completing the work are required.

E2.4 Measurement and Payment

E2.4.1 Confined Space Entry

(a) Performing hazard assessments, preparing a Safe Work Plans, and confined space entry support for the Work and inspections will not be measured for payment and shall be considered incidental to the Work. No separate payment will be made.

E3. SHOP DRAWINGS

E3.1 Description

(a) This Specification shall revise, amend, and supplement the requirements of CW 1110 of the City of Winnipeg's Standard Construction Specifications.

(b) 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.

E3.2 Submit all Shop Drawings in accordance with CW 1110 except as modified herein.

E3.3 The Contractor shall submit specified Shop Drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be shown on all submissions for engineering review.

E3.4 Submit Shop Drawing submissions within five (5) Business Days of a request or receipt of Notice of Award in accordance with B19, whichever is earlier.

E3.5 Allow for a five (5) Business Days period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.

E3.6 Shop Drawings not meeting the requirements of CW 1100 or the requirements specified herein will be returned to the Contractor without review for resubmission.

E3.7 Shop drawing submissions will be limited to 2 reviews per shop drawing. This shall include a review of the initial submission and a review of the revised submission. Costs associated with subsequent reviews will be charged to the Contractor.

E3.8 Measurement and Payment

(a) The provision of Shop Drawings shall be considered incidental to the Work and will not be measured for payment. No additional payment will be made.

E4. MOBILIZATION AND DEMOBILIZATION

E4.1 Description

(a) This Specification shall govern Mobilization and Demobilization from site.

E4.2 Measurement and Payment

E4.2.1 Mobilization and Demobilization

(a) Mobilization and demobilization will be measured on a lump sum basis and paid for at the Contract Lump Sum Price for “Mobilization and Demobilization”. Payment for Mobilization and demobilization shall include all costs associated with mobilization and demobilization, site set up, and cleanup. Payment will be made on the following schedule:

(b) 50% payment of the Mobilization and Demobilization lump sum price will be paid once lining crews arrive on site to commence cleaning and sewer preparation works.

(c) 100% of the Mobilization and Demobilization lump sum price will be paid subsequent to completion of the liner installation, liner repairs (if necessary), and site cleanup.

E5. TRAFFIC MANAGEMENT

E5.1 Further to Section 3.7 of CW 1130 of the General Requirements the Contractor shall be responsible to redirect and maintain traffic with appropriate signing in accordance with The City of Winnipeg, "Manual of Temporary Traffic Control in Work Areas on City Streets at all times during construction.

E5.2 Maintain access for approaches, driveways, public lanes and crossing streets for all locations.

E5.3 Bus traffic must be maintained at all times or as approved by the Contract Administrator.

E5.4 The Contractor shall maintain access to all businesses during business hours, except where written authorization has been provided by the business.

E5.5 The Contractor shall maintain access to all schools, community centres, and other public buildings at all times.

E5.6 Further to Section 3.6 of CW 1130 of the General Requirements, the Contractor shall maintain safe pedestrian crossings at intersections at all times. If possible, only one pedestrian crossing at an intersection is to be blocked by construction at any one time. If more than one pedestrian crossing is blocked by construction at an intersection at the same time the Contractor shall provide flag persons to safely escort pedestrians across the intersection. The Contractor shall leave pedestrian crossing locations safe and free of equipment that may hamper pedestrians when no construction activities are being performed at a particular crossing location.

E5.7 Further to Clause 3.7 of CW 1130 of the General Requirements, should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, he/she shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.

E5.8 The Contractor shall not park company or private vehicles inside the barricaded work zone in a manner that will block sightlines for vehicles and pedestrians approaching and crossing intersections.

E5.9 The Contractor is responsible for maintaining safe vehicular and pedestrian traffic through their work site as identified herein. The Contractor shall rectify any unsafe conditions immediately

upon notification. This could include but is not limited to, providing flag persons, clearing debris and snow from sites, moving equipment, and erecting additional signage.

E5.10 Regional Street Lane Closures

E5.10.1 Construction activities on Regional Streets shall be restricted to the closed lanes between 07:00 to 09:00 hours and 15:30 to 17:30 hours Monday to Friday and other hours as outlined herein or directed by the Contract Administrator.

E5.10.2 The City reserves the right to restrict or cancel Regional Street lane closures at any time due to the occurrence of special events or conflicting third party work.

E5.10.3 The Contractor shall submit all regional lane closure requests to the Contract Administrator a minimum of five (5) Business Days prior to the planned work. Requests for regional lane closures shall include all required information for submission required by the City's online request form. A link to the form can be found here: (http://www.winnipeg.ca/publicworks/trafficcontrol/laneclosures/LaneClosuresMap.asp).

E5.11 Residential Streets

(a) The contractor shall strive to maintain at least one lane of traffic on residential streets. Street shall be signed as "Road Closed - Local Access Only".

(b) A minimum of one lane of traffic shall be maintained on one-way residential streets at all times.

(c) Where required, the Contractor shall provide notice of complete street shutdowns complete with dates and duration a minimum of five (5) Business Days prior to the street closures.

E5.12 Measurement and Payment

(a) Traffic management as outlined herein will be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

E6. FLOW CONTROL

E6.1 Description

(a) This Specification shall cover flow control measures required for main line sewer and sewer services required to perform the work.

E6.2 Submittals

(a) Submit a written flow control plan for sewers to be lined for review by the Contract Administrator in accordance with E2, a minimum of five (5) Business Days prior to undertaking the work. The flow control plan shall include the following:

(i) A description and sketch detailing the arrangement of the proposed flow control measures.

(ii) A list of the key components required for the flow control measures, including but not limited to the following:

(i) Cofferdams/bulkheads

(ii) Piping or hoses

(iii) Pumps

(iii) A detailed procedure for installation and removal of the flow control measures.

(iv) Monitoring plan (if required). Note: all plans shall include a 24 hr contact person.

(v) Means and methods for dealing with excessive flows or wet weather events.

(vi) Means and methods for bypassing flows from apartment complexes and commercial buildings.

(vii) Supply of temporary washroom facilities where required.

E6.3 Methods

(a) Provide necessary flow control measures for the main line sewer and sewer services required to perform the work. Diversion of wastewater flow directly or indirectly to the environment, land drainage sewers, or storm relief sewers will not be allowed.

(b) Maintain existing sewer flows from upstream sewers during construction around the sewers being lined.

(c) Where bypass pumping combined sewer flows, the Contractor shall provide a minimum pumping capacity of 2.75 times the estimated average day flows as provided herein or estimated by the Contractor.

(d) Erection of scaffolding overtop of active roadways will not be permitted for the purposes of flow control.

(e) Provide adequate temporary bypass pumping for live sewer services connected to the sewer being lined from when the service is blocked off until it is reinstated.

(f) Provide security personnel for locations where by-pass pumping requires normally secure or locked doors and access areas to be left open or unlocked.

(g) Ensure all flow control components and materials are removed from the sewer system upon completion of the work.

E6.3.1 Flow Control for S-MA20016531 and S-MA20016527

(a) The 450 mm steel/AC force main crossing Sturgeon Creek (S-MA20016531 and S-MA20016527) are fully redundant and flows may be directed to one (1) of the two (2) force mains via the upstream valve chamber on Assiniboine Crescent for an extended period of time.

(b) Only City of Winnipeg operations staff are permitted to operate valves on the force main. Valve operation shall be coordinated through the Contract Administrator.

(c) The Contractor shall employ sufficient flow control measures within the downstream discharge manhole to prevent back flow of sewage into the isolated force main.

E6.3.2 Weather

(a) Review the Environment Canada weather forecast with the Contract Administrator before each day of liner installation.

(b) Delay installation of liners and/or secure Works when the anticipated weather conditions are such that anticipated sewer flow will exceed the flow control measures provided.

(c) The Contractor shall advise immediately of any weather-related delays.

(d) The Contractor to schedule Work according to the weather; The City is not responsible for costs associated with weather related delays.

E6.4 Measurement and Payment

(a) Flow control measures necessary for mainline sewers will be measured on a lump sum basis and paid for at the Contract Price for “Flow Control”.

(b) Payment for “Flow Control” shall include, but is not limited to the following:

(i) Supply of flow control plans, drawings, and submissions;

(ii) Investigative work to confirm flows, manhole, and pipe configurations;

(iii) Supply, installation, and removal of cofferdams and flow diversions;

(iv) Supply, mobilization, monitoring, operation, and demobilization of pumps and hoses;

(v) Hydrovac, hauling, and disposal of sewage where required for flow control purposes;

(vi) Traffic signage;

(vii) Supply, installation, and removal of all traffic ramps and associated materials; and,

(viii) Any and all other plant and materials required to complete the work as specified herein and identified on reviewed flow control plans.

(c) Payment for flow control will be as follows:

(i) 25% payment of the Flow Control unit price will be paid when flow control measures have been mobilized to site and are in operation.

(ii) 100% of the Flow Control unit price will be paid subsequent to the completion of the liner installation and demobilization of flow control measures.

(d) Where no flow control measures are undertaken, no payment will be made for this item of work.

E7. EXCAVATIONS AND PIPELINE ACCESS

E7.1 Description

(a) This Specification shall cover excavations, shoring, and pipeline access required for the purposes of completing the proposed rehabilitation work.

E7.2 Submittals

E7.2.1 Shoring Plan

(a) A shoring plan shall be prepared and submitted in accordance with E3 a minimum of ten (10) Business Days prior to undertaking the excavation and shoring installation. The shoring plan shall include the following:

(i) Means of excavation;

(ii) limits of excavation;

(iii) stockpile locations; and,

(iv) shoring plans/materials

(b) Where required by Workplace Safety and Health Regulation, shoring Shop Drawings shall be sealed by a Professional Engineer, registered in the Province of Manitoba, experienced in the design of excavation shoring systems.

E7.3 Shoring Design

E7.3.1 Shoring shall be provided for excavations in accordance with CW 2030.

E7.3.2 All shoring systems shall comply with Manitoba Workplace Safety and Health requirements.

E7.4 Methods

E7.4.1 Work Area

(a) The Contractor shall keep all equipment, personnel, and materials off private property except where explicitly permitted on the Drawings.

(b) The Contractor shall erect construction fencing along the property line with 2610 Assiniboine Crescent as indicated on the Drawings.

E7.4.2 Excavation

(a) The Contractor is responsible for locating the existing sewer and other buried utilities and shall take all steps to locate the existing sewer prior to excavation and installation of shoring.

(b) Materials shall not be stockpiled over pipelines.

(c) Carefully excavate to expose existing pipelines.

(d) Only smooth edged buckets may be utilized for excavations within 1.5 m of the existing force mains. Note, the presence of existing tool launch wyes on the force main.

(e) The existing force mains shall be located prior to proceeding with excavations within 1.0 m of the pipe. Final excavation (within 300 mm of the pipe wall) shall be completed using soft dig or hand excavation methods to prevent damage to the pipe.

(f) Excess excavation materials shall be disposed of off-site.

E7.4.3 Shoring Installation

(a) Piles (if used) shall be installed with a minimum of 500 mm of clear separation between the pile and the outside of the existing pipeline.

(b) Piles (if used) shall be pre-bored to a depth below the invert of the pipeline.

(c) Excavation and shoring installation shall not initiate movement or otherwise destabilize soils sounding the existing pipelines.

(d) Locate the extents of the existing pipeline prior to pre boring and installing shoring using soft dig methods.

(e) Construction Vibrations

(i) The Contractor shall use means and methods that will limit vibrations at the locations adjacent to utilities and structures. Where construction operations such as sheet pile driving or similar activities induce significant ground vibrations near the sewer line, vibration monitoring shall be performed using an accelerometer to measure the peak particle velocities.

E7.4.4 Pipeline Access

(a) The Contractor may access the force main from the following locations to facilitate CIPP liner installation:

(i) Existing discharge manhole on Ashcroft Point

(ii) Existing launch wyes located downstream of the valve chamber on Assiniboine Crescent

E7.4.5 Pipe Bedding

(a) Pipe bedding shall be completed to CW2030, Class B standards.

E7.4.6 Backfill

(a) Backfill within 1 m of existing and proposed pavements and driveways shall be completed to CW 2030, Class 2 standards.

(b) All other areas shall be backfilled with a Class 4 or 5 backfill unless otherwise noted on the Drawings.

(c) Backfilling with frozen materials will not be permitted.

E7.5 Measurement and Payment

(a) “Pipeline Access” shall be measured and paid on a Lump Sum basis as listed in the Form B: Prices.

(b) Payment for “Pipeline Access” shall include the supply of all materials and equipment required to complete the Work, including: excavation, shoring, disassembly and reassembly of piping, and backfilling as specified herein.

(c) Payment for Pipeline Access will be as follows:

(i) 50% payment of the Pipeline Access Modifications lump sum price upon completion of excavations and commencement of cleaning operations.

(ii) 100% payment of the Pipeline Access Modifications lump sum price upon backfill of the excavation.

E8. SEWER INSPECTIONS

E8.1 Description:

(a) This Specification describes the requirements for obtaining sewer measurements and inspections required to facilitate the specified rehabilitation work.

E8.2 Methods

E8.2.1 Verification of Existing Sewer Dimensions

(a) Verify sewer dimensions prior to design as follows:
  (i) Measure the diameter and cross-section of the AC force main (downstream at the discharge location) a minimum distance of 500 millimetres inside the sewer.
  (ii) Use calibrated callipers or other suitable measuring device capable of measuring accurately to +/- 1 mm to confirm cross section geometry at the following clock positions:
    - 12:00 to 6:00
    - 2:00 to 8:00
    - 3:00 to 9:00
    - 4:00 to 10:00

(b) Verify sewer dimensions and depths prior to installation as follows:
  (i) Length of sewer to confirm the liner length prior to installation.
  (ii) Measure the diameter and cross-section of the force main at a minimum distance of 500 millimetres inside the sewer.
    - Internal dimensions of the upstream steel force main.
  (iii) Use calibrated callipers or other suitable measuring device capable of measuring accurately to +/- 1 mm to confirm cross section geometry at the following clock positions:
    - 12:00 to 6:00
    - 2:00 to 8:00
    - 3:00 to 9:00
    - 4:00 to 10:00

(c) Submit host pipe lengths, depths, and dimensions to the Contract Administrator in conjunction with the design submission and pre-design inspection where required.

(d) Confirm measured pipe dimensions and lengths with the Contract Administrator prior to CIPP liner installation.

E8.2.2 Perform the following sewer inspections in accordance with CW 2145 and as outlined herein:

(a) A combination of SONAR and CCTV may be employed to complete the following inspections.

(b) For all CCTV inspections, the force main shall be fully dewatered to permit full inspection of the pipeline.

(c) Pre-Cleaning Inspection:
  (i) Perform prior to undertaking pipe cleaning and preparation.
  (ii) Pre-Cleaning inspection may be completed using CCTV or Sonar. See E8.5 for SONAR inspection requirements.
  (iii) No coding of the CCTV submission will be required.

(d) Pre-Lining Inspection:

(i) Perform after sewer cleaning and preparation.

(ii) The Pre-Lining Inspection shall confirm:

- Necessary cleaning and pipe preparation work, including internal and external sewer repairs, have been satisfactorily completed.
- Condition of the sewer pipe is consistent with the design conditions and the Specifications. The Contractor shall advise the Contract Administrator of any condition that is contrary to the design conditions or assumptions made that may affect either long or short term performance of the liner prior to commencing lining.

(iii) Pre-Lining inspection may be completed using CCTV or Sonar. See E8.5 for SONAR inspection requirements.

(iv) Pre-Lining CCTV/Sonar inspection shall be reviewed on site or provided to the Contract Administrator to review. Provide to the Contract Administrator a minimum of one (1) Business Day prior to lining for review and acceptance prior to proceeding with the liner installation.

(v) No coding of the submission will be required.

(e) Post-Lining Inspection:

(i) Perform immediately following installation of the liner, after completion of sewer service reinstatement, and while flow control measures are in place.

(ii) Intent is to confirm the adequacy of sewer service reinstatements and the fit and finish of the liner.

(iii) Post-Lining inspection may be completed using CCTV or Sonar. See E8.5 for SONAR inspection requirements.

(iv) Post-Lining inspection CCTV inspection or preliminary SONAR report shall be submitted within one (1) Business Day of completion of the inspection to permit review prior to placing the force main into service.

(v) Substantial Performance and Total Performance for the project will not be granted prior to submission and acceptance of the Post-Lining CCTV/Sonar inspection and associated reports.

(vi) Full coding required.

(f) Warranty Inspection:

(i) Warranty Inspection not required.

E8.2.3 Submit all inspection videos and SONAR data to the Contractor Administrator for review in accordance with CW 2145 and as specified herein.

E8.3 Sewer Inspection Reports

(a) Provide the Contract Administrator with the following sewer inspection reports prepared in accordance with CW 2145.

(i) Pre and post-lining inspection and reports before acceptance of the Work for Total Performance.

E8.4 Amendments and Supplements to CW 2145:

E8.4.1 Replace Section 3.4 with:

(a) Ensure each operator is fully trained in all aspects of sewer inspection and capable of making accurate observations and recording all conditions that may be encountered in the sewers.

(b) Perform condition coding using operators who can demonstrate proficiency coding in accordance with the requirements of the WRc “Manual of Sewer Condition Classification 3RD Edition”.

E8.4.2 Replace Section 3.5 with:

(a) Perform sewer condition coding in accordance with the requirements of the WRc Manual of Sewer Condition Classification 3RD Edition.

(b) Record place names in accordance with Clause 3.9.4 of the CW 2145.

E8.4.3 Further to Section 3.13, a paper or "hard copy" of the sewer inspection reports is not required and the digital format should be submitted on a CD-R.

(a) The Contractor shall maintain backup copies of all digital video and inspection data submissions for the duration of the Warranty Period as stated in C13.

(b) The Contractor shall supply inspection data for review by the Contract Administrator on a DVD.

E8.4.4 Replace Clause 3.8.1 with:

(a) Provide a minimum of 400 lines of resolution around the periphery of the picture for digital MPEG video playback.

E8.4.5 Replace Clause 3.11.1 with:

(a) Capture the inspections in digital format in colour from the live video source on archival grade digital versatile discs, DVD-R format to the following minimum requirements. Adjust requirements as required to achieve 400 lines of resolution specified in Clause E8.1.6 of this Specification.

(i) XDVD MPEG-2 or MPEG-4 format (MPEG-4 preferred).

(ii) Picture Size: NTSC 720 x 480 @ 29.97 frames per second.

(iii) Data/Bit Rate: 6.0 M-bits/sec.

(b) Replace Clause 3.17.7.6, with:

(i) Record the distance from the centre of the manhole to the cable calibration location at the start of the inspection and adjust the distance reading so that zero is at the centre of the start manhole. This distance is known as the cable calibration distance. The cable calibration location is the intersection point between the camera's widest horizontal viewing angle and the pipe's side periphery (03 or 09 o'clock) when the camera is level and looking forward.

E8.5 SONAR Inspections

(a) SONAR inspections may be utilized to complete the entirety or portions of the inspections identified in E8.2.2 with the intended purpose of confirming pipe prep work requirements, completion of prep work, and fit and finish of the liner.

(b) Where SONAR inspections are employed, the pipeline shall be completely full of water to facilitate a complete inspection. Portions of the pipe that are not completely filled with water shall be inspected using CCTV.

(c) SONAR inspection cable distances shall be referenced from the same location and calibrated to coincide with accompanying CCTV inspections.

(d) The Contractor or SONAR inspection Sub-Contractor shall have qualified technicians on site or on call remotely for real time review and interpretation of the SONAR data.

(e) A SONAR inspection plan shall be submitted a minimum of twenty (20) Business Days prior to undertaking SONAR inspections. The SONAR inspection plan shall include the following:

(i) Identify SONAR crew (or Sub-Contractor).

(ii) Qualifications for on site SONAR technicians and data analysists working on the project. The SONAR inspection foreman and data analysist shall have a minimum of five (5) years of experience with pipeline SONAR inspections.

(iii) Proposed SONAR equipment.

(iv) Proposed extents of SONAR inspection.

(v) Means of ensuring a full pipe through the SONAR inspection zone.

(vi) Sample preliminary SONAR report.

(vii) Sample final SONAR report. Include example SONAR results from an inspection within a steel pipeline of similar diameter.

(f) SONAR inspection reporting:

(i) On site SONAR technicians shall report any anomalies or concerns related to the force main cleaning or CIPP liner immediately to the Contract Administrator.

(ii) A written preliminary report shall be submitted within 24 hrs of the SONAR inspection. The preliminary report shall identify any potential debris or issues with the CIPP liner that may result in the need for additional cleaning, additional inspection, or remediation of the liner.

(iii) A final written report shall be submitted within 7 Calendar Days of the SONAR inspection.

E8.6 Sewer Inspection Equipment

E8.6.1 Notwithstanding CW 2145, CCTV equipment meet the following requirements:

(a) Minimum requirements of the in-line inspection platform include:

(i) Independently controlled drive tracks that enable the platform to manoeuvre around bends and climb over debris.

(ii) Operable under partially or fully submerged flow conditions, for distances up to 500m upstream or downstream from a single access point.

(iii) Operable in sewers of various cross-sections and constructed of standard pipe materials including brick, concrete, PVC, HDPE, and steel.

(iv) Tethered to facilitate extraction of the platform from the sewer, without causing damage to the sewer infrastructure, in the event the equipment fails or otherwise becomes uncontrollable within the sewer.

(v) Equipped with sufficient high intensity lighting to illuminate the sewer for visual inspection.

(vi) Equipment shall be capable of continuously capturing digital video from first generation recordings with no frame loss, regardless of the progression of the inspection.

(vii) Equipment shall be used to acquire continuous digital video images of the sewer for the entire length being inspected.

E8.6.2 SONAR Scanning Inspection

(a) SONAR scanning equipment shall accurately measure sediment depth and debris buildup on pipe walls continuously throughout the inspection.

(b) SONAR scanning shall be conducted from access point to access point.

(c) Minimum equipment requirements are:

(i) SONAR equipment must be programmable multi-frequency profiling SONAR specifically adapted to using sound waves to locate and map subaqueous sewer irregularities by creating continuous SONAR images recorded in “real time” mode.

(ii) SONAR equipment shall be digital, and support a range of frequencies from 600 kHz to 2.25 MHz to minimize noise.

(iii) The range resolution measurement error shall be no greater than 2.0mm from distances of 1 to 4m, and no greater than 10.2mm from distances of beyond 5m.

(iv) The minimum detectable range for the SONAR unit shall be 150mm.

E8.7 Video Coding

(a) Perform sewer condition coding in accordance with the requirements of the WRc Manual of Sewer Condition Classification 3Rd Edition.

(b) Perform condition coding using operators who can demonstrate proficiency coding in accordance with the requirements of the WRc "Manual of Sewer Condition Classification 3RD Edition".

(c) Ensure each operator is fully trained in all aspects of sewer inspection and capable of making accurate observations and recording all conditions that may be encountered in the sewers.

(d) Operators failing to meet the accuracy requirements on two occasions will not be permitted to code on the remainder of the contract until they can demonstrate to the Contract Administrator that they can code in accordance with the requirements of the WRc Manual of Sewer Condition Classification 3Rd Edition.

(e) Incorporate a suitable distance-reading device to measure the location of the equipment in the pipe, to an accuracy of ±0.5% of the length of the inspection.

E8.8 Measurement and Payment

E8.8.1 Verification of Sewer Dimensions:

(a) Verification of existing sewer lengths, depths, and dimensions shall be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

E8.8.2 Pipeline Inspections:

(a) The total length of inspection to be paid will be the total length of sewer inspected using CCTV or SONAR to the satisfaction of the Contract Administrator for each identified inspection. Measurement will be made horizontally at grade above the center line of the sewer from centre to centre of manholes as provided by the Contractor. Where partial or incomplete inspections are submitted, the length of sewer inspected will the length recorded by the Contractors calibrated inspection equipment or as determined by the Contract Administrator.

(b) Payment will not be made for inspections re-performed where the Contract Administrator has determined the requirements of the specification have not been satisfied.

(c) Payment will only be made once per inspection regardless of duplication of CCTV and SONAR inspection efforts.

(d) Siphon dewatering and other efforts to facilitate CCTV inspections will be considered incidental to "Pipeline Inspection" and will not be measured for payment. No additional payment will be made.

(e) Siphon filling and other efforts to facilitate SONAR inspections will be considered incidental to "Pipeline Inspection" and will not be measured for payment. No additional payment will be made.

E8.8.3 Sewer Inspection Reports

(a) CCTV and SONAR inspection reports shall be considered incidental to the inspection and will not be measured for payment. No additional payment will be made.

E9. PIPELINE CLEANING

E9.1 Description

(a) This Specification shall cover the cleaning of the pipelines to be rehabilitated under this Contract.

E9.2 General

E9.2.1 Cleaning Objectives and Methods

(a) Proper cleaning of the host pipe is critical to ensure the liner obtains a tight fit with the host pipe and is installed in a manner consistent with long term design objectives.

(b) The objective of the cleaning operation is to remove all loose and hard debris from existing pipelines resulting a clean (near bare) pipe and uniformly round conduit for installation of the CIPP liner.

(c) The contractor should employ a combination of high pressure flushing, pigging, mechanical cleaning, or other methods to ensure the host pipes are cleaned sufficiently to meet the stated design objectives.

(d) The existing host pipe is known to have near through wall corrosion pitting defects which could be aggravated by aggressive cleaning methods, resulting in additional challenges for installation of the CIPP liners. Cleaning method shall be selected to suit the configuration and condition of the pipeline and minimise the potential to aggravate existing defects.

(e) Defect maps for the 450 mm steel force mains based on an advanced electromagnetic inspection undertaken by PICA in 2014 can be found in Appendix C. Inspection reports produced by PICA for the 450 mm steel force mains will be provided upon request by Bidders.

(f) It is anticipated that pipeline cleaning will take a maximum of three days per pipeline. The Contractor shall identify during the cleaning plan review period if they believe this time is in sufficient to complete the desired level of cleaning.

E9.2.2 Existing Pipelines

(a) Internal pipeline diameters based on the best available record information. The Contractor is responsible to confirm the inner pipe diameters prior to undertaking cleaning work:

Pipeline	Wall Thickness/Pipe Class	Internal Diameter
450 mm Steel Force Main	4.8 mm (3/16”)	447.6 mm (estimated)
450 mm AC Force Main	Class 150	457.2 mm (18”)

E9.3 Submittals

E9.3.1 Cleaning Plan

(a) The Contractor shall submit in writing a detailed cleaning plan for review by the Contract Administrator. The cleaning plan at a minimum shall include the following:

(i) Method(s) of cleaning

(ii) Tools and equipment required

(iii) Sizes and densities of foam pigs to be used

(iv) Means of debris collection and disposal

(b) The pipeline cleaning plan must be submitted a minimum of twenty (20) Business Days prior to undertaking cleaning operations.

(c) No cleaning operations shall be undertaken prior to review of the cleaning plan by the Contract Administrator.

E9.3.2 Shop Drawings

(a) The Contractor shall submit Shop Drawings for the proposed winch line (or flusher hose), complete with the safe pull strength as recommended by the manufacturer.

(b) The Contractor shall submit Shop Drawings for all cleaning pigs proposed for use.

E9.4 Products

E9.4.1 Foam Cleaning Pigs

(a) Material: One piece moulded open-cell polyurethane

(b) Density: up to a standard medium density cleaning pig (80 to 112 kg/m^3)

(c) Pigs shall be new and packaged for shipping.

(d) Pigs shall be supplied complete with a factory installed steel pulling cable. The cable and loops shall be rated for a tensile force equal to 1.5 times the capacity of the proposed winch. Pigs shall be supplied complete with a steel support disc on both ends suitable for towing pigs. The steel disk shall have a minimum diameter of 100 mm.

(e) Foam cores for pigs shall be of equal or greater density than foam body

(f) Pigs to be sized for the internal diameter of the pipeline or as recommended by the manufacturer for the intended purposes.

(g) Bristled pigs may use synthetic plastic or steel brushes.

E9.4.2 Water for pig launching may be obtained from fire hydrants in accordance with CW 1120 and E14.

E9.5 Equipment

E9.5.1 High velocity sewer flushing equipment shall meet the requirements of CW2140.

E9.5.2 Winch and Winch Line

(a) Winch lines shall be one of the following:

(i) synthetic winch lines;

(ii) steel cable; or,

(iii) braided flusher hose.

(b) Proposed winch lines and hoses must have a third party verified tensile load rating. Minimum tensile strength for the wince line shall be 60 kN (13,490 lb) or as required to facilitate the cleaning operations, whichever is greater. Winch lines should have a minimum tensile capacity of 1.5 times the maximum capacity of the winch.

(c) Winches used for cleaning purposes shall have sufficient load capacity to facilitate pipeline cleaning.

(d) Winches used for cleaning purposes shall be fitted with gauges capable of monitoring winching loads. Winch loads shall be monitored at all times to ensure the load rating of the winch lines and cleaning pigs is not exceeded. Controls on winch output must be implemented when winch lines do not meet the tensile capacities noted herein relating to winch capacity. Controls shall limit winch loads to 66% of the tensile capacity of the winch line.

E9.6 Methods

E9.6.1 Pigging

(a) Where applicable, provide pig launch tubes, pipe and fittings, including valves.

(b) Winch lines shall be inserted into the pipelines for cleaning purposes. Winch lines may be inserted by high pressure flusher nozzle, flow drone or other accepted method.

(c) Foam cleaning pigs shall be tethered on each end and be capable of being winched in either direction.

E9.6.2 Flushing of Pipelines using Traditional Flushing Equipment

(a) Flushing equipment shall conform to CW2140 and may be utilized for removal of debris from pipelines.

(b) Flushing pressures shall be limited to prevent aggravation of existing pipeline defects.

E9.6.3 Mechanical Cleaning

(a) Mechanical cleaning (chain flails, scrapers) may be employed for the removal of hard debris. Setup and operation of mechanical cleaning methods shall be undertaken with

an abundance of caution to not aggravate existing defects or otherwise damage the pipe prior to lining.

E9.6.4 Alternative Cleaning Methods

(a) Alternative cleaning methods other than those noted herein may be utilized upon review and acceptance by the Contract Administrator.

E9.7 Method of Measurement and Basis of Payment

E9.7.1 Pipeline Cleaning

(a) Pipeline cleaning will be measured on a daily basis with an hourly overtime rate.

(b) Payment for "Pipeline Cleaning" will include supplying of all materials and performance of all work as specified herein, including site access, removal of access hatches, confined entry support, temporary access, flow diversions, performance of all cleaning and gauging work, and disposal of solid debris.

(c) Time measured will be based on on-site availability of the Contractor's crews, from the time crews are present on site, until crews are complete and site secured of the shift, as certified by the Contract Administrator. Delays in cleaning caused by malfunctioning equipment or poor planning on the part of the Contractor will not be considered for payment.

(d) Hourly overtime rate for each hour or portion thereof in excess of the daily minimum rate of 10 hours.

(e) The supply of pigs for pipeline cleaning will be considered incidental to "Pipeline Cleaning" and will not be measured for payment. No additional payment will be made.

(f) Flushing of pipelines for the purposes of debris removal will be considered incidental to "Pipeline Cleaning" and will not be measured for payment. No additional payment will be made.

(g) Siphon dewatering to facilitate CCTV inspections will be considered incidental to "Pipeline Inspection" and will not be measured for payment for "Pipeline Cleaning".

E10. PIPELINE MODIFICATIONS

E10.1 General

(a) Contractors may choose to complete the cleaning and rehabilitation works from the existing launch wyes or undertake a more extensive disassembly of the existing force main to facilitate the work. The specifications contained here shall govern any permanent modifications undertaken on the existing force mains to facilitate the Work.

(b) The Contractor shall restore the existing force mains back to existing condition upon completion of the work, including reinstallation of the existing launch wyes and blind flanges. Modifications to the system required to complete the rehabilitation work, including the installation of short pipe segments for end sealing purposes, shall incorporate reinstallation of the tool launch wyes and blind flanges. In the case of pipeline modifications, detailed modification plans must be submitted for review and acceptance by the Contract Administrator.

(c) Any proposed modifications to the existing force mains shall include corrosion protection features currently found on the pipeline, including the repair of coatings and the reinstallation of anodes, continuity bonding, and petrolatum corrosion protection wrapping.

(d) Any damage to existing pipeline components or coatings shall be repaired in accordance with the requirements noted herein.

(e) The Contractor shall assume that new hardware and gaskets will be required for all connections and couplings.

(f) The Contractor may need to excavate and repair defects within the liner at the existing 41 deg bend location, should significant defects be found during the post-lining inspection. Defects within the liner will be evaluated jointly with the Contract Administrator, City, and

Contractor to determine the severity of the defects and the need to repair post installation of the CIPP.

E10.2 Submissions:

E10.2.1 Submit Shop Drawings for all permanent and temporarily installed fittings, valves, piping and couplings in accordance with E3.

E10.2.2 Where permanent piping modifications are required (i.e. the force main will not be reassembled in its existing configuration) a clear and concise drawing(s) showing the final piping configuration is required. The drawing(s) shall illustrate the permanent piping configuration complete with all fittings, couplings, restraints, corrosion protection features, bedding and backfill requirements, and any other pertinent detail required for evaluation by the Contract Administrator and construction. The drawing shall be sealed and signed by a Professional Engineer, registered in the Province of Manitoba and experienced in the design pressure pipelines.

E10.2.3 CIPP repair procedures: If required, the Contractor shall submit a detailed work plan for the repair of defects in the CIPP liner at the existing 41 deg bends. The plan shall include:

(a) Excavation and shoring methods

(b) Temporary thrust restraint

(c) Detailed work sequence

(d) CIPP repair procedures and products

(e) CIPP end sealing procedures and products

E10.3 Products

E10.3.1 Fasteners

(a) Bolts for all direct bury flange connections shall be ASTM A307 or ASTM F568M, grade B.

(b) Nuts for all direct bury flange connections shall be ASTM A563 or ASTM A563M, grade B.

(c) Bolts for all sleeve style couplings and/or restraints shall be ASTM F593 or ASTM F738M, type 316 stainless steel.

(d) Nuts for all sleeve style couplings and/or restraints shall be ASTM F594 or ASTM F836M, type 316 stainless steel.

(e) Anti-seize compound shall be used on all bolts.

(f) For flanged connections, bolt size, type and diameter shall be in accordance to AWWA C207. Bolt length suitable for the installation.

(g) All flanged connections shall be wrapped in a petrolatum tape coating system in accordance with E10.3.14. All steel bolting hardware shall be liquid epoxy coated in accordance with E10.3.10, and E10.4.2 prior to wrapping with petrolatum tape coating system.

E10.3.2 Flange Gaskets

(a) 3mm, full-faced, SBR rubber gaskets or neoprene in accordance with AWWA C207.

(b) Gaskets shall be one piece construction where possible.

(c) Segmented gaskets shall be constructed of a minimum number of segments and joints shall be of dovetailed construction, or other jointing methods approved by the Contract Administrator.

E10.3.3 Blind Flanges

(a) Steel blind flanges shall be AWWA C207 Class D.

(b) Cast and ductile blind flanges shall be ASME/ANSI B16.1 Class 150.

(c) Steel blind flanges to be fusion bonded epoxy coated in accordance with AWWA C213, E10.3.11, and E10.4.2.

(d) Cast and ductile blind flanges shall be fusion bonded epoxy coated in accordance with AWWA C116, E10.3.11, and E10.4.2.

E10.3.4 Ductile Iron Fittings

(a) Flanged ductile iron fittings conforming to AWWA C110.

(b) Fittings shall meet the following minimum criteria:

(i) Fittings shall be new.

(ii) Permanently installed fittings shall be cement-mortar lined in accordance with AWWA C104.

(iii) All fittings to be liquid epoxy coated to AWWA C210, E10.3.10, and E10.4.2.

E10.3.5 Ductile Iron Pipe

(a) Ductile iron pipe conforming to AWWA C151.

(b) Pipe shall meet the following minimum criteria:

(i) Thickness Class 54 (minimum).

(ii) Pipe shall be new.

(iii) Permanently installed pipe shall be cement-mortar lined in accordance with AWWA C104.

(iv) All pipe to be liquid epoxy coated in accordance with AWWA C210, E10.3.10, and E10.4.2.

E10.3.6 Fabricated Steel Pipe and Fittings

(a) Steel pipe and fittings shall conform to AWWA C200, AWWA C208, and meet the following requirements:

(i) Minimum steel yield strength of 240 MPa (35,000 psi)

(ii) Minimum wall thickness of 9.5 mm for all sizes.

(iii) All exposed steel surfaces (interior and exterior) shall be liquid epoxy coated in accordance with AWWA C210, E10.3.10, and E10.4.2.

E10.3.7 Flanges for Pipe and Fittings

(a) Steel flanges shall conform to AWWA C207, minimum Class D Flange

(b) Threaded ductile iron flanges shall conform to AWWA C115 ASME/ANSI B16.1 Class 150.

E10.3.8 Pipe Couplings and Flange Adaptors

(a) Pipe couplings and flange adaptors shall conform to AWWA C219.

(b) Unless otherwise specified, center sleeves for pipe couplings shall be constructed from:

(i) Ductile iron or steel

(c) Minimum requirements for sleeve couplings are:

(i) Center sleeve length: 250 mm

(ii) Center sleeve thickness for steel couplings: 9.5 mm

(iii) Couplings capable of accommodating up to 2 degrees deflection

(iv) Design pressure 150 psi

(d) Minimum requirements for flange adaptors:

(i) Flanges shall conform to ASME/ANSI B16.1 Class 150, or

(ii) AWWA C207, Class D.

(e) Restraining end rings shall be supplied where axial thrust restraint is specified on the Drawings. Restraint rings shall be specifically designed for the material type of the pipes being joined.

(f) All hardware shall be type 316 stainless steel in accordance with E10.3.1.

(g) Couplings to be fusion bonded epoxy coated in accordance with E10.3.11 and E10.4.2.

(h) For couplings shall be supplied with two di-electric insulating boots where both pipelines are constructed from ferrous metal.

(i) Buried pipe couplings shall be further protected against corrosion by wrapping the assembled coupler with petrolatum tape coating system in accordance with E10.3.14.

(j) All transition couplings larger than 300 mm in diameter, with differential outside pipe diameters greater than 25 mm, shall be restrained to prevent movement of the coupling due to differential thrust forces. Tie rods placed in compression for the purpose of restraining differential thrust forces shall be no longer than 150 mm and the Contractor must demonstrate they are capable of withstanding the applied forces.

E10.3.9 Coatings

(a) Unless otherwise specified herein exterior coatings and interior linings for all ferrous metal piping and fittings shall be a liquid epoxy meeting the requirements of E10.3.10. As an alternative to liquid epoxy, the contractor shall have the option to use fusion bonded epoxy in accordance with E10.3.11.

E10.3.10 Liquid Epoxy Coatings

(a) Liquid epoxy coatings shall conform to AWWA C210.

(b) All coatings shall be applied in a minimum of two (2) or more layers (5 mils dry film thickness minimum each coat) for a minimum final coating dry film thickness of the greater of 16 mils or the thickness recommended by the manufacturer for immersion service.

(c) Interior pipe linings shall be a 100% solids liquid epoxy product. Approved products: Enviroline 230, Bar-Rust 234P, Specialty Polymer Coatings SP-7888, or approved equal in accordance with B7.

(d) Exterior coatings for all exposed steel, piping, valves, and actuators shall be Polyamide Epoxy. Approved products: Enviroline 230, Bar-Rust 234P, Specialty Polymer Coatings SP-7888, Tnemec Series 140F Pota-Pox Plus, Amerlock 2 or approved equal in accordance with B7.

(e) Submit product data for interior lining and exterior coating products in accordance with E3.

E10.3.11 Fusion Bonded Epoxy Coatings

(a) Fusion bonded epoxy coatings shall conform to AWWA C213 for steel components and AWWA C116 for ductile iron fittings.

(b) The final minimum coating thickness shall be the greater of 16 mils or the thickness recommended by the manufacturer for immersion service.

(c) Submit product data for interior lining and exterior coating products in accordance with E3.

E10.3.12 Continuity Bonding

(a) Wires for continuity bonding shall be No.10 American Wire Gauge (AWG) 7-strand copper conductor with black TWU insulation.

(b) Thermite weld products shall be properly selected based on the wire size, pipe size and material.

(c) Thermite weld caps shall be constructed from 20 mil high-density polyethylene and may be either pre filled or field filled with a bituminous mastic coating or approved equal.

E10.3.13 Galvanic Anodes

(a) Galvanic anodes for cathodic protection of buried ferrous pipes and fittings shall be 10.9 kg pre-packaged zinc anodes to City of Winnipeg specification.

E10.3.14 Petrolatum Tape Corrosion Protection System

(a) All buried pipe couplers and flanged connections shall be protected against corrosion by a petrolatum tape corrosion protection system consisting of the following components:

(i) Petrolatum paste primer

(ii) Void-filling mastic filler

(iii) Petrolatum tape

(iv) Protective outerwrap

(b) Petrolatum tape systems shall conform to AWWA C217.

(c) Approved product: Petrolatum tape system manufactured by Denso North America Inc., Trenton Corporation, Petro Coating Systems Ltd, or approved equal in accordance with B7.

(d) Submit Shop Drawings for petrolatum wrapping system in accordance with CW1110.

E10.4 Methods

E10.4.1 Installation of Lead Wires, Continuity Bonding and Galvanic Anodes

(a) Anodes and continuity bonding shall be installed on new and existing pipes and fittings where shown on the Drawings or as directed by the Contract Administrator.

(b) Thermite Welding Procedure:

(i) Prepare steel surface to bare metal by grinding or filing. Remove all coatings, dirt, mill scale, oxide, grease, moisture, and other foreign matter from weld areas in an area required to complete the weld.

(ii) Before welding, remove wire insulation as required to fit mold, avoiding damage to the exposed copper wire. If wire is cut or nicked over halfway through its diameter, cut off and strip new end. If manufacturer requires the use of a copper sleeve, crimp it securely to wire and remove excess wire protruding from the end of the sleeve.

(iii) After charge is set, remove mold and slag from weld area with welder's hammer. Strike top and sides of weld with hammer to test secureness of connection. If weld does not hold, remove scrap weld material, clean, and begin weld process again.

(iv) After welding and before coating the cleaned weld area, the Contract Administrator may test the joint bond for and wires for electrical continuity.

(v) When the weld passes test for soundness and electrical continuity, repair the coating in the weld area with mastic and weld cap placed over the weld. Clean weld area to remove any loose material, and welding residuals. Cover exposed metal on the pipe and wire with mastic filled weld cap. Ensure weld cap covers the entire area of coating removed for installation of the thermite weld. If not, repair coating as per the coating manufactures recommendations prior to installing weld cap.

E10.4.2 Coatings

(a) Prepare metal surfaces for recoating using the following methods:

(i) Steel - Prepare steel surfaces for recoating by blast cleaning to near-white metal as specified by Joint Surface Preparation Standard NACE No.2/SSPC-SP10.

(ii) Cast and Ductile Iron - Prepare ductile iron surface in accordance with NAPF 500-03.

(iii) Remove all dust and loose residues from the prepared surfaces and surrounding area. The surface shall be roughened to a degree suitable for the coating system employed.

(b) Protect valve seals, machined surfaces, threads, and nameplates from sandblasting.

(c) Primer coat to follow immediately after completion of sandblasting and prep.

(d) Apply liquid epoxies of prepared surfaces in accordance with AWWA C210, E10.3.10, and the manufactures recommendations.

(e) Apply fusion bonded epoxies of prepared surfaces in accordance with AWWA C213, E10.3.11, and the manufactures recommendations.

(f) Provide adequate ventilation and heat to facilitate curing of coatings.

(g) Interior linings for pipes and fittings shall be applied and cured as recommended by the manufacturer prior to placing into service. Linings must be fully cured for immersion service prior to installation and reinstating the line into service. Where accelerated cure times are required for assembly and water immersion, a coating and curing plan shall be submitted to the Contract Administrator in accordance with E3 a minimum of five (5) Business Days prior to application.

E10.4.3 Field Welding of Steel Pipelines and Fittings

(a) Field welding of steel pipes shall conform to AWWA C206.

(b) Connections to existing pipelines shall be accomplished with a full penetration butt weld or a fillet welded split sleeve (external).

(c) Patches on steel pipelines shall be filet welded.

(d) All fillet welds shall have minimum leg lengths equal to the thickness of the material being welded.

(e) All welds shall be inspected using magnetic particle testing methods by a qualified inspector in accordance with ASTM E1444.

E10.4.4 Installation of Petrolatum Tape Corrosion Protection Systems

(a) Install in accordance with AWWA C217 and the manufactures recommendations.

(b) For all surfaces to be wrapped with the corrosion protection system, remove loose rust, paint and foreign matter by hand and/or power tool cleaning in accordance with SSPC-SP-2 or SSPC-SP-3.

(c) Apply a thin uniform coat of petrolatum paste primer, using a glove or brush, to all surfaces to be wrapped with the corrosion protection system.

(d) Apply void-filling mastic filler, by hand, to all flanges designated to be wrapped with the corrosion protection system. Mold the mastic to a rounded configuration around the flange, filling all spaces around fasteners and eliminating sharp edges and irregular shapes.

(e) Spirally wrap the petrolatum tape, using a minimum 25mm overlap, over the primed and mastic-filled pipe and flange surfaces. While wrapping, press out all air pockets and smooth all lap seams.

(f) Spirally wrap clear outerwrap, using sufficient tension to make a tight-fitting cover, over the petrolatum tape.

E10.4.5 Repair of CIPP liner at Existing 41 Deg Bend (Contingency)

(a) The Contractor shall not undertake the repair of defects on the CIPP liner at the existing bends without authorization to proceed from the Contract Administrator.

(b) The post lining inspection will be reviewed to confirm the integrity of the liner along its length. The geometry of the existing force mains results in additional risks for installation related defects to be present at the existing 41 deg bend on the force mains. Should defects be identified at this location, Contract Administer will review said defects in conjunction with the Contractor and City to determine if the severity of the defects, the impacts on long term performance, and the need to repair prior to acceptance of the liner. Key considerations for this review will be ensuring the long term hydrostatic integrity of the CIPP liner.

(c) Should repair of CIPP liner defects at this location be deemed necessary, the Contractor shall complete repairs of the defects through trenchless means if deemed to be adequate for the defects and the proposed service conditions of the CIPP liner. If trenchless repairs are not deemed feasible, the Contractor shall sequentially remove the bends to facilitate repair of the CIPP liner. Planning of this work must take into consideration:

(i) The proximity of existing natural gas pipeline infrastructure;

(ii) Thrust forces present within the line force main; and,

(iii) The need to salvage and reinstall the existing bends.

(d) Repair of the CIPP defects shall include the following:

(i) Excavation, shoring, and accommodation of the existing natural gas utilities.

(ii) Temporary thrust bracing for the pipe in service. Thrust forces are anticipated to be 17.5 kN (3950 lb) based on an internal operating pressure of 15 psi.

(iii) Sequential removal of the force main bend to permit repair of the CIPP. The existing steel pipe shall be neatly cut back from the existing bend at a location conducive for the installation of sleeve couplings upon reinstallation.

(iv) Repair of the CIPP defects using accepted procedures and products.

(v) Prep and coat the interior surface of the force main prior to installation of end seals.

(vi) Sealing of the CIPP liner to the existing steel force main at the cut locations utilizing end seals in accordance with E11.6.4(c) to ensure a hydrostatically integral joint.

(vii) Reinstallation of the bend complete with two sleeve couplings and corrosion protection measures. Corrosion protection measures shall include:

- Coating of the exposed force main up to a suitable termination point a minimum of 300 mm past the termination of the liner.
- Installation of petrolatum corrosion protection system on the sleeve couplings.
- Installation of anodes on the bend and both exposed ends of the force main.

E10.5 Measurement and Payment

E10.5.1 Pipeline Modifications

(a) Pipeline modifications for the purposes of pipeline rehabilitation will be considered incidental to “Pipeline Access” and will not be measured for payment. No additional payment will be made.

E10.5.2 Repair of CIPP Liner at Existing 41 Deg Bend (Contingency)

(a) Removal and replacement of the existing 41 deg bends on the force main for the purposes of repairing the CIPP liner shall be paid on a unit basis for each bend removed, repaired, and replaced in accordance with the Drawings and requirements

noted herein. Payment for replacement of the removal, repair, and reinstallation of the bend shall include all labour and materials required to complete the work.

E11. CURED-IN-PLACE-PIPE (CIPP)

E11.1 Description

(a) This specification covers the supply and installation of full segment, and partial full segment (blind shot) using cured-in-place pipe (CIPP).

E11.2 Definitions

(a) Cured-in-place-pipe (CIPP) means trenchless sewer rehabilitation by installing a resin-felt composite structure which when cured will form a continuous-close fit liner within an existing sewer.

(b) Approved CIPP Suppliers and Installers means suppliers and installers pre-approved under City of Winnipeg "Request for Qualifications for the Supply and Installation of Cured in Pipe (CIPP)". A list of pre-approved CIPP suppliers and installers for 2010 is included in the Specifications.

(c) Full segment CIPP means CIPP extending from manhole to manhole or manhole to node (wye or tee connection to another sewer).

(d) Non-Reinforced CIPP liners shall be considered any CIPP liner constructed from a non-reinforced felt.

(e) Reinforced CIPP liners shall be considered any CIPP liner constructed from either a carbon fibre or glass fibre reinforced felt.

E11.3 Pre-Approved CIPP Suppliers, Installers, and Materials

(a) The following is a list of sewer lining systems – suppliers, installers and materials that have been pre-approved under the City of Winnipeg "Request for Qualifications for the Supply and Installation of Cured in Pipe (CIPP)" Bid Opportunity No. 253-2006 and Bid Opportunity 403-2007 for City of Winnipeg sewer rehabilitation projects.

Table E2.3.1a): Pre-Approved CIPP Suppliers and Installers

Applicant	***Insituform Technologies Limited***	***Capital Commercial Pipe Services***	***Nelson River Construction Inc.***	***Clean Water Works Inc.***
Contact	Andrew Foster 780-413-0200	Brian Ratchford 905-522-0522	Brad Morton 204-949-8700	Jeff Pappin 613-745-2444
Supplier	Insituform Technologies Inc.	Capital Commercial Pipe Services	C.I.P.P. Corporation	Clean Water Works Inc.
Installer	Insituform Technologies Limited	Capital Commercial Pipe Services	Nelson River Construction Inc.	Clean Water Works Inc.
Liner Name	Standard ITL CIPP & Standard ITL CIPP AISC	Capital Lining System (CIPP)	C.I.P.P. Corp Liner	CWW CIPP Design

(b) Notwithstanding pre-approval under City of Winnipeg "Request for Qualifications for the Supply and Installation of Cured in Pipe (CIPP)" Bid Opportunity No. 253-2006 and Bid Opportunity 403-2007, Bidders must meet the qualifications identified in B13.

E11.4 Submittals

E11.4.1 Installation of CIPP liners shall not commence prior to submission and review of the submissions identified herein by the Contract Administrator.

E11.4.2 Provide CIPP end seal submission for review by the Contract Administrator in accordance with E2 a minimum of twenty (20) Business Days prior to starting lining operations. The CIPP end seal submission shall include the following:

(a) Product description and applicable product literature.

(b) A detailed installation procedure.

(c) Identify any force main modifications required to utilize the proposed system. Where permanent force main modifications are required, the Contractor shall provide a force main modification drawings in accordance with E10.2.2.

(d) A minimum of three (3) examples of where the system has been used complete with liner design pressures and applicable pressure testing results.

E11.4.3 Provide CIPP designs for review by the Contract Administrator in accordance with E2 a minimum of fifteen (15) Business Days prior to starting lining operations. CIPP shop drawings shall including the following information and shall be sealed and signed by a Professional Engineer, registered in the Province of Manitoba and experienced in the design of trenchless rehabilitation systems. The CIPP design submission shall include the following:

(a) CIPP thickness computations including all specified design checks identified in E11.5. Identify design assumptions based on a review of the Sewer Maintenance Inspection that differ from the information provided in the Specifications for the existing sewer design conditions.

(b) Design submissions shall include all calculations and each liner design shall be submitted on individual, liner/asset specific calculation sheets.

(c) Name and manufacturer of the resin and felt tube proposed for each CIPP.

(d) Means of liner installation and curing method (e.g. air/steam, water, air/UV).

(e) CIPP material properties used for design. The calculations shall clearly identify the short term and long term material properties assumed in the design and the long term creep retention factor utilized. The submission shall include historical testing data confirming both the short and long term material properties utilized in the design.

(f) Host pipe measurements identified in E8.2.1, including the following:

(i) Sewer length

(ii) Host pipe dimensions

(iii) Sewer invert depths

(g) Other information that may reasonably be required by the Contract Administrator to confirm the CIPP design proposed conforms to the specified requirements and design intent.

E11.4.4 Provide resin samples within five (5) Business Days of a request by the Contract Administrator. Samples shall be provided as follows:

(a) Arrange for the manufacturer of the resin to forward a reference sample of each type of resin proposed for use on the works to a test laboratory designated by the Contract Administrator to be used as a comparative reference sample for infrared spectrum testing.

(b) When requested by the Contract Administrator, deliver a representative sample from each resin batch to be used on the project before adding the catalyst from the wet-out facility to a test laboratory designated by the Contract Administrator.

(c) The Contract Administrator will arrange and pay for an infrared analysis of the samples, if required for the project.

E11.4.5 Submit a liner impregnation protocol a minimum of five (5) Business Days prior to wet of out liners. The liner impregnation protocol shall include the following:

(a) Resin impregnation method.

(b) Designated location of the wet out facility.

(c) Documentation that the resin to be used has not exceeded its shelf life as recommended by the manufacturer of the resin.

(d) Volume and weight of resin to be impregnated into each liner and repair section including the proposed excess allowance for polymerization and migration (typically 7%) into cracks and joints of the host pipe. Resin migration amounts shall be rationalized based on the, installation, host pipe material/condition, and experience with the proposed product.

(e) Resin calculations shall be provided for each liner.

(f) Roller gap setting required to provide the final installed CIPP thickness based on the proposed volume of resin.

E11.4.6 Submit a liner installation protocol a minimum of fifteen (15) Business Days prior to installation of CIPP. The liner installation protocol shall include the following:

(a) Proposed main line and sewer service flow control arrangements in accordance with E6. Note, flow control plans may be submitted separate from the liner installation protocol.

(b) Installation and curing method complete with proposed equipment. Identify equipment in accordance with D14.

(c) Site layout drawing showing the location of all proposed equipment required for installation.

(d) A full curing protocol, including:

(i) Curing times (heat up, curing, cool down)

(ii) Curing temperatures

(iii) Inversion and cure pressures (minimum and maximum)

(iv) Rate of travel of the UV light train and amount of lamps in operation in the case of UV cures.

(e) Provide the maximum allowable axial and longitudinal tensile stress for the fabric tube and the arrangement for monitoring pull-in forces during installation if liner insertion is to be by pull-in methods.

(f) Number and location of heat source monitor gauges.

(g) Number and location of thermistors to be used for monitoring the temperature of the liner during the curing process.

(h) Estimated length of time required to reinstate the main line sewer and sewer services.

(i) Additional information may be required by the Contract Administrator for complex installations. This may include site setup details, over the hole wetout procedures, and other information pertinent to the review and evaluation of the Contractors proposed construction methods.

(j) Submission Requirements:

(i) A common installation procedure may be submitted for the two proposed liners. Notwithstanding, any individual liner installation requirements shall be clearly identified in the submission.

E11.4.7 Submit a sampling protocol a minimum of five (5) Business Days prior to installation of CIPP. The protocol shall include:

(a) Sampling procedures for plate samples, confined pipe samples, and cut samples.

(b) Description of confined pipe forms to be utilised.

(c) Procedure, complete with diagram for placement of heat sink (sand bags) for confined pipe samples.

(d) Sizes for all samples to be obtained.

(e) Liner repair products and procedures for direct cut samples.

E11.5 Design of CIPP Liners

E11.5.1 Design Objectives

(a) Maximizing the structural enhancement of the sewer by installing a close-fit CIPP.

(b) Maximise the internal diameter of the rehabilitated sewer with as little impact on the hydraulic capacity of the sewer as possible.

(c) Eliminating infiltration and exfiltration.

(d) Preventing root intrusion.

(e) Providing sufficient chemical resistance to prevent further sewer pipe degradation related to the conveyance of sewage.

(f) Minimizing sewer service disruption during rehabilitation.

(g) Minimizing the time required to complete the sewer rehabilitation.

(h) Minimizing disturbance to pavements and boulevards.

(i) Minimizing disruption to vehicular and pedestrian traffic.

(j) Minimizing the impact of construction on commercial, industrial, and institutional facilities.

(k) Select a CIPP product and construction approach for rehabilitation with the intent towards maximizing the achievement of these design objectives.

E11.5.2 General Requirements

(a) Chemical and mechanical properties of the liner based on the waste stream to establish and minimum design life of 50 years.

(b) Size CIPP in accordance with the design objectives to provide a close-fit to the host pipe with no annulus except for the maximum allowable diametric shrinkage due to curing permitted in ASTM D5813.

(c) Long-term values for flexural modulus of elasticity and flexural strength will be considered to be the projected value at 50 years of a continuous application of the design load based on the specific resin and felt composite as established by ASTM D2990 based on an applied stress level of 25% of the yield strength of the liner and approved for use in the pre-qualification process. A minimum test length of 10,000 hrs is required. The Contractor shall provide supporting long term test data conforming to ASTM D2990 for any resin and felt composites not approved for use in the prequalification process.

(d) The Contractor shall provide short term test data on the modulus of elasticity and flexural strength of the in place composite structure conforming to ASTM D790 for any resin and felt composites not approved for use in the prequalification process.

E11.5.3 Minimum Loading Assumptions:

(a) Unless otherwise specified, the groundwater table shall be assumed to be 2.0 m below the existing ground surface.

(b) Calculate soil loads based on saturated soil unit weight of 18.85 kN/m^3 (1922 kg/m^3).

(c) Design calculations shall consider both maximum and minimum soil cover scenarios for each liner. The governing load case shall govern the design.

(d) The following live loads shall be included in the design:

(i) Sewers crossing beneath rail lines: Where identified, applied soil pressures from a Cooper E80 rail load shall be estimated and utilized in the design of the CIPP liner. Rail loads shall include a track allowance dead load of 297 kg/m. Applied rail loads at depth shall be calculated using the Boussinesq solution for distribution of soil stresses from surface point loads. Impact factors for rail loads shall be calculated in accordance with the AREMA Manual for Railway Engineering.

(ii) All other sewers: The applied soil pressures from an AASHTO HS 25 design truck unless a higher or lower value is indicated in the contract specifications shall be estimated and utilized in the design of the CIPP liner. Applied soil pressures from AASHTO design truck loads shall be estimated in accordance with AASHTO LRFD Bridge Design Specifications, Seventh Edition (2014).

(e) Unless otherwise specified, applied soil pressures at depth caused by superimposed surface loads shall be calculated using the Boussinesq solution for distribution of stresses from surface point loads.

E11.5.4 Hydraulic Design Checks

(a) Perform a design check to confirm that the full flow hydraulic capacity of the CIPP will be equal to or greater than the existing sewer. Use “Manning’s” formula with assumed ‘n’ value of 0.012 for the CIPP and 0.014 for the existing sewer. Report any sewers showing a decrease in post lining flow capacity from existing conditions.

E11.5.5 Circular CIPP Design – Minimum Design Assumptions

(a) An enhancement factor (K) of 7, assuming a close fit with the host pipe.

(b) Minimum factor of safety (N) of 2 for restrained buckling analysis.

(c) Modulus of soil reaction (E’s) will be assumed to be 6900 kPa unless otherwise specified.

(d) The following minimum values for ovality of the existing sewer shall be used unless otherwise specified or as determined from observation of the maintenance inspection:

(i) Partially deteriorated design – 3%

(ii) Fully deteriorated design – 2%

E11.5.6 Circular CIPP Design - Partially Deteriorated Condition

(a) Design CIPP for partially deteriorated pipe condition in accordance with Appendix X1 of ASTM F1216 and the following minimum design checks:

(i) Determine wall thickness by restrained buckling analysis.

(ii) Determine whether wall thickness will be governed by long-term flexural stress.

(iii) Determine whether any localized thickening is required for missing segments or holes in the host pipe.

(iv) Deter

(v) Perform supplemental design checks where the host pipe has invert “flats” to determine whether wall thickness will be governed by one of the following:

- Buckling by assuming the flat functions as a pin-ended strut.
- Stress, by assuming the flat functions as a pinned member, subjected to axial and transverse loads.
- Deflection by assuming that allowable deflection is limited to 3% of the length of the flat.

E11.5.7 Circular Design – Fully Deteriorated Condition

(a) Design CIPP for fully deteriorated pipe condition in accordance with Appendix X1 of ASTM F1216 and the following minimum design checks:

(i) Determine wall thickness by restrained buckling analysis.

(ii) Check minimum wall thickness requirements.

(b) Applied external loads shall be estimated in accordance with Appendix X1 of ASTM F1216.

E11.5.8 Circular Design – Pressure Applications

(a) Design CIPP for fully deteriorated pipe condition in accordance with Appendix X1 of ASTM F1216 and the following minimum design checks:

(i) Determine internal pressure capacity based on identified host pipe deterioration condition.

(ii) Account for transient pressures where identified.

(iii) Except where otherwise specified, assume the liner is subject to full vacuum pressure.

E11.5.9 Existing Sewer Design Conditions

(a) No CCTV inspection is available for the force mains to be rehabilitated.

(b) An advanced electromagnetic inspection was undertaken by PICA in 2014 and defect maps produced from their findings have been included in Appendix C.

(c) The Contractors attention is directed to the site phots provided in Appendix B.

(d) The existing force mains contain a 150 mm diameter flanged offtake at the creek bottom (see Record Drawings in Appendix A). The offtake ports are to be abandoned and lined over.

E11.5.10 Site Specific Design Requirements

(a) The following site-specific design requirements supersede design requirements identified elsewhere within the Specifications.

(b) St. James Interceptor Force Main Siphon:

(i) Pressure liner design required.

(ii) Host Pipe Design Condition:

- Operating and external loading conditions - Fully deteriorated host pipe (AWWA M28 Class IV Liner)
- Transient internal pressure conditions - Partially deteriorated host pipe (AWWA M28 Class III Liner)
- Host pipe deflection for design purposes: 2% (all design conditions)

(iii) Pipeline defects:

- 150 mm hole (existing offtake ports) - The Contractor must design the CIPP liner to span the existing offtake port unless the port can be suitable grouted with a cementitious product, an internal repair effected, or similar means of eliminating the need for the liner to span the 150 mm diameter opening.
- 50 mm (assumed long term corrosion defect)

(iv) External groundwater level for design purposes: 231.86 m (flood protection level) except where otherwise specified

(v) Internal design operating pressure: 140 kPa (20 psi)

(vi) Internal transient pressure: 1035 kPa (150 psi)

(vii) Full internal vacuum: -98 kPa (-14.3 psi)

(viii) The Contractor shall consider the following minimum design conditions:

Design Scenario	Station (m)	Invert Depth (m)	Ground Elevation (m)	Live Load	Internal Pressure (kPa)	Internal Vacuum (kPa)	Groundwater Elevation (m)	Design Condition
Max Soil Cover	1-181	229.74	233.65	N/A	0	-98	231.86	FD
Max Soil Cover	1-181	229.74	233.65	HS-20	0	0	231.86	FD
Min Soil Cover	1+108	228.76	230.1	N/A	0	-98	231.86	FD
Min Soil Cover	1+108	228.76	230.1	HS-20	0	0	228.00	FD
Max Internal Operating Pressure	N/A	N/A	N/A	N/A	140kPa	0	N/A	FD
Max External Hydrostatic Head	1+130	226.56	227.50	N/A	0	-98	231.86	FD
Internal Transient Pressure	N/A	N/A	N/A	N/A	1035 kPa	0	N/A	PD

E11.6 Materials

E11.6.1 Non-Reinforced CIPP Products

(a) Non-Reinforced CIPP products shall conform to the requirements of ASTM F1216 and D5813.

E11.6.2 Reinforced CIPP Products

(a) Reinforced CIPP products shall conform to the requirements of ASTM F2019 and D5813. Notwithstanding ASTM F2019, the fabric tube may be reinforced with either glass or carbon fibres, as required to achieve the desired short and long term material properties and may be installed via inversion methods.

E11.6.3 CIPP Resin

(a) CIPP liners shall utilize a vinyl ester resin.

E11.6.4 CIPP End Seals

(a) Where specified the Contractor shall install end seals for the purposes of ensuring a hydrostatically integral connection between the CIPP liner and host pipe.

(b) Hydrophilic CIPP End Seals

(i) Hydrophilic CIPP end seals shall be a full-circle, compression end sleeve or o-ring made of hydrophilic rubber, or equal, seal at overlapping points or the end of the CIPP liner to provide a watertight seal.

(ii) Hydrophilic CIPP end seals shall only be utilized for gravity applications and are not permitted for use where the pipeline is exposed to internal pressure during normal operation (e.g. force mains).

(c) Internal Mechanical Compression Seals

(i) Internal mechanical compression seals shall be constructed from EPDM rubber Derivative Membrane for use as joint liner material shall be manufactured in compliance with ASTM-D3900, D3568 and shall have designation M4AA710A13B13C12Z1Z2Z3 in accordance with ASTM-D2000.

(ii) Stainless steel bands, spacers, shims, and set screws for securing rubber membrane across piping joints shall be Type 303, 304, 316 or Maunell as manufactured in accordance with ASTM-A240.

(iii) Minimum pressure rating: 670 kPa (100 psi)

(iv) Accepted products: Quick Lock by Uhrig Kanaltechnik GmbH, Weko-Seal by Miller Pipeline Corp., L-Lock-P by Trelleborg Pipe Seals, or approved equal in accordance with B7.

(d) Sleeve Couplings with Fibreglass Pipe Stub

(i) The use of sleeve couplings in conjunction with the CIPP liner terminating within a fiberglass pressure pipe is acceptable where the CIPP liner can be demonstrated to provide a leak proof termination between the CIPP liner and the fibreglass pipe.

(ii) The fibreglass pressure pipe shall conform to AWWA C950 and have a minimum operating pressure rating of 670 kPa (100 psi). Internal diameter for the fiberglass pipe shall be sufficiently close to that of the host pipe to allow for a smooth transition

(iii) The Contractor shall provide historical field and demonstration testing data to demonstrate their ability to obtain a water tight seal between the CIPP liner and the fibreglass pipe.

(iv) Sleeve couplings shall conform to E10.

E11.7 Construction Methods

E11.7.1 Verification of Existing Sewer Dimensions

(a) Verify dimensional requirements of each sewer to be rehabilitated prior to design and manufacture of the CIPP tube in accordance with E8.2.1.

E11.7.2 Sewer Cleaning and Preparation Prior to Lining

(a) Perform sewer preparation and repairs as indicated in the specification and drawings.

(b) Complete cleaning and internal host pipe repairs in accordance with E9.

E11.7.3 Sewer Repairs to be Done by Others

(a) Sewer repairs shown on the Drawings as “To Be Done By Others” or identified prior to sewer lining will be completed before lining work starts.

E11.7.4 Pipeline Access

(a) Complete pipeline access modifications in accordance with E7 and E10.

E11.7.5 Installation of CIPP

(a) Unless otherwise specified, install liners by inversion methods in accordance with ASTM F1216 or by pull-in methods in accordance with ASTM F1743 or ASTM F2019.

(b) The Contractors attention is drawn to the fact that the existing force main may have through wall corrosion related defects resulting in groundwater infiltration when dewatered. Further, cleaning may result in aggravation of these defects again resulting in infiltration of groundwater when dewatered. The Contractor shall plan for and be prepared to install the CIPP liner through a non-dewatered siphon. The Contractor may utilize a pre-liner if desired.

(c) Unless otherwise specified in E11.7.6, full segment and partial full segment CIPP shall be cured by hot water, steam, or UV light sources.

(d) Carry out workmanship in accordance with ASTM D5813.

(e) Trim ends of CIPP neatly to fit flush with interior vertical surface and manhole benching and seal to make watertight.

(f) Fill annular spaces where the CIPP does not make an adequate seal with the host pipe at manholes, termination points and sewer services due to broken or misaligned pipe with a resin-rich mixture compatible with the CIPP.

E11.7.6 Site Specific Installation Requirements:

(a) St. James Interceptor Force Main Siphon:

(i) The Contractor shall utilize water inversion and curing methods only.

(ii) The Contractor shall utilize a continuous temperature monitoring system for each inversion.

E11.7.7 CIPP End Seals

(a) The Contract shall install the following end seals:

(i) Upstream termination point (Station 1+191) – Internal mechanical compression seals pursuant to E11.6.4(c) or sleeve couplings with fibreglass pipe stub pursuant to E11.6.4(d).

(ii) Downstream termination point (Station 1+000) – Hydrophilic CIPP end seals pursuant to E11.6.4(b). Alternatively, the Contractor may use of any of the products identified in E11.6.4.

E11.7.8 Annulus Grouting

(a) Complete annulus grouting where identified by the Contract Administrator during the Post Lining Video inspection.

E11.7.9 Pressure Test

(a) A pressure test shall be undertaken after installation of the liner and reassembly of the force main and prior placing the force main back into service. The Contractor may utilize the existing blind flange and 50 mm threaded port to complete the pressure test.

(b) Carry out a pressure test on each liner installed as per Clause 8.3 of ASTM F1216. The test shall be completed once the pipeline has been reassembled such that the test will represent the entire pipeline. Provide all equipment, gauges, meters, vessels, etc. required to demonstrate the pipeline pressure during the duration of the test and the amount of make-up water required to return the pipeline to the required test pressure during and at the end of the test period. Perform pressure and leakage testing in the presence of the Contract Administrator. Maintain the test pressure within 5% of the test pressure throughout the test duration, re-pressurizing and measuring all make up water used.

(i) Minimum test pressure shall be 97 kPa (14 psi) measured at the force main elevation at the upstream liner termination point.

(ii) Leakage allowance is an “apparent” leakage allowance to account for entrapped air, etc. Any visible or readily apparent leaks shall be repaired irrespective of leakage allowance.

(iii) The pipe shall be pressurized at test pressure for three (3) hours prior to test to allow for stabilization of the liner.

(iv) The test duration shall be one (1) hour, commencing after completion of the stabilization period.

(v) Allowable apparent leakage shall be calculated as 0.077 litres per millimetre of pipe diameter per kilometer per hour.

(vi) The Contractor shall record the pipeline pressure and all makeup water utilized in accordance with CW 2125 throughout the stabilization and testing period.

(c) The downstream end of the force main shall be plugged with a temporary inflatable test plug or similar. Flushing of the force main may be required to fill and expel air from the pipeline prior to testing.

(d) Temporary Inflatable Plugs for Leakage Tests

(i) Plugs shall be capable of withstanding a minimum of 207 kPa (30 psi) of backpressure.

(ii) Plugs shall be capable of being anchored from downstream of the plug.

(iii) Plugs shall have a 25 mm (min) air bleed port.

E11.7.10 Quality Control Records

(a) Maintain the following Quality Control records of the work and provide to the Contract Administrator after completion of the work.

(i) Summary of the resin impregnation process including:

- Volume of resin supplied.
- Excess quantity of resin added during the wet out to account for polymerization and migration into the host pipe.
- Roller gap setting.
- Resin catalyst(s) used.
- Time and location of the wet out.
- Means taken to store and transport the resin impregnated CIPP from the wet out facility to the job site.

(ii) Means of curing liners.

(iii) Continuous log of pressure maintained in the liner during the curing period.

(iv) Pulling force used to pull or winch CIPP into place in the host sewer and measured liner elongation.

(v) Continuous log of temperature at boiler in and out and at all thermistors placed between the host pipe and the liner at all manholes during the initial cure, cure, and cool down periods.

(vi) Where specified, the Contractor shall install the CIPP liners complete with a fibre optic thermal sensing cable (to be left in place) that is capable of continuously monitor curing temperatures along the entire length of CIPP liner. The cable and recording equipment shall be capable of temperature readings every 450 mm in real time. Curing data logs shall be submitted to the Contract Administrator with the Quality Control records.

(vii) For UV cures, monitoring shall also include the rate of travel of the UV assembly and the amount of lamps in operation during the curing process.

E11.7.11 CIPP Samples for Quality Assurance Purposes

(a) The following quality assurance testing will be completed on samples prepared during CIPP liner installation:

(i) short term flexural properties in accordance with ASTM D790;

(ii) short term flexural properties in accordance with ISO 11296;

(iii) wall thickness measurements in accordance with ASTM F1216 and D5813;

(iv) short term tensile strength in accordance with ASTM D638; and

(v) apparent hoop tensile strength in accordance with ASTM D2290.

(b) The Contractor shall provide the following samples from each CIPP liner:

(i) One (1) confined test sample in accordance with E11.7.11(i). Confined test samples will be used for the following testing:

- Force main 1 sample - Apparent hoop tensile strength (ASTM D2290)
- Force main 2 sample – Short term flexural properties (ISO 11296)

(ii) Two (2) plate samples in accordance with E11.7.11(j). Plate samples are to be utilized for the following tests for each liner:

- Short term flexural properties (ASTM D790)
- Short term tensile strength (ASTM D638)

(c) The Contract Administrator will coordinate and pay for CIPP sample testing as noted herein.

(d) Flexural strength and flexural modulus results obtained from test plates will be reduced by the maximum percentage difference of the results of the confined pipe testing (ISO 11296) and test plate sample testing (ASTM D790) prepared from the same CIPP liner.

(e) Where issues are identified with sampling procedures and/or for design reconciliation the Contractor shall, upon the request of the Contract Administrator, cut a sample directly from the installed CIPP liner in accordance with E11.7.11(k).

(f) The Contractor shall obtain and provide the Contract Administrator with pre and post lining measurements taken in accordance with E8.2.1 of this specification to confirm in-place liner thickness.

(g) The Contract Administrator will review CIPP liner thickness results taken from confined pipe samples. Where confined pipe samples are not obtained, thickness measurements will be obtained from liner measurements or direct cut samples.

(h) All samples shall be labeled as follows:
  (i) City of Winnipeg asset number
  (ii) Date of installation
  (iii) Street name

(i) Confined Test Samples
  (i) Provide necessary forms of the same diameter as the host pipe and secure a minimum 300 millimetre long full diameter confined test sample from each CIPP and internal point repair. Large diameter CIPP liners utilizing reinforcing may require a longer sample length, confirm with the Contract Administrator.
  (ii) Confined pipe sample forms shall have an internal diameter equal to that of the steel force main (447.6 mm) ± 3 mm. The use of 450 mm SDR 35 PVC sewer pipe is recommended.
  (iii) Locate the test sample from inside an intermediate manhole or at a termination point and invert through the form.
  (iv) Confined test sample forms shall be fully encapsulated with sand bags or a similar medium to form a heat sink and replicate the install conditions of the CIPP liner.
  (v) Cut the CIPP sample to coincide with multi-piece form if used for CIPP larger than 450 millimetres in diameter to facilitate removal from the manhole. Provide the sample to the Contract Administrator complete with the form where used.

(j) Test Plate Samples
  (i) Test plate samples shall be produced from a full thickness portion of the liner (where possible), shall contain the same resin and hardener ratios and volumes used in the CIPP liner wet-out. Ensure the test plate is clamped as close to the final installation thickness of the CIPP liner as possible.
  (ii) For unreinforced liners the minimum dimension of test plate sample shall be 300mm x 300mm.
  (iii) For reinforced liners the test plate sample shall be sized to accommodate a 32:1 span to depth (liner thickness) ratio. Circumferential reinforcing fibres shall be orientated in the long dimension of the test plate sample. Minimum dimensions for the test sample shall be as follows. Confirm the required test plate size for reinforced liners with the Contract Administrator prior to installation of the CIPP liner.
    - Width: 13 times the thickness of the liner
    - Length: 35.2 times the thickness of the liner
  (iv) Prepare test plate samples on-site from the actual CIPP and cure in the following manner:
    - in a clamped mold placed in the downtube or manhole for water-cured liners.
    - In a clamped mold placed in a container filled with uniformly distributed steam from the installation manhole for steam-cured liners.
  (v) For reinforced liners, the direction of the circumferential reinforcement shall be clearly marked on the sample when prepared and wet-out. Markings that are

damaged or obscured during the curing process shall be reapplied to ensure the testing laboratory can cut samples in the correct orientation.

(k) Direct Samples

(i) Where directed, the Contractor shall obtain a sample of the installed CIPP liner from within the host pipe.

(ii) Direct cut samples shall only be obtained from the downstream discharge manhole.

(iii) Direct samples of the CIPP liner shall be a minimum of 300mm x 300mm for unreinforced liners.

(iv) For reinforced liners the sample shall be sized to accommodate a 32:1 span to depth (liner thickness) ratio. Circumferential reinforcing fibres shall be orientated in the long dimension of the sample. Minimum dimensions for the test sample shall be as follows. Confirm the required sample size for reinforced liners with the Contract Administrator prior to obtaining the sample.

- Width: 13 times the thickness of the liner
- Length: 35.2 times the thickness of the liner

(v) Confirm sampling locations with the Contract Administrator prior to work. Direct samples from reinforced liners shall be oriented with the long dimension vertically in the straightest portion of the sewer or as directed by the Contract Administrator.

(vi) For repairs up to 25 mm in thickness, grout the area where test sample was taken with a resin-rich repair product such as an epoxy based repair system that is compatible with the liner system and specifically designed for the nature, size and thickness of the patch being repaired to form a smooth watertight patch flush with liner.

- For repairs over 25 mm in thickness, polymer modified cementitious grout compatible with the liner materials may be used.

(vii) Ensure repairs at direct sampling locations are captured during subsequent CCTV inspections.

E11.7.12 Infrared Spectroscopy

(a) The Contract Administrator may arrange for testing to compare the infrared spectrum of the resin field samples supplied from the wet-out to the reference spectrum generated from the resin sample provided by the resin manufacturer to verify installed material acceptability at no cost to the Contractor.

E11.7.13 Post Construction Design Review for Total Performance

(a) The Contract Administrator will perform a post-construction design review to confirm that the completed CIPP meets the 50 year design life structural requirements prior to issuance of Total Performance. The design review will utilize the measured values for flexural strength, flexural modulus, and CIPP thickness from the confined pipe sample testing, directly obtained samples, or the reduced strength/modulus values obtained from the test plate testing in circumstances where confined pipe samples are not able to be secured.

(b) CIPP strength values will be further reduced to account for creep based on the creep reduction values recommended in the pre-qualification submissions to assess the suitability of the liner to meet the 50 year design life requirement. The use of full enhancement factors in this analysis will be limited to liners that are confirmed by visual classification to be close-fit liners based on the post-lining sewer inspection.

(c) The Contract Administrator will advise of any discrepancies between the constructed CIPP and the design requirements.

(d) Defects in CIPP liners will be reviewed on a case by case basis by the Contract Administrator. The Contract Administrator will consult with the Contractor and taking into account the condition of the host pipe prior to lining, the CIPP installation

conditions, and the long term use of the sewer to assess the structural and performance ramifications of the defects.

(e) The Contractor shall:

(i) Perform necessary remedial measures to confirm that a CIPP deemed as structurally deficient will comply with the 50 year design life requirement such as confirmation of actual ovality, determination of a more representative groundwater elevation locally through monitoring, and supplemental strength testing and thickness measurements.

(ii) Repair sections of CIPP removed for supplemental testing by placing a full circumference internal point repair of the same thickness as the full segment liner over and extending 300 millimetres beyond each side of the cut section.

(iii) Install a supplemental CIPP of the required thickness to structurally enhance the installed CIPP if supplemental testing fails to confirm the CIPP will meet the 50 year design life requirement.

(iv) Review remedial action with the Contract Administrator prior to implementation.

(v) Perform further testing, monitoring and calculations and install structural enhancements at own cost.

E11.8 Measurement and Payment

E11.8.1 Verification of Existing Sewer and CIPP Dimensions

(a) Verification of existing sewer and CIPP dimensions shall be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

E11.8.2 CIPP Installation

(a) Liner installation will be measured on a length basis for each size and paid for at the Contract Unit Price for “Full Segment CIPP”, “Partial Full Segment CIPP”. Length to be paid for will be the total length of CIPP supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

(b) Full segment CIPP measurement will be made horizontally at grade, above the centreline of the pipe from centre to centre of manholes.

(c) Partial full segment CIPP measurement will be made from the centre of one manhole to the termination point of the CIPP as measured by the post lining video inspection. Partial full segment CIPP installed beyond the limits identified by the Contract Administrator during review of the pre-lining video will not be measured for payment.

(d) Eighty (80) percent of the payment will be made upon satisfactory completion of the CIPP installation work. The remaining twenty (20) percent of the payment will be made upon confirmation of the CIPP strength, delivery and acceptance of all required submissions, shop drawings, and reports, and rectification of all identified defects.

(e) Where CIPP liners are improperly installed due to negligence on the part of the Contractor, payment for the CIPP liner will be withheld until the identified issues have been rectified.

E11.8.3 CIPP End Seals

(a) Installation of CIPP end seals shall be considered incidental to the CIPP installation and will not be measured for payment. No separate payment shall be made.

E11.8.4 Pressure Testing

(a) Pressure testing shall be considered incidental to the CIPP installation and will not be measured for payment. No separate payment shall be made.

E11.8.5 Quality Control Records

(a) Preparation of quality control records shall be considered incidental to the CIPP installation and will not be measured for payment. No separate payment shall be made.

E11.8.6 Test Samples

(a) All work and materials required for the preparation, recovery, and repair of CIPP test samples shall be considered incidental to the CIPP installation and will not be measured for payment. No separate payment shall be made.

E12. RESTORATION

E12.1 Description

(a) This Specification shall cover the restoration of all work sites.

E12.2 Restoration Works

(a) Reconstruct concrete pavements in accordance with CW 3230, CW3310, and SD-213A.

(b) Reconstruct asphalt pavements and overlays in accordance with CW3410 using a Type 1A asphaltic concrete pavement.

(c) Reconstruct concrete barrier curbs in accordance with CW3240 and SD-206A.

(d) Sod all maintained grassed areas in accordance with CW3510.

E12.3 Measurement and Payment

E12.3.1 Asphalt Roadway Repairs

(a) Construction of “Asphalt Roadway Repairs (c/w Concrete Slab Patches)” shall be measured on a square metre basis as listed in Form B. Measurement will be made for each square metre of parking lot acceptably repaired. Payment for “Asphalt Roadway Repairs (c/w Concrete Slab Patches)” shall include all base and sub base preparation, the supply and placement of concrete pavements, asphalt pavements, and all associated materials and labour to complete the work.

(b) Construction of “Asphalt Roadway Repairs (w/o Concrete Slab Patches)” shall be measured on a square metre basis as listed in Form B. Measurement will be made for each square metre of parking lot acceptably repaired. Payment for “Asphalt Parking Lots Repairs (w/o Concrete Slab Patches)” shall include the supply and placement of asphalt pavements, and all associated materials and labour to complete the work.

E12.3.2 Concrete Barrier Curb Replacement

(a) “Concrete Barrier Curb Replacement” shall be measured on a linear metre basis for. Measurement will be made for each linear metre of concrete curb acceptably replaced. Payment for “Concrete Barrier Curb Replacement” shall include all base and sub base preparation, and the supply and placement of concrete curbing.

E12.3.3 Supply and installation of sod using imported topsoil shall be measured and paid in accordance with CW 3510.

E12.3.4 Payment for restoration works will be limited to areas disturbed to facilitate construction. Surface restoration outside of the designated construction areas shall be at the Contractors expense.

E13. TREE PROTECTION, PRUNING, AND REMOVAL

E13.1 Description

E13.1.1 This specification covers the pruning and removal of existing trees as required to facilitate construction.

E13.1.2 This specification amends CW 3110 Clearing and Grubbing.

E13.2 Quality Control

E13.2.1 Person performing work shall possess a valid Manitoba Arborists License.

E13.3 Materials

E13.3.1 Wound Dressing

(a) Wound dressing shall be horticultural accepted non-hardening bituminous emulsion, free of materials toxic to callus formation, containing disinfectant for fungal and other diseases.

E13.4 Construction Methods

E13.4.1 The Contractor shall take the following precautionary steps to prevent damage from construction activities to existing boulevard trees within the limits of the construction area:

(a) The Contractor shall not stockpile materials and soil or park vehicles and equipment on boulevards within 2 metres of trees.

(b) Trees in close proximity to the work and moving equipment are to be strapped with 25 x 100 x 2400 mm wood planks, or suitably protected.

(c) Excavation shall be performed in a manner that minimizes damage to the existing root systems. Where possible, excavation shall be carried out such that the edge of the excavation shall be a minimum of 1.5 times the diameter (measured in inches), with the outcome read in feet, from the closest edge of the trunk. Where roots must be cut to facilitate excavation, they shall be pruned neatly at the face of excavation.

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

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

E13.4.2 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the City Forester or his/her designate.

E13.4.3 Scheduling of Work

(a) The Contractor shall review work with Contract Administrator prior to starting work.

(b) The Contractor shall schedule the work in accordance with the restrictions set out in the federal Migratory Birds Convention Act, 1994.

E13.4.4 Removal

(a) If the Contractor requires removing trees to access the Site or facilitate construction, the Contractor shall submit a plan to the Contract Administrator for review, a minimum of ten (10) Business Days prior to removal. No removals of trees shall be made without written acceptance by the Contract Administrator and the City of Winnipeg's Forestry Department. The plan shall at a minimum indicate:

(i) Trees requiring removal complete with size and species, and description of requirement for removal.

(b) Replanting requirements will be determined by the level of tree removals proposed and accepted by the Contract Administrator and City of Winnipeg's Forestry Department.

E13.4.5 Pruning

(a) Prune individual trees as indicated by the Contract Administrator. Remove dead, dying, diseased, interfering, objectionable and weak growth in order to promote healthy development suitable to the purpose for which plant material is grown.

(b) Prune in accordance with Agriculture Canada Publication 1505-1977, The Pruning Manual.

(c) Employ clean sharp tools and make cuts flush with main branch, smooth and sloping as to prevent accumulation of water. Remove projecting stumps on trunks or main branches. Remove dead and injured branches and branches that rub causing damage to bark. Trim trees without changing their natural shape. Do not damage lead branches or remove smaller twigs along main branches.

E13.4.6 Cut Back

(a) Eliminate narrow crotches as much as possible; avoid cutting back to small suckers. Remove smaller limbs and twigs to leave foliage evenly distributed.

(b) When reducing overall size, make symmetrical in appearance to maintain tree-like form typical of species.

(c) Do not remove more than one-third of total branching at single operation.

E13.4.7 Repair and Protection

(a) Repair cuts and old scars in accordance with Agriculture Canada Publication 1505-1977, The Pruning Manual.

(b) Paint new cuts 100mm in diameter and over with wound dressing.

E13.5 Method of Measurement and Basis of Payment

E13.5.1 Pruning and removal of trees will be considered incidental to “Pipeline Access” and will not be measured for payment. No additional payment will be made.

E14. WATER SUPPLY

E14.1 Further to specifications CW 1120, Section 3.1, CW 2140 and CW 2145, water supply for the Work may be taken from City of Winnipeg hydrants in accordance with the following:

(a) Only hydrants approved by Water Services Division (WSD) shall be used for water supply.

(b) The Contractor shall supply and use a Backflow Protection Arrangement as shown on Standard Drawing SD-019 when taking water from City hydrants. Alternatively, the Contractor may rent the Backflow Protection Arrangement from the Water Services Division (WSD) if available. WSD will supply a meter and locks for the Backflow Protection Arrangement.

(c) The Contractor is permitted to turn approved hydrants on and off provided the Contractor has received training by the Water Services Division and the turn-ons and turn-offs are done in the presence of the Contract Administrator.

(d) Hydrants approved for use shall be considered to be “in the Contractor’s control” from the time the City has turned the hydrant on until the Contractor has notified the City the hydrant is no longer being used and the meter box has been removed.

(e) Between November 1 and April 30 of any year the Contractor shall take all necessary precautions to prevent freezing of hydrants and related appurtenances for hydrants in their control and shall be responsible to pump out hydrants turned off by Emergency Services. Heating and hoarding of hydrants will be required by the Contractor.

(f) If a hydrant or appurtenance is damaged due to freezing or improper turn-on or turn-off procedures while in the Contractor’s control, WSD will assess the damage and determine if WSD will repair the damage or if the Contractor will be responsible to repair the damage. Costs for repairs completed by WSD will be deducted from payments owing the Contractor. Repairs completed by the Contractor will be at the Contractor’s expense.

(g) Erect and maintain signage (bump signs) warning oncoming traffic of hose crossings to the satisfaction of the Contract Administrator and the Manual of Temporary Traffic Control. Construct ramps as shown on attached Drawing D-8211.

(h) Direct hook-up of pipeline flushing equipment to a hydrant is not permitted unless approved by the Contract Administrator

(i) WSD may instruct the Contractor to make other arrangements for hydrant turn-ons and turn-offs.

E14.2 Measurement and Payment

(a) The supply of the Backflow Protection Arrangement or rental of same from WSD shall be considered incidental to “Pipeline Access” and will not be measured for payment. No additional payment will be made.

(b) All costs associated with heating and hoarding shall be considered incidental to “Pipeline Access” and will not be measured for payment. No additional payment will be made.

(c) Further to Section 3.7 of CW 1120, charges incurred for the permit and water meters shall be paid for by the Contractor when taken out. The Contractor shall forward the invoice to the Contract Administrator for reimbursement. The billing for water usage sent to the Contractor shall be forwarded to the Contract Administrator for payment. The Bid Opportunity number shall be noted on each permit.

PART F - SECURITY CLEARANCE

F1. SECURITY CLEARANCE

F1.1 Each individual proposed to perform the following portions of the Work:

(a) any Work on private property;

(b) any Work within City facilities other than:

(i) an underground structure such as a manhole;

(ii) in areas and at times normally open to the public;

(c) communicating with residents and homeowners in person or by telephone;

F1.1.1 Each Individual shall be required to obtain a Police Information Check from the police service having jurisdiction at his/her place of residence. Or

(a) BackCheck, forms to be completed can be found on the website at: http://www.backcheck.net/ ; or

(b) Commissionaires (Manitoba Division), forms to be completed can be found on the website at: https://www.commissionaires.ca/en/manitoba/home; or

(c) FASTCHECK Criminal Record & Fingerprint Specialists, forms to be completed can be found on the website at: https://myfastcheck.com

F1.2 Prior to the award of Contact, and during the term of the Contract if additional or replacement individuals are proposed to perform Work, the Contractor shall supply the Contract Administrator with a Police Information Check obtained not earlier than one (1) year prior to the Submission Deadline, or a certified true copy thereof, for each individual proposed to perform such Work.

F1.3 Any individual for whom a Police Information Check is not provided, or for whom a Police Information Check indicates any convictions or pending charges related to property offences or crimes against another person will not be permitted to perform any Work specified in F1.1.

F1.4 Any Police Information Check obtained thereby will be deemed valid for the duration of the Contract subject to a repeated records search as hereinafter specified.

F1.5 Notwithstanding the foregoing, at any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require an updated Police Information Check. Any individual who fails to provide a satisfactory Police Information Check as a result of a repeated Police Information Check will not be permitted to continue to perform any Work specified in F1.1.

Appendix A

Record Drawings

Appendix B

Site Photos

Appendix C

Steel Force Main Defect Maps