



**THE CITY OF WINNIPEG**

# **TENDER**

**TENDER NO. 990-2023B**

**CONSTRUCTION OF ~1,045M OF 1200 MM INTERCEPTOR SEWER –  
CENTREPORT SOUTH REGIONAL WATER AND WASTEWATER SERVICING  
PHASE 1A (CONTRACT 3)**

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**APPENDIX B** - Geotechnical Baseline Report

**APPENDIX C** - Future Lift Station Final Site Grading (Draft)

**APPENDIX D** – Interceptor Sewer Work Areas (Figure)

## **PART B - BIDDING PROCEDURES**

### **B1. CONTRACT TITLE**

- B1.1 CONSTRUCTION OF ~1,045 M OF 1200 MM INTERCEPTOR SEWER – CENTREPORT SOUTH REGIONAL WATER AND WASTEWATER SERVICING PHASE 1A (CONTRACT 3)

### **B2. SUBMISSION DEADLINE**

- B2.1 The Submission Deadline is 12:00 noon Winnipeg time, May 15, 2024.
- B2.2 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

### **B3. SITE INVESTIGATION**

- B3.1 Further to C3.1, the Bidder may view the Site without making an appointment.
- B3.2 The Bidder is advised that before submitting a Bid, each Bidder may, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests, and studies and obtain any additional information and data which pertain to subsurface or physical conditions at or contiguous to the Site or otherwise, which may affect cost, progress, performance, or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of the Contract Documents.
- B3.3 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.
- B3.4 The Bidder is responsible for inspecting the Site, the nature of the Work to be done and all conditions that might affect their Bid/Proposal or their performance of the Work, and shall assume all risk for conditions existing or arising in the course of the Work which have been or could have been determined through such inspection.

### **B4. ENQUIRIES**

- B4.1 All enquiries shall be directed to the Contract Administrator identified in D8.1.
- 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.
- B4.6 Any enquiries concerning submitting through MERX should be addressed to:  
MERX Customer Support  
Phone: 1-800-964-6379  
Email: merx@merx.com

## **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 MERX website at [www.merx.com](http://www.merx.com).
- B6.4 The Bidder is responsible for ensuring that they have received all addenda and is advised to check the MERX 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/Proposal. 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 D8.

## **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 their 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 they wish 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 their 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/Proposal;
- (b) Form B: Prices;
- (c) Form G1: Bid Bond and Agreement to Bond.

B8.2 Further to B8.1, the Bidder should include 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 electronically through MERX at [www.merx.com](http://www.merx.com).

B8.4.1 Bids will **only** be accepted electronically through MERX.

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).

**B9. BID**

- B9.1 The Bidder shall complete Form A: Bid/Proposal, making all required entries.
- B9.2 Paragraph 2 of Form A: Bid/Proposal shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in their own name, their 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 their 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/Proposal, 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/Proposal shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in their 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 their duly authorized officer or officers;
  - (d) if the Bidder is carrying on business under a name other than their 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/Proposal should be entered 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.
- B10.2 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).
- B10.5 The Bidder shall enter the Total Bid Price from Form B: Prices into the Total Bid Price field in MERX.
- B10.5.1 Bidders are advised that the calculation indicated in B18.4 will prevail over the Total Bid Price entered in MERX.



## **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) Ward and Burke Microtunnelling Ltd. – Budgeting and Constructability
- (b) The Tunneling Company Inc. – Budgeting and Constructability
- (c) Lafarge Canada Inc. – RCP for Pipe Jacking
- (d) DECAST Ltd. – RCP for Pipe Jacking

## **B12. CONFLICT OF INTEREST AND GOOD FAITH**

B12.1 Further to C3.2, 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 their 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 their 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 their 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 their 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 their 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 their sole discretion:
- (a) disqualify a Bidder that fails to disclose a perceived, potential or actual Conflict of Interest of the Bidder or any of their 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 their 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 their 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 their 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, Purchasing Division website at <https://www.winnipeg.ca/matmgt/Templates/files/debar.pdf>
- 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);
  - (d) have completed the Accessible Customer Service online training required by the Accessibility for Manitobans Act (AMA) (see B13.5 and D10)
  - (e) upon request of the Contract Administrator, provide the Security Clearances in accordance with PART F - Security Clearance;
  - (f) The City has, through a Request for Qualification process (RFQ No. 990-2023A), identified Microtunnelling Contractors who have successfully prequalified to participate in this project. Only submissions from a prequalified Contractor will be accepted. Any Bid received from a Bidder who is not a prequalified Microtunnelling Contractor will be rejected.

- (g) Further to (f), the following Contractors have been pre-qualified through the Request for Qualification process (RFQ No. 990-2023A):
- (i) **Bothar Inc.**  
Jonathan Barrie  
235093 Wrangler Drive SE  
Rocky View County, Alberta, T1X 0K3  
Ph: 587-834-7593  
Fax: N/A
  - (ii) **C&M McNally Engineering Corp. & The Triad Engineering and Contracting Co.**  
Andrew McNally  
1-4380 South Service Road  
Burlington, ON, L7L 5Y6  
Ph: 905-928-9550  
Fax: 905-637-2337
  - (iii) **Erritt Construction Ltd.**  
Vincent Walshe  
399 Applewood Crescent  
Concord, ON, L4K 4J3  
Ph: 647-808-3284  
Fax: N/A
  - (iv) **Michels Canada Co.**  
Ryan Turko  
16 Avenue  
Nisku, Alberta, T9E 0A9  
Ph: 778-309-1723  
Fax: N/A
  - (v) **The Tunneling Company Inc.**  
Kurtis Vurzinger  
4646 32 Street SE  
Calgary, AB, T2B 3J7  
Ph: 250-320-1844  
Fax: N/A

B13.4 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, Purchasing Division website at <http://www.winnipeg.ca/matmgt/>.)

B13.5 Further to B13.3(d), the Bidder acknowledges they and all Subcontractors have obtained training required by the Accessibility for Manitobans Act (AMA) available at <http://www.accessibilitymb.ca/training.html> for anyone that may have any interaction with the public on behalf of the City of Winnipeg.

B13.6 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

- (a) The Bidder will be required to provide proof that the individuals undertaking the Work meet the qualifications listed in their submission from RFQ 990-2023A, and the Specifications.
- (b) All tunnelling Work must be completed by a prequalified Microtunnelling Contractor listed above in B13.3.

B13.7 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 include in their Bid Submission bid security in the form of a digital 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 Form G1: Bid Bond and Agreement to Bond, available on The City of Winnipeg, Corporate Finance, Purchasing Division website at <https://www.winnipeg.ca/MatMgt/templates/files/eBidsecurity.pdf>.

B14.2 Bid security shall be submitted in a digital format meeting the following criteria:

- (a) The version submitted by the Bidder must have valid digital signatures and seals;
- (b) The version submitted by the Bidder must be verifiable by the City with respect to the totality and wholeness of the bond form, including: the content; all digital signatures and digital seals; with the surety company, or an approved verification service provider of the surety company.
- (c) The version submitted must be viewable, printable and storable in standard electronic file formats compatible with the City, and in a single file. Allowable formats include pdf.
- (d) The verification may be conducted by the City immediately or at any time during the life of the bond and at the discretion of the City with no requirement for passwords or fees.
- (e) The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding B14.2(a).

B14.3 Bonds failing the verification process will not be considered to be valid and the bid shall be determined to be non-responsive in accordance with B18.1(a).

B14.4 Bonds passing the verification process will be treated as original and authentic.

B14.4.1 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.

B14.5 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 formed with 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.

B14.6 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 not be opened publicly.

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 MERX website at [www.merx.com](http://www.merx.com).

B15.3 After award of Contract, the name(s) of the successful Bidder(s) and their Contract amount(s) will be available on the MERX website at [www.merx.com](http://www.merx.com).

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/Proposal.

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 formed 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/Proposal.

#### **B17. WITHDRAWAL OF BIDS**

B17.1 A Bidder may withdraw their Bid without penalty at any time prior to the Submission Deadline.

#### **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) Evaluated 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 their Bid or in other information required to be submitted, that they are 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 Bidders are advised that the calculation indicated in B18.4 will prevail over the Total Bid Price entered in MERX.
- B18.4.2 Further to B18.1(a), in the event that a unit price is not provided on Form B: Prices, the City may determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.
- B18.4.3 Further to B18.1(c), the Evaluated Total Bid Price shall include Site Occupancy Costs and Daily Equipment Costs as shown on Form B: Prices. Site Occupancy Costs shall be the Initial Span bid in the Charged Days, multiplied by the Site Occupancy Unit Price listed in Form B: Prices. Daily Equipment Costs are formulated as described in E10.

## **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 their 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 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.
- B19.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of their Bid upon written request to the Contract Administrator.

## PART C - GENERAL CONDITIONS

### C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for Construction* (Revision 2020-01-31) 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, Purchasing Division website at [http://www.winnipeg.ca/matmgt/gen\\_cond.stm](http://www.winnipeg.ca/matmgt/gen_cond.stm)
- C0.2 A reference in the 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.
- (a) Further to C2.4:
    - (i) Specifications shall govern over the Geotechnical Baseline Report (GBR)
    - (ii) The GBR shall govern over the Geotechnical Data Report (GDR)
  - (b) Further to C3.1(a), revise clause (ii) with the following:
    - (i) The nature of the surface and subsurface conditions at the Site and reviewed the GBR and GDR appended to these Specifications.

#### D2. FORM OF CONTRACT DOCUMENTS

- D2.1 Notwithstanding C4.1(c) and C4.4, the Contract Documents will be provided to the Contractor electronically and there will be no requirement for execution and return to the City by the Contractor. Accordingly, the provisions under C4.4(a) and C4.4(b) are no longer applicable.

#### D3. BACKGROUND AND PROJECT INFORMATION

- D3.1 Centreport Canada is North America's largest tri-modal port shared between the City of Winnipeg and the RM of Rosser. The goal of this project is to bring regional water and wastewater infrastructure to the southern portions of CentrePort Canada (CentrePort South) located within the City of Winnipeg. These lands, previously referred to as Airport Area West (AAW), will ultimately result in an additional 1,457 hectares of serviced lands planned for commercial and residential development.
- D3.2 The first phase of the CentrePort Program (referred to as Phase 1A) includes four (4) separate construction contracts. The current project (Contract 3) is to install the 1200 mm interceptor sewer to collect the wastewater and direct it to a future wastewater lift station being constructed under a separate contract.
- D3.3 Further to D3.2, Critical Stages are included in this Contract (990-2023B) to facilitate the future Lift Station, Force Main, and Feeder Main Contract Works. Reference D25.
- D3.4 Winnipeg's geographical location results in highly variable seasonal temperatures that may affect construction. During the winter the ground freezes to approximately 2.5 meters depth, and the impact of low temperatures must be considered for construction methods, equipment operation and rates of production.
- D3.5 Winnipeg is located beneath what was once glacial Lake Agassiz, and lies in a flood plain at the confluence of the Red and Assiniboine Rivers, which influences both the geotechnical and hydrologic characteristics of the region.
- D3.6 A geotechnical investigation was undertaken to determine soil stratigraphy and evaluate the competency of the underlying bedrock including strength, hardness, extent of fracture, water bearing potential and rock quality designation index. The findings of the geotechnical investigation are summarized in the attached Geotechnical Data Report (GDR) and presented in Appendix A.
- D3.7 A Geotechnical Baseline Report (GBR) which addresses subsurface conditions has been developed for the project and is presented in Appendix B.



D3.8 The City is in process of obtaining temporary construction access agreements and permanent easements on privately owned lands to facilitate shaft construction, laydown areas, and pipe installation as shown on the Drawings. It is expected that the access agreements with the private land owners will be in place by the time the project is awarded.

#### **D4. DESIGN INTENT**

D4.1 The following provides background on the project considerations and design intent. It is included as information only. The Contractor is responsible for the means and methods for completion of the Work in conformance with the Drawings and Specifications.

- (a) A number of assumptions have been made during the design process which apply to the microtunnelling Work.
  - (i) Three (3) tunnel drives are required.
  - (ii) Launch and receiving shafts were located at each end of the tunnel drives as shown on the Drawings.
  - (iii) The tunnel alignment includes horizontal curves to minimize impact/land acquisition of privately owned lands and to accommodate future anticipated land requirements by the Province.
- (b) Preparation Work
  - (i) Utility locations and elevations are to be confirmed by the Contractor prior to tunnelling and shaft construction as required to allow for preventative or corrective actions if required.
  - (ii) Temporary modifications to existing ditches within working and laydown areas may be required to deal with drainage throughout the duration of construction.
  - (iii) Temporary modifications, excavation, and regrading to the existing berm along the east side of Sturgeon Access is required to facilitate a flat working surface for construction of the MH-03 and MH-04 working shafts (as required).
- (c) Stub-outs
  - (i) The means and methods of the trenchless stub installation from MH-03 to property line are to be determined by the Contractor in accordance with the Drawings and Specifications.
  - (ii) A bulkhead is required to be installed at the end of the stub to facilitate future connection as identified on the Drawings and the Specifications herein.
  - (iii) A temporary sewer plug is required to be installed within the stub just downstream of the connection to the manhole as identified on the Drawings and Specifications herein (with one permitted relocation if required). Coordination with the lift station Contractor may be required. Purpose of the temporary sewer plug is to prevent any potential drilling fluid from entering the stub.
- (d) Shaft Construction
  - (i) The means and methods of all shaft construction is to be determined by the Contractor in accordance with the Drawings and Specifications.
- (e) Traffic Management
  - (i) The Work will take place along PTH 190 Service Road and Sturgeon Access. Sturgeon Access is classified as a Regional Street by the City. Traffic plans must be developed to minimize the impacts along Sturgeon Access. Reference E6 and E15.
  - (ii) Any Work impacting traffic lanes or flow are to be planned and coordinated to minimize the duration of detours and interruptions.

#### **D5. SCOPE OF WORK**

D5.1 The Work to be done under the Contract shall consist of the construction of a new interceptor sewer that is approximately 1,045 m in length using microtunnelling methods. The interceptor sewer consists of a final pipe inside diameter of 1200 mm. The complete Scope of Work is described within the Drawings and Specifications.

- D5.2 The major components of the Work are as follows:
- (a) Implementation of traffic controls for each stage of the Work, as required.
  - (b) Construction of shafts as required to facilitate Tunnelling and construction of stub-outs.
  - (c) Carry out preparative Works for tunnelling, including development of the launch/receiving shafts and laydown areas.
  - (d) Install and monitor subsurface instrumentation to identify potential settlement caused by the Tunnelling operations.
  - (e) Construction of the interceptor sewer.
  - (f) Construction of stub-out (from MH-03 to property line).
  - (g) Installation of manholes.
  - (h) Surface restoration and related Works.

D5.3 The following shall apply to the Work:

- (a) Universal Design Policy  
<http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeld=2&DocId=3604>

## D6. SITE INVESTIGATION DUE DILIGENCE AND RISK

- D6.1 Notwithstanding C3.1, the Contractor acknowledges that the site investigation reports and other site information included in this Tender have been provided to it and may be relied upon by the Contractor to the extent that the Contractor uses Good Industry Practice in interpreting such report(s) and site information and carries out the Work in accordance with Good Industry Practice based upon such report(s) and the information contained in them and such other site information. In the event that a site condition related to:
- (a) the location of any utility which can be determined from the records or other information available at the offices of any public authority or person, including a municipal corporation and any board or commission thereof, having jurisdiction or control over the utility;
  - (b) the Site conditions, including but not limited to subsurface hazardous materials or other concealed physical conditions;
  - (c) the location, nature, quality or quantity of the materials to be removed or to be employed in the performance of the Work;
  - (d) the nature, quality or quantity of the Plant needed to perform the Work;
  - (e) all matters concerning access to the Site, power supplies, location of existing services, utilities or materials necessary for the completion of the Work; and
  - (f) all other matters which could in any way affect the performance of the Work that could not have been “properly inferable”, “readily apparent” and “readily discoverable” using Good Industry Practice by the Contractor, results in additional Work which is a direct result of the newly discovered site condition, such additional Work will be considered by the City under Changes in Work.

## D7. DEFINITIONS

D7.1 When used in this Tender:

- (a) “**Benchmark**” is a permanent reference Control Point established by the Contractor;
- (b) “**Charged Day**” means the unit of measurement for time of Site Occupancy. For the purpose of assessing Charged Days, a Charged Day will be equivalent to a Working Day as defined in C1.1 (tt) and amended in D28.1;
- (c) “**Closed Face Tunnelling**” means a guided mechanized tunnel using either a slurry shield or earth pressure balance tunnel boring machine fitted with a pressure bulkhead between the excavation face and the tunnel lining;

- (d) **“Contact Grouting”** means grout injected into the theoretical space between the jacking pipe and the ground after the drive is completed.
- (e) **“Controlled Low Strength Material” (CLSM)** is cement stabilized fill, per CW 2160;
- (f) **“Control Point”** means a marker established as a referenced point for survey methods;
- (g) **“Electronic Jacking Record”** means electronic data in native format, such as ASCII, TXT or HTML, or as imported into MS Excel, and as recorded by the data logger of the microtunnelling control system. In no case shall the term “Electronic Jacking Record” be construed to mean a scan or printout of machine operating parameters submitted in portable document format (PDF);
- (h) **“Final Span”** means the number of Charged Days assessed for Site Occupancy as calculated pursuant to D28.1;
- (i) **“GBR”** means Geotechnical Baseline Report;
- (j) **“GDR”** means Geotechnical Data Report;
- (k) **“HDPE”** means high density polyethylene;
- (l) **“Initial Span”** means the number of Charged Days bid by the Contractor for Site Occupancy on Form B: Prices;
- (m) **“Jacking Pipe”** means a reinforced concrete pipe jacked behind a MTBM. The Jacking Pipe shall be specifically designed to be installed by Pipe Jacking to support the anticipated loading and planned curvature;
- (n) **“Jacking Record”** means a manually or automatically recorded report that contains information on Tunnelling (and Pipe Jacking) operations as defined herein;
- (o) **“Launch Shaft”** means excavation from which the trenchless technology equipment is launched for the installation of a pipeline. The launch shaft may incorporate a thrust wall to spread reaction loads to the ground and an entry ring to control inflows of groundwater and soil at the portal.
- (p) **“Microtunnelling”** means a remotely controlled, guided, pipe jacking process that provides continuous support to the excavation face and uses a pressurized bentonite slurry spoil removal system. The microtunnelling process does not require routine personnel entry into the tunnel. A key element of microtunnelling is the ability to control the stability of the face by applying fluid and mechanical pressure to balance the earth and groundwater pressures;
- (q) **“Microtunnelling Boring Machine (MTBM)”** means a remote-controlled, guided slurry shield that provides continuous support to the excavation face. The MTBM is operated from a control container located on the ground surface;
- (r) **“RCP” or “RCJP”** means Reinforced Concrete Pipe used for Pipe Jacking. Note that this project requires HDPE lined Reinforced Concrete Pipe as indicated in the Drawings and Specifications;
- (s) **“Reception Shaft”** means excavation into which the microtunnelling equipment is driven and recovered.
- (t) **“Settlement Point”** means a point with elevation and spatial location established by survey prior to construction. The point is re-surveyed periodically to monitor ground movements. The point may be a nail, pin, subsurface settlement rod, borehole extensometer, or other device that can be readily located and surveyed;
- (u) **“Site”** means the lands and other places on, under, in or through which the work is to be performed;
- (v) **“Site Occupancy”** means a system for monitoring and administering progress of the Work. Site Occupancy involves the Contract Administrator setting a completion date for the Work along with a daily Contract administration cost (Site Occupancy cost) for each Working Day the Contractor is able to Work. The Contractor bids the number of anticipated Working Days to complete the Work, and depending on the actual Working Days to

complete the Work, there may be a bonus payment or deduction applied to the final payment;

- (w) **“SubSurface Monitoring Point”** (SSM) means a cased borehole settlement monitoring point located above the tunnel crown used for detecting settlement between the location of the Settlement Point and the tunnel excavation. This device serves as a simple borehole extensometer;
- (x) **“Supply Chain Disruption”** means an inability by the Contractor to obtain goods or services from third parties necessary to perform the Work of the Contract within the schedule specified therein, despite the Contractor making all reasonable commercial efforts to procure same. Contractors are advised that increased costs do not, in and of themselves, amount to a Supply Chain Disruption;
- (y) **“Standpipe Piezometer”** means a tube inserted into the soil used as a piezometer to measure ground water levels;
- (z) **“Tunnelling”** means the trenchless construction method used to install pipelines. For the interceptor sewer Work upstream of MH-03, Tunnelling refers to the use of Microtunnelling with pipe jacking. For the stub downstream of MH3, tunnelling refers to the trenchless method(s) to be utilized by the Contractor to install the stub pipe in accordance with the Drawings and Specifications herein.
- (aa) **“Tunnel Face”** means the vertical (or near vertical) soil face at the end of the tunnel heading;
- (bb) **“Work” or “Works”** means the carrying out and the doing of all things, whether of a temporary or permanent nature, that are to be done pursuant to the Contract and, without limiting the generality of the foregoing, includes the furnishing of all Plant, Material, labour and services necessary for or incidental to the fulfilment of the requirements of the Contract, including all Changes in Work which may be ordered as herein provided.

## **D8. CONTRACT ADMINISTRATOR**

D8.1 The Contract Administrator is KGS Group, represented by:

John Minkevich, B.Sc., P.Eng.  
Municipal Project Manager

Telephone No. 204-896-1209  
Email Address jminkevich@kgsgroup.com

D8.2 At the pre-construction meeting, the Contract Administrator will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

## **D9. CONTRACTOR'S SUPERVISOR**

D9.1 At the pre-construction meeting, the Contractor shall identify their designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

## **D10. ACCESSIBLE CUSTOMER SERVICE REQUIREMENTS**

D10.1 The Accessibility for Manitobans Act (AMA) imposes obligations on The City of Winnipeg to provide accessible customer service to all persons in accordance with the Customer Service Standard Regulation (“CSSR”) to ensure inclusive access and participation for all people who live, work or visit Winnipeg regardless of their abilities.

D10.1.1 The Contractor agrees to comply with the accessible customer service obligations under the CSSR and further agrees that when providing the Goods or Services or otherwise acting on the City of Winnipeg's behalf, shall comply with all obligations under the AMA applicable to public sector bodies.

- D10.1.2 The accessible customer service obligations include, but are not limited to:
- (a) providing barrier-free access to goods and services;
  - (b) providing reasonable accommodations;
  - (c) reasonably accommodating assistive devices, support persons, and support animals;
  - (d) providing accessibility features e.g. ramps, wide aisles, accessible washrooms, power doors and elevators;
  - (e) inform the public when accessibility features are not available;
  - (f) providing a mechanism or process for receiving and responding to public feedback on the accessibility of all goods and services; and
  - (g) providing adequate training of staff and documentation of same.

## **D11. UNFAIR LABOUR PRACTICES**

- D11.1 Further to C3.2, the Contractor declares that in bidding for the Work and in entering into this Contract, the Contractor and any proposed Subcontractor(s) conduct their respective business in accordance with established international codes embodied in United Nations Universal Declaration of Human Rights (UDHR) <https://www.un.org/en/about-us/universal-declaration-of-human-rights> International Labour Organization (ILO) [https://www.ilo.org/global/lang--en/index.htm](https://www.ilo.org/global/lang-en/index.htm) conventions as ratified by Canada.
- D11.2 The City of Winnipeg is committed and requires its Contractors and their Subcontractors, to be committed to upholding and promoting international human and labour rights, including fundamental principles and rights at work covered by ILO eight (8) fundamental conventions and the United Nations Universal Declaration of Human Rights which includes child and forced labour.
- D11.3 Upon request from the Contract Administrator, the Contractor shall provide disclosure of the sources (by company and country) of the raw materials used in the Work and a description of the manufacturing environment or processes (labour unions, minimum wages, safety, etc.).
- D11.4 Failure to provide the evidence required under D11.3, may be determined to be an event of default in accordance with C18.
- D11.5 In the event that the City, in its sole discretion, determines the Contractor to have violated the requirements of this section, it will be considered a fundamental breach of the Contract and the Contractor shall pay to the City a sum specified by the Contract Administrator in writing (“Unfair Labour Practice Penalty”). Such a violation shall also be considered an Event of Default, and shall entitle the City to pursue all other remedies it is entitled to in connection with same pursuant to the Contract.
- D11.5.1 The Unfair Labour Practice Penalty shall be such a sum as determined appropriate by the City, having due regard to the gravity of the Contractor’s violation of the above requirements, any cost of obtaining replacement goods/ services or rectification of the breach, and the impact upon the City’s reputation in the eyes of the public as a result of same.
- D11.5.2 The Contractor shall pay the Unfair Labour Practice Penalty to the City within thirty (30) Calendar Days of receiving a demand for same in accordance with D11.5. The City may also hold back the amount of the Unfair Labour Practice Penalty from payment for any amount it owes the Contractor.
- D11.5.3 The obligations and rights conveyed by this clause survive the expiry or termination of this Contract, and may be exercised by the City following the performance of the Work, should the City determine, that a violation by the Contractor of the above clauses has occurred following same. In no instance shall the Unfair Labour Practice Penalty exceed the total of twice the Contract value.

## **D12. FURNISHING OF DOCUMENTS**

- D12.1 Upon award of the Contract, the Contractor will be provided with 'issued for construction' Contract Documents electronically, including Drawings in PDF format only.

## **SUBMISSIONS**

### **D13. AUTHORITY TO CARRY ON BUSINESS**

- D13.1 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.

### **D14. SAFE WORK PLAN**

- D14.1 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 Documents, if applicable.
- D14.2 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, Purchasing Division website at <http://www.winnipeg.ca/matmgt/Safety/default.stm>
- D14.3 Notwithstanding B13.4 at any time during the term of the Contract, the City may, at their 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.

### **D15. INSURANCE**

- D15.1 The City shall provide and maintain the following owner controlled insurance coverage to remain in place at all times during the performance of the Work:
- (a) wrap up liability insurance, in the amount of at least ten million dollars (\$10,000,000.00) inclusive. The insured parties shall include the City, Contractor and all subcontractor whether named or unnamed in the policy and all others having an insurable interest in the Work. Manitoba, its ministers, officers, employees and agents to be listed as additional insureds. Wrap up liability insurance to include but not limited to:
    - (i) products and completed operations
    - (ii) blanket contractual liability
    - (iii) unlicensed motor vehicle liability,
    - (iv) sudden and accidental pollution liability with a minimum sublimit of \$1,000,000
    - (v) City and Contractors protective coverage
    - (vi) blasting, tunneling or the removal or weakening of support of any land, whether such support be natural or otherwise,
    - (vii) no XCU exclusion,
    - (viii) cross liability clauses
    - (ix) non-owned automobile liability
  - (b) Wrap up liability insurance shall be maintained from the date of the commencement of the Work until the date of Total Performance of the Work and shall include an additional twenty-four months completed operations coverage that will take affect after Total Performance. .

- (c) The City reserves the right to add, delete, revise and redefine insurance requirements and deductibles at any time, at its sole discretion, or as necessitated by the placement, extensions/renewals of the insurance policy, during the term of the Project.
- D15.2 Deductibles under the policy not to exceed \$50,000 maximum of any one loss and shall be borne by the Contractor;
- D15.3 The Contractor shall provide and maintain the following insurance coverage at all times during the performance of the Work and throughout the warranty period:
- (a) commercial general liability insurance, in the minimum amount of five million dollars (\$5,000,000) inclusive per occurrence and five million dollars (\$5,000,000) general aggregate. The said insurance shall include coverage for products and completed operations, blanket contractual, Contractors protective, sudden and accidental pollution, non-owned automobile, unlicensed motor vehicle liability, a cross liability clause and shall not contain any XCU exclusions or limitations and will add the City, Manitoba cts ministers, officers, employees and agents to be added as additional insureds.
  - (b) 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 \$5,000,000 inclusive for loss or damage including personal injuries and death resulting from any one accident.
  - (c) an all-risks Installation Floater carrying adequate limits to cover all supplies and/or materials intended to enter into and form part of any installation.
  - (d) All risks property insurance for all equipment, machinery, portable offices, portable toilets including any tunnelling and trenchless sewer installation equipment, and tools used on the Project that may be owned, rented, leased or borrowed.
- D15.4 Deductibles shall be borne by the Contractor.
- D15.5 All policies shall be taken out with insurers licensed in the Province of Manitoba.
- D15.6 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 Documents, as applicable.
- D15.7 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.
- D15.8 The Contractor will be required to cooperate with the City and provide their project experience and project claims history and any other information necessary to obtain the owner-controlled project insurance as outlined in D14.1 (a) and (b) within five (5) business days after request.
- D16. CONTRACT SECURITY**
- D16.1 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.
- D16.1.1 Where the contract security is a performance bond, it may be submitted in hard copy or digital format. If submitted in digital format the contract security must meet the following criteria:

- (a) the version submitted by the Contractor must have valid digital signatures and seals;
- (b) the version submitted by the Contractor must be verifiable by the City with respect to the totality and wholeness of the bond form, including: the content; all digital signatures and digital seals; with the surety company, or an approved verification service provider of the surety company.
- (c) the version submitted must be viewable, printable and storable in standard electronic file formats compatible with the City, and in a single file. Allowable formats include pdf.
- (d) the verification may be conducted by the City immediately or at any time during the life of the bond and at the discretion of the City with no requirement for passwords or fees.
- (e) the results of the verification must provide a clear, immediate and printable indication of pass or fail regarding D16.1(b).

D16.1.2 Digital bonds failing the verification process will not be considered to be valid and may be determined to be an event of default in accordance with C18.1. If a digital bond fails the verification process, the Contractor may provide a replacement bond (in hard copy or digital format) within seven (7) Calendar Days of the City's request or within such greater period of time as the City in their discretion, exercised reasonably, allows.

D16.1.3 Digital bonds passing the verification process will be treated as original and authentic.

D16.2 The Contractor shall provide the Contract Administrator identified in D8 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 an award letter 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 Documents, if applicable.

D16.3 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 D16.1(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.

## **D17. SUBCONTRACTOR LIST**

D17.1 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 the General Conditions for the return of the executed Contract Documents, if applicable.

## **D18. DETAILED WORK SCHEDULE**

D18.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least ten (10) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the General Conditions for the return of the executed Contract.

D18.2 The detailed work schedule shall consist of the following:

- (a) A critical path method (CPM) schedule for the work; and
  - (b) A Gantt chart for the Work based on the CPM schedule;
- as acceptable by the Contract Administrator.

D18.3 Further to D18.2(a), the CPM schedule shall clearly identify start and completion dates of the following Work items:

- (a) Commencement date



- (b) Mobilization
- (c) Utility locates
- (d) Shafts by location
  - (i) Excavation and support
  - (ii) Working slab
  - (iii) Tunnelling equipment setup
  - (iv) Entry/exit seal installation
- (e) Intermediate manhole(s)
- (f) Sewer Construction
  - (i) Tunnelling
  - (ii) Stub Out
- (g) Liner Welding
- (h) Additional Critical Dates
- (i) Substantial Performance
- (j) Site Restoration
- (k) Total Performance

D18.4 Timelines and staging for traffic management identified in E15 as required to complete the Work should be included in the schedule.

D18.5 The Contractor shall update the schedule and provide it to the Contract Administrator prior to each weekly construction site meeting for review and discussion at the meetings.

#### **D19. DEWATERING AND DRAINAGE PLAN**

D19.1 In addition to C6 and in co-ordination with B1.1(a), the Contractor is solely responsible for planning, implementing, maintaining and monitoring an effective dewatering and drainage system for the Site during performance of the Work.

D19.2 The Contractor is responsible for the control, diversion, storage and pumping of all water including without limitation groundwater, seepage, surface water, melt water, rainwater, and water in pipes throughout all stages of the Work.

D19.3 The Contractor shall submit a Dewatering and Drainage Plan to the Contract Administrator at least five (5) Calendar Days prior to commencement of Work at the Site. The Contractor must obtain approval of the Dewatering and Drainage Plan prior to implementation. If changes are made to the Dewatering and Drainage Plan during construction, the Contractor shall submit these changes to the Contract Administrator for approval in advance of implementation of the changes. The Dewatering and Drainage Plan submittal shall include the following at a minimum:

- (a) a sketch or sketches of the Site clearly showing the drainage scheme and flow paths including temporary features such as ditches/swales or piping, pump locations, storage elements and connections or outlets to the existing land drainage system;
- (b) information for all pipe used including material, diameter, length, fittings, connections, restraints, blocking, protection features;
- (c) dimensions for all swales and ditches to be used;
- (d) description of all erosion protection measures and material used;
- (e) monitoring and maintenance plan including Contractor's designated contact person responsible for dewatering and drainage, inspection intervals and means for supervising and monitoring pumping activity;
- (f) pump sizes and power source (as required), and noise attenuation features (to be mitigated to 55 dBa from 7 am – 7 pm);

- (g) refueling procedures for any fuel-powered equipment, including transfer area containment and fuel storage procedures; and
  - (h) any other related information reasonably requested by the Contract Administrator.
- D19.4 Do not pump or drain any water containing excessive suspended materials or harmful substances into waterways, sewers or other drainage systems. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with governing authority's limitations and requirements.
- D19.5 The Contractor shall be responsible for all damages within or outside the Site directly resultant from Contractor's actions, omissions or neglect which may be caused by or which may result from water backing up, flowing through, overflowing or excessive surcharge of drainage systems.
- D19.6 The Contractor shall organize and bear all costs related to the effective dewatering of excavations and all other pumping and drainage necessary for the proper execution of the Work, including keeping the pipes, structures, shafts, excavations and trenches free of undesirable accumulations of groundwater, seepage, surface water, melt water, and rainwater.
- D19.7 All dewatering equipment and discharge hoses shall be protected from freezing and shall remain fully operational in freezing weather.
- D19.8 The Contractor is responsible for dewatering and disposing of all water drained or pumped as above in compliance with all local, Municipal, Provincial and Federal environmental regulations, ordinances, bylaws, etc., as reviewed and accepted by the Contract Administrator. Provide documentation, in advance of discharging, indicating that authority has been granted to take and/or discharge effluent water into any drainage ditch or other area. Contractor shall develop and implement at their own cost any filtration, settlement or other acceptable treatment methods required prior to disposal.**
- D19.9 Further to D19.8, the Contractor is responsible for water sampling and testing prior to discharging to determine what, if any, treatment is required prior to disposal and to ensure all local, Municipal, Provincial and Federal environmental regulations and by-laws are adhered to. A record of water quality must be provided to the Contract Administrator prior to disposal.**
- D19.10 Keep all drainage channels, gutters, swales, ditches, sewers, culverts and disposal areas free of silt, sand, debris and gravel and remove such deposits as required and/or as directed by the Contract Administrator.
- D19.11 All Work associated with the Dewatering and Drainage plan (with the exception of water sampling) will be considered incidental to Site Development and Restoration.**
- D19.12 Costs associated with water sampling, testing, and permitting prior to discharging as required shall be paid for under the Contract Unit Price for "Allowance for Material Sampling and Testing". Costs will be based on actual invoiced costs to complete the Work with allowable Contractor mark-ups in accordance with the General Conditions.**
- D20. SITE DEVELOPMENT PLAN**
- D20.1 The Contractor shall provide the Contract Administrator with a Site Development Plan at least ten (10) Business Days prior to the commencement of any Work on the Site.
- D20.2 The Site Development Plan shall at minimum include:
- (a) Laydown areas at launch and receiving shaft locations showing location of all required elements to complete the tunnel including shaft dimensions, crane, pipe storage, spoil or separation plant (based on selected Tunnelling method), generator, site trailers, proposed fencing, gates.
  - (b) Temporary vehicle access/egress locations

- (c) Planned easement areas (as shown on the Drawings)

## **SCHEDULE OF WORK**

### **D21. EXPEDITED SHOP DRAWINGS AND UTILITY LOCATES**

- D21.1 Further to E4, in order to expedite Shop Drawings with critical timeliness, the lowest responsive Bidder, as outlined in B15, will be permitted, after receiving written approval from the Contract Administrator, to arrange for the preparation of Shop Drawings for the following items with critical timelines:
- (a) Shaft Shoring
  - (b) Jacking Pipe with HDPE liner information
- D21.2 In order to expedite utility locates, the lowest responsive Bidder, as outlined in B15, will be permitted, after receiving written approval from the Contract Administrator, to arrange for utility locates for the Site.
- D21.3 If Award is made to the lowest responsive Bidder, then as indicated in E4, no payment for the preparation of Shop Drawings will be made.
- D21.4 If Award is made to the lowest responsive Bidder, no payment for the booking of utility locates will be made.
- D21.5 If no Contract is awarded, then the City of Winnipeg will pay the lowest responsive Bidder up to a maximum of five hundred dollars (\$500.00) for each of the requested items identified in D21.1 for the preparation and delivery of Shop Drawings and a single payment for the booking of utility locates as per D21.2. Delivery of the Shop Drawings to the City, booking of Utility Locates, and payment of the above mentioned amounts will constitute full and final consideration of each party to the other, and neither party will have any further liability to the other with respect to this Tender.

### **D22. COMMENCEMENT**

- D22.1 The Contractor shall not commence any Work until they are in receipt of an award letter from the Award Authority authorizing the commencement of the Work.
- D22.2 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 D13;
    - (ii) evidence of the workers compensation coverage specified in C6.15;
    - (iii) the Safe Work Plan specified in D14;
    - (iv) evidence of the insurance specified in D15;
    - (v) the contract security specified in D16;
    - (vi) the Subcontractor list specified in D17;
    - (vii) the Detailed Work Schedule specified in D18;
    - (viii) the Dewatering and Drainage Plan specified in D19;
    - (ix) the Site Development Plan specified in D20; and
    - (x) the direct deposit application form specified in D41.
  - (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.
- D22.3 The Contractor shall commence the Work on the Site no later than the date of Substantial Performance as indicated in D26 less the number of Working Days bid as Initial Span for Site Occupancy and indicated on Form B: Prices. For purposes of establishing this date, Charged Days will be applied assuming seven (7) Charged Days per calendar week, and not including

Statutory Holidays. If the Contractor has not commenced work by this date, Charged Days will be assessed for each day following this date, at the rate of five (5) Charged Days per calendar week, not including Statutory Holidays.

D22.4 The City intends to award this Contract by July 15, 2024.

D22.4.1 If the actual date of award is later than the intended date, the dates specified for Critical Stages, Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

### **D23. WORKING DAYS**

D23.1 Notwithstanding C1.1(tt), a Working Day includes a Saturday, Sunday, or a statutory or civic holiday when the Contractor chooses to undertake work requiring the presence of the Contract Administrator and/or City resources.

D23.2 Notwithstanding C1.1(tt), a Working Day on Saturdays, Sundays and statutory holidays will be from 09:00 to 19:00. If a Contractor wished to commence work earlier than 09:00 on Saturdays, Sundays and statutory holidays a noise by-law exemption to the neighbourhood livability by-law must be applied for, approved, and an in place.

**D23.3 For the purposes of bidding this Project, a Working Day is considered a 12 hour day. If a Contractor elects to Work 24 Hours during Microtunnelling operations as per D24, the Contractor shall assume two (2) Working Days to be used.**

D23.4 Further to C1.1(tt), 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.

D23.5 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.

D23.6 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.

D23.7 The Contract Administrator will identify the Working Days charged during the regular site meetings.

### **D24. HOURS OF WORK**

D24.1 Contractor is permitted to conduct 24 hour operations when Microtunnelling.

- (a) Hours of work listed in Clause C1.1(tt) are amended by this clause when working on the specified Work activities.
- (b) Work occurring during the prohibited times listed in Clause 69(1) of City Neighbourhood Livability By-Law 1/2008 will be exempt during 24 hour operation on the condition that the Contractor has adhered to the Noise Management requirement listed in D19 and E21.

### **D25. CRITICAL STAGES**

D25.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

- (a) **Critical Stage 1:** To accommodate the future lift station Works, construction of the stub pipe from MH-03 to Property Line (complete with bulkhead and temporary plug), as identified on the Drawings, must be completed by December 20, 2024.

- (i) This will permit the Lift Station Contractor to connect to the stub under their contract.
- (b) **Critical Stage 2:** To accommodate the future force main installation, all works around MH-04 within Critical Stage Area 2, as identified on the Drawings, must be completed by June 15, 2025.
  - (i) This will permit the Force Main Contractor to install the pipe that falls within the area associated with Critical Stage 2.
- (c) **Critical Stage 3:** To accommodate the future lift station final site regrading and drainage works, all Work within the Critical Stage 3 Area, as identified on the Drawings and in Appendix C – Future Lift Station Site Grading Figure (Draft), must be completed by September 2, 2025.
  - (i) This will permit the Lift Station Contractor to complete their final surface works.
  - (ii) To achieve Critical Stage 3, the Interceptor Contractor must:
    - Remove all placed materials with the exception of the manhole, shoring and installed piping;
    - Cut down the shoring in accordance with the Drawings and Specifications;
    - Restore ditching (if impacted);
    - Remove access to site/laydown area;
    - Restore existing grades to the final design surface elevations shown in Appendix C – Future Lift Station Site Grading Figure (Draft).
      - The Lift Station Contractor will be responsible for final surface regrading within the Critical Stage 3 Area. Therefore, if the existing berm is cut down by the interceptor sewer Contractor as part of their site development, the interceptor sewer Contractor will not be required to return this area to elevations above the design surface elevations for the future lift station site. The interceptor sewer Contractor will be required to restore the Site within the Critical Stage 3 Area to the approximate final design surface elevations shown in Appendix C – Future Lift Station Site Grading Figure (Draft).
  - (iii) The interceptor sewer Contractor will not be responsible for revegetation of the area within Critical Stage 3 (restoration of this area will be completed by the Contractor for the lift station contract). Restoration of any lands disturbed by construction activities outside of the specific area noted on the Drawings for Critical Stage 3, will be the responsibility of the interceptor sewer Contractor.

## **D26. SUBSTANTIAL PERFORMANCE**

- D26.1 The Contractor shall achieve Substantial Performance by October 15, 2025.
- D26.2 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.
- D26.3 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.

## D27. TOTAL PERFORMANCE

- D27.1 The Contractor shall achieve Total Performance by October 31, 2025.
- D27.2 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.
- D27.3 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.

## D28. SITE OCCUPANCY

### DEFINITIONS

- D28.1 Wherever the following terms are used, the intent and meaning will be interpreted as follows:
- (a) Charged Days: Means the unit of measurement for time of Site Occupancy. For the purpose of assessing Charged Days, a Charged Day will be equivalent to a Working Day as defined in C1.1 (tt) and amended in D23.
  - (b) Initial Span: Means the number of Charged Days bid by the Contractor for Site Occupancy on Form B: Prices.
  - (c) Final Span: Means the number of Charged Days assessed for Site Occupancy as calculated pursuant to D28.2.

### MEASUREMENT

- D28.2 Time shall be of the essence of the Contract. The Contractor shall provide the necessary material, labour and equipment to ensure that the Works will be completed within the consecutive amount of Working Days bid for Initial Span for Site Occupancy, and in no case later than the date specified for **Substantial Performance** for all Work excluding permanent restoration. Failure to complete the Work within the Bid number of Charged Days will result in the deduction of Site Occupancy costs, as further defined herein. The total amount of Charged Days will be measured in whole numbers.
- D28.3 Charged Days will be assessed for every day except for the following:
- (a) Days prior to the Contractor starting Work on a stage of the Contract. The Contractor shall provide a minimum of fourteen (14) Calendar Days' notice to the City for Commencement of the Work. Failure of the Contractor to Commence Work as indicated, in the opinion of the Contract Administrator, may result in the assessment of Charged Days equivalent to the estimated costs incurred to the City;
  - (b) Days not worked due to Force Majeure.
- D28.4 Further to D28.3, following commencement of Work, the Contractor will be permitted one (1) suspension of on-site construction to facilitate coordination of Subcontractors, materials deliveries, construction sequencing, or seasonal weather; Charged Days will not be charged during this period. During this period, the Site must be made secure, roadways completely operational, and all existing facilities and work in progress to be protected from weather or other potentially harmful effects. Changes to Contract Critical Stages or completion dates resulting from suspension of Charged Days, will not be considered.

### FINAL SPAN

D28.5 Extensions to the Initial Span will determine the Final Span and will be calculated as follows:

- (a) Final Span =  $(F \div A) \times I$
- (b) Where: Final Span = adjusted number of Charged Days allowed (a fraction of a day will be rounded up to a full day);
  - (i) F = Final Contract Amount (excluding Site Occupancy)
  - (ii) I = Initial Span of the Contract
  - (iii) A = Total Bid Price (excluding Site Occupancy and less Provisional Items bid amount)

#### SITE OCCUPANCY PAYMENT

D28.6 Payment for Site Occupancy for the Contract will be made as follows:

- (a) If the number of Charged Days equals the Final Span, no payment or deduction will be made.
- (b) If the number of Charged Days is less than the Final Span, a payment equal to the Contract Unit Price per Charged Day multiplied by the difference between the Final Span and the actual number of Charged Days, to a maximum amount of two percent (2%) of the Total Bid Price, will be made to the Contractor.
- (c) If the number of Charged Days exceeds the Final Span, a deduction equal to the Contract Unit Price per Charged Day multiplied by the difference between the actual number of Charged Days and the Final Span will be made from the payment to the Contractor.
- (d) Items identified in E11 as Provisional are not included in the initial span calculation.

#### D29. LIQUIDATED DAMAGES

D29.1 If the Contractor fails to achieve Critical Stages 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 1 – Two thousand five hundred dollars (\$2,500.00);
- (b) Critical Stage 2 – Two thousand five hundred dollars (\$2,500.00);
- (c) Critical Stage 3 – Two thousand five hundred dollars (\$2,500.00);
- (d) Total Performance – One thousand five hundred dollars (\$1,500.00).

D29.2 The amounts specified for liquidated damages in D29.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve, Critical Stages or Total Performance by the days fixed herein for same.

D29.3 Any liquidated damages associated with Critical Stages and Total Performance shall be evaluated independently from Site Occupancy Charged Days.

D29.4 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D29.5 Liquidated Damages will be assessed for every Working Day except for the following:

- (a) Days between Substantial Performance and the date the City authorizes that permanent pavement works may commence, should the date of Substantial Performance be achieved at a time when permanent pavement works has been suspended as a result of inclement seasonal weather.

#### D30. SUPPLY CHAIN DISRUPTION SCHEDULE DELAYS

D30.1 The City acknowledges that the schedule for this Contract may be impacted by the Supply Chain Disruption. Commencement and progress of the Work shall be performed by the

Contractor with due consideration to the delivery requirements and schedule identified in the Contract in close consultation with the Contract Administrator.

- D30.2 If the Contractor is delayed in the performance of the Work by reason of the Supply Chain Disruption, the Work schedule may be adjusted by a period of time equal to the time lost due to such delay and costs related to such delay will be determined as identified herein.
- D30.3 A minimum of seven (7) Calendar Days prior to the commencement of Work, the Contractor shall declare whether a Supply Chain Disruption will affect the start date. The Contractor shall provide sufficient evidence that the delay is directly related to a Supply Chain Disruption, including but not limited to ordering of Material or Goods, production and/or manufacturing schedules or availability of staff as appropriate.
- D30.4 For any delay related to Supply Chain Disruption and identified after Work has commenced, the Contractor shall within seven (7) Calendar Days of becoming aware of the anticipated delay declare the additional delay and shall provide sufficient evidence as indicated in D30.3. Failure to provide this notice will result in no additional time delays being considered by the City.
- D30.5 The Work schedule, including the durations identified in D25 to D27 where applicable, will be adjusted to reflect delays accepted by the Contract Administrator. No additional payment will be made for adjustment of schedules except where seasonal work, not previously identified in the Contract, is carried over to the following construction season.
- D30.6 Where Work not previously identified is being carried over solely as a result of delays related to Supply Chain Disruption, as confirmed by the Contract Administrator, the cost of temporary works to maintain the Work in a safe manner until Work recommences, will be considered by the Contract Administrator. Where the Work is carried over only partially due to Supply Chain Disruption, a partial consideration of the cost of temporary works will be considered by the Contract Administrator.
- D30.7 Any time or cost implications as a result of Supply Chain Disruption and in accordance with the above, as confirmed by the Contract Administrator, shall be documented in accordance with C7.

### **D31. SCHEDULED MAINTENANCE**

- D31.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:
- (a) Seeding and/or Sodding as specified in CW3510 and Specifications included herein;
  - (b) Watering and maintenance of new vegetation until established;
- D31.2 Determination of Substantial Performance and Total Performance shall be exclusive of scheduled maintenance identified herein. All scheduled maintenance shall be completed prior to the expiration of the warranty period. Where the scheduled maintenance cannot be completed during the warranty period, the warranty period shall be extended for such period of time as it takes the Contractor to complete the scheduled maintenance.

## **CONTROL OF WORK**

### **D32. JOB MEETINGS**

- D32.1 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.



D32.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever they deem it necessary.

### **D33. COORDINATION OF WORK WITH OTHERS**

D33.1 As shown in Appendix D – Contract Site Extents Figure, work by others on or near the Site will include but not necessarily be limited to the CentrePort South Phase 1A Regional Water and Wastewater contracts:

- (a) Contract 4A (Feeder Main – Tender 220-2024) – Contractor TBD.
  - (i) Coordination is required with the feeder main Contractor for connection of the future 150mm PVC force main to MH-04. This Work has been included as a Provisional Item in this Contract as well as within the feeder main contract. Coordination between the two contracts and the Contract Administrators will be required to determine which contractor completes this piece of work. Reference Drawings and E32.
- (b) Contract 1A (Lift Station – Tender 301-2024) – Contractor TBD.
  - (i) Work on the lift station contract is anticipated to be taking place concurrently with this Contract. Specific areas have been designated for each contract to avoid conflicts and ensure that there is a single contractor designated to any location at any time. See Appendix D – Contract Site Extents Figure.
  - (ii) Critical Stages are included in this Contract to facilitate the requirements of the lift station contract schedule (See D25).
- (c) Contract 2A (Force Main – Tender TBD) – Contractor TBD.
  - (i) Work on the force main contract is anticipated to be taking place concurrently with this Contract at two locations: East of the future access to the lift station (near MH-03), and at the intersection of Sturgeon Road and Sturgeon Access (near MH-04). Specific areas have been designated for each contract to avoid conflicts and ensure that there is a single Contractor designated to any location at any time. See Appendix D – Contract Site Extents Figure.
  - (ii) Critical Stages are included in this Contract to facilitate the requirements of the force main contract schedule (See D25).
  - (iii) Areas designated for these other contracts are not available for the interceptor sewer Contractor Works unless specified herein.

### **D34. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)**

D34.1 Further to C6.26, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

### **D35. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS**

D35.1 Further to B13.4, 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 their sole discretion and acting reasonably, require updated proof of compliance, as set out in B13.4.

### **D36. TRAFFIC CONTROL**

D36.1 Further to clause 3.7 of CW 1130:

- (a) The Contractor shall make arrangements with City of Winnipeg Traffic Services to place temporary regulatory signs. The Contractor shall bear all costs associated with the placement of temporary traffic control devices required to complete the Work.
- (b) The Contractor shall not interfere with traffic signals. Any modification of traffic signals shall be done by City of Winnipeg Traffic Signals.

- (i) Advance notice is required to facilitate traffic signal modifications.
- (c) The Contractor shall make arrangements with Winnipeg Transit for Work that impacts Transit routes or stops.
- (d) The City of Winnipeg Manual of Temporary Traffic Control on City Streets is available online at:
  - (i) <http://winnipeg.ca/publicworks/trafficControl/manualTempTrafficControl.stm>

D36.2 Additional traffic management requirements are outlined in **E15**.

### **D37. WORK UNDERNEATH AND IN THE VICINITY OF HYDRO POWER INFRASTRUCTURE**

D37.1 The Contractor is responsible for notifying Manitoba Hydro in advance of Work in the vicinity and underneath Hydro infrastructure (e.g. overhead transmission lines). The Contractor shall follow all Manitoba Hydro requirements for safe working distances and clearances from Hydro infrastructure including but not limited to overhead electrical lines.

D37.2 Manitoba Hydro requires a minimum vertical clearance from their overhead electrical lines as follows:

- (a) Minimum 10 feet from overhead distribution lines;
- (b) Minimum 15 feet from overhead transmission lines; and
- (c) Minimum 20 feet from high voltage transmission lines.

### **D38. WORK IN PROXIMITY TO LARGE NATURAL GAS MAINS**

D38.1 The Contractor should be familiar with and comply with the requirements of the latest revision of Manitoba Hydro's "Safe Excavation & Safety Watch Guidelines". This document is available at: [http://www.hydro.mb.ca/customer\\_services/permits\\_and\\_inspections/excavation\\_guidelines.pdf](http://www.hydro.mb.ca/customer_services/permits_and_inspections/excavation_guidelines.pdf)

D38.2 Work precautions and procedures required for working near gas mains will be incidental to the Contract.

### **D39. CONFINED SPACE ENTRY**

D39.1 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 Entry Work, and in particular the requirements for conducting hazard/risk assessment and providing personal protective equipment (PPE).

D39.2 The Contractor shall assist and provide Supplied Air Breathing Apparatus conforming to the requirements of the Act, Regulations and Guidelines for the use of the Contract Administrator where confined entry is required to allow for inspection of the Work.

### **D40. GEOTECHNICAL BASELINE REPORT (GBR) AND GEOTECHNICAL DATA REPORT (GDR)**

D40.1 The Geotechnical Data Report and Geotechnical Base Line Report are provided in Appendix A and Appendix B, respectively.

D40.2 The primary purpose of the GBR is to establish a contractual understanding of the geotechnical conditions anticipated to be encountered during construction of the project. The GBR sets baselines for geotechnical conditions and material behavior anticipated to be encountered during construction in order to provide a basis for bidding and assist in resolution of disputes that may arise over subsurface conditions. Secondly, the GBR:

- (a) Presents the geotechnical conditions that formed the basis of design.
- (b) Identifies important considerations, key project constraints, and select requirements that must be addressed by the Contractor during bid preparation and construction.

- (c) Provides information to assist the Contractor in evaluating requirements for excavating and supporting the ground.
  - (d) Provides guidance to the Contract Administrator in administering the contract and monitoring Contractor performance.
- D40.3 The GBR provides the basis for identifying geotechnical and geologic conditions that qualify as a “substantial difference in the nature of the surface or subsurface conditions”, as defined in D43. The geotechnical baseline conditions (baseline) contained within the GBR are not necessarily geotechnical fact. The baseline was developed using judgment to interpolate between borings and extrapolate beyond the boring logs and laboratory test data. The judgment applied in the interpolations and extrapolations reflects the view of the author of the report in describing the baseline. Bidders should use the baseline subsurface conditions and the surface conditions which can be observed during a site visit as the basis for bids. It should be noted that the project design was based on assumed construction methods and levels of workmanship. The behavior of the geologic materials present in the surface and subsurface excavations will be influenced by the Contractor’s selected equipment, means, and methods.
- D40.4 The GDR provides a summary of results for the geotechnical and geophysical explorations, field testing, and laboratory testing undertaken within the CentrePort project area and along the pipe alignment.
- D40.5 Bidders should have a geotechnical engineer and/or engineering geologist review and explain the information presented in the GBR and GDR to assure a complete understanding of the reported information as a basis for submitting a Bid. Additional documents used to develop the GBR are listed in the References section of the GBR.
- (a) The GBR was developed in part from the GDR. The technical data contained within the GDR upon which Contractor may rely are: the boring method, the locations and logs of the borings, the levels of subsurface water (if any), laboratory test methods and results, geophysical survey data, and similar factual data. The Contractor is not entitled to rely upon other technical data.
  - (b) Bore hole information represents subsurface characteristics to the extent indicated, only for the point location of the bore hole and, with regard to the level of subsurface water (if any), only at the time the boring was made and when subsurface water level readings were collected.
- D40.6 Geophysical seismic refraction surveys were conducted to estimate the depth to bedrock along the pipe alignment and the results are based on interpretation of the data. The depths to subsurface boundaries derived from seismic refraction surveys are generally accepted as accurate to within ten percent of the true depths to the boundaries, below 10 meters. Above 10 meters, the accuracy of the seismic refraction data is approximately +/- 1.0 meters. Structural discontinuities in the bedrock occurring on a scale less than the geophone spacing would go undetected in the interpretation of the data.
- D40.7 Risks associated with subsurface conditions consistent with, or less adverse than the baseline conditions are allocated to the Contractor. Those risks associated with subsurface conditions more adverse than the baseline condition are accepted by the City. The provision of a baseline condition in the Contract is not a warranty that the baseline condition will be encountered. The baseline condition is the contractual standard that the City and the Contractor will agree to use when interpreting D43.
- D40.8 The City accepts the risks for subsurface conditions that are more adverse than the stated baseline conditions. The City will negotiate with the Contractor for additional reasonable compensation to the Contractor if these three conditions exist:
- (a) The actual subsurface conditions encountered are more adverse than the baseline conditions.
  - (b) The Contractor can document that the subsurface conditions are more adverse than those described in the baseline and that the conditions materially and significantly increased the cost and/or time required to complete the work.

- (c) The Contractor has made diligent efforts to complete the work described in the Contract Documents, including any changes to methods, equipment, labor, and materials made necessary by the adverse conditions using the most cost effective means.

D40.9 If all of the foregoing conditions are satisfactorily met, additional compensation and schedule will be negotiated, based on the provisions described in D43 and E10.

## MEASUREMENT AND PAYMENT

### D41. PAYMENT

D41.1 Further to C12, the City shall make payments to the Contractor by direct deposit to the Contractor's banking institution, and by no other means. Payments will not be made until the Contractor has made satisfactory direct deposit arrangements with the City. Direct deposit application forms are at [https://winnipeg.ca/finance/files/Direct\\_Deposit\\_Form.pdf](https://winnipeg.ca/finance/files/Direct_Deposit_Form.pdf).

D41.2 Further to D28, no payment will be made for Site Occupancy, other than as set out in D28.6.

### D42. WATER USE

D42.1 The Contractor is responsible for obtaining City permits and paying for any charges associated with temporary water meters and water use.

### D43. CHANGES IN WORK

D43.1 Amend C7.2.1 (a) to include the following additional clauses:

- (a) Contractor shall notify the Contract Administrator promptly in writing of any changes in geotechnical, geologic or material behaviour conditions that the Contractor considers more adverse than the GBR baseline conditions upon discovery and before they are disturbed, in any event no later than five (5) calendar days after discovery.
- (b) No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under the Contract Documents.
- (c) No claim by the Contractor related to shaft construction and/or tunnelling shall be allowed under the Changes of Work provisions unless the Contractor investigates and demonstrates that such alleged conditions are materially different from those conditions identified in the Geotechnical Baseline Report and results in an increase in the Contractor's cost of and/or time required for performance of the Work. The Contractor shall within 30 calendar days after notification to the City that the Contractor believes a material difference exists, provide the documentation, backup, justification, and compensation for the alleged impact to Contractor's cost of and/or time required for performance of the Work. Any and all costs incurred by the Contractor for demonstrating that a material difference exists shall be borne by the Contractor unless the City agrees that the material difference does have a cost and/or time impact. If City agrees that there is a material difference that impacts Contractor's cost and/or time, payment for geologic investigation(s) and testing of the material difference will be paid for by the City. Payment will be made by the City for reasonable and customary prices for geologic investigation(s) and testing. Contractor is encouraged to review geologic investigations and/or testing planned to demonstrate a material difference with the Contract Administrator prior to execution of the same. City will be sole judge of what is reasonable and customary.
- (d) The Contractor expressly agrees to maintain detailed daily labor, material, production, and equipment logs defining hours and costs for all periods of Contractor performance representing claimed differing site conditions. These logs shall fully separate bid Contract Work from claimed differing site condition work, and the Contractor shall provide these documents to the Contract Administrator for review. These daily logs shall constitute documentation of performance and must be signed on a daily basis both by the Contractor and Contract Administrator. Said signatures do not mean acceptance of the claim or value of adjustment of Contract Price and/or Time but will serve to document the Contractor's

use of labor, material, and equipment. If Contract Administrator and City agree that there is a material difference that impacts Contractor's cost and/or time, payment for the material difference in labour, material, production and equipment will be paid for by the City based on reasonable and customary prices, using the methods defined in C7.4. Equipment rates will be established in accordance with the Daily Equipment Rate listed on the Form B and as defined in E10. The failure of the Contractor to maintain said logs or to obtain signatures on the logs shall render the Contract Administrators daily records as definitive.

#### **D44. FUEL PRICE ADJUSTMENT**

- D44.1 The Contract is subject to a fuel price adjustment which will be calculated monthly based on eligible Work completed utilizing the following mathematical formulas;
- (a) where the price of fuel has increased -  $((CFI/BFI)-1.15) \times Q \times FF$ ; and
  - (b) where the price of fuel has decreased -  $((CFI/BFI)-0.85) \times Q \times FF$ ; where
    - (i) BFI = base fuel index
    - (ii) CFI = current fuel index
    - (iii) FF = fuel factor
    - (iv) Q = monetary value of Work applied in the calculation.
- D44.1.1 Eligible Work will be determined in accordance with D44.5.
- D44.1.2 The base fuel index (BFI) will be the retail price of fuel identified on the Submission Deadline based on latest published "Monthly average retail prices for gasoline and fuel by geography" for Winnipeg, published by [Statistics Canada, Table 18-10-0001-01](#). The BFI is a blended rate based on 15% regular unleaded gasoline at self-service filling stations and 85% diesel fuel at self-service filling stations.
- D44.1.3 The current fuel index (CFI) based on the above blended rate will be determined for each monthly progress estimate and applied on the following progress estimate as a change order once rates are published by Statistics Canada.
- D44.1.4 A Fuel Factor (FF) rate of the monetary value of all eligible Work completed that month based on the Contract unit prices will be used to calculate the assumed apportioned cost of fuel.
- D44.2 Fuel cost adjustments may result in additional payment to the Contractor or credit to the City within the Contract by way of a monthly change order.
- D44.3 The fuel escalation or de-escalation adjustment will not be applied if the CFI is within  $\pm 15\%$  of the BFI.
- D44.4 Fuel escalation adjustments will not be considered beyond the Substantial Performance/Critical Stages except where those dates/Working Days are adjusted by change order. Fuel de-escalation adjustments will apply for Work that extends beyond the dates/Working Days specified for Substantial Performance/Critical Stages.
- D44.5 The Fuel Factor (FF) rates will be set as follows:
- (a) The Fuel Factor rate shall be set at 1.2% of the monetary value of all Work based on unit prices except for the portions of the Contract identified below;

#### **WARRANTY**

##### **D45. WARRANTY**

- D45.1 Notwithstanding C13.2, 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.

D45.1.1 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.

D45.1.2 For the purpose of contract security, the warranty period shall be one (1) year.

## **DISPUTE RESOLUTION**

### **D46. DISPUTE RESOLUTION**

D46.1 If the Contractor disagrees with any opinion, determination, or decision of the Contract Administrator, the Contractor shall act in accordance with the Contract Administrator's opinion, determination, or decision unless and until same is modified by the process followed by the parties pursuant to D46.

D46.2 The entire text of C21.4 is deleted, and amended to read: "Intentionally Deleted"

D46.3 The entire text of C21.5 is deleted, and amended to read:

- (a) If Legal Services has determined that the Disputed Matter may proceed in the Appeal Process, the Contractor must, within ten (10) Business Days of the date of the Legal Services Response Letter, submit their written Appeal Form, in the manner and format set out on the City's Purchasing Website, to the Chief Administrative Officer, and to the Contract Administrator. The Contractor may not raise any other disputes other than the Disputed Matter in their Appeal Form.

D46.4 Further to C21, prior to the Contract Administrator's issuance of a Final Determination, the following informal dispute resolution process shall be followed where the Contractor disagrees with any opinion, determination, or decision of the Contract Administrator ("Dispute"):

- (a) In the event of a Dispute, attempts shall be made by the Contract Administrator and the Contractor's equivalent representative to resolve Disputes within the normal course of project dealings between the Contract Administrator and the Contractor's equivalent representative.
- (b) Disputes which in the reasonable opinion of the Contract Administrator or the Contractor's equivalent representative cannot be resolved within the normal course of project dealings as described above shall be referred to a without prejudice escalating negotiation process consisting of, at a minimum, the position levels as shown below and the equivalent Contractor representative levels:
  - (i) The Contract Administrator;
  - (ii) Supervisory level between the Contract Administrator and applicable Department Head;
  - (iii) Department Head.

D46.4.1 Names and positions of Contractor representatives equivalent to the above City position levels shall be determined by the Contractor and communicated to the City at the pre-commencement or kick off meeting.

D46.4.2 As these negotiations are not an adjudicative hearing, neither party may have legal counsel present during the negotiations.

D46.4.3 Both the City and the Contractor agree to make all reasonable efforts to conduct the above escalating negotiation process within twenty (20) Business Days, unless both parties agree, in writing, to extend that period of time.

D46.4.1 If the Dispute is not resolved to the City and Contractor's mutual satisfaction after discussions have occurred at the final escalated level as described above, or the time period set out in D46.4.3, as extended if applicable, has elapsed, the Contract

Administrator will issue a Final Determination as defined in C1.1(v), at which point the parties will be governed by the Dispute Resolution process set out in C21.

## INDEMNITY

### D47. INDEMNITY

D47.1 Indemnity shall be as stated in C17.

D47.2 Notwithstanding C17.1, the Contractor shall save harmless and indemnify the City in the amount of twice the Contract Price or five million dollars (\$5,000,000), whichever is greater, against all costs, damages or expenses arising from actions, claims, demands and proceedings, by whomsoever brought, made or taken as a result of negligent acts or negligent omissions of the Contractor, their Subcontractors, employees or agents in the performance or purported performance of the Work, and more particularly from:

- (a) accidental injury to or death of any person whether retained by or in the employ of the contractor or not, arising directly or indirectly by reason of the performance of the Work, or by reason of any trespass on or damage to property;
- (b) damage to any property owned in whole or in part by the City, or which the City by duty or custom is obliged, directly or indirectly, in any way or to any degree, to construct, repair or maintain;
- (c) damage to, or trespass or encroachment upon, property owned by persons other than the City;
- (d) any claim for lien or trust claim served upon the City pursuant to The Builders' Liens Act;
- (e) failure to pay a Workers Compensation assessment, or Federal or Provincial taxes;
- (f) unauthorized use of any design, device, material or process covered by letters patent, copyright, trademark or trade name in connection with the Work;
- (g) inaccuracies in any information provided to the City by the Contractor.

D47.3 Further to C17, The City shall save harmless and indemnify the Contractor in the amount of twice the Contract Price or five million dollars (\$5,000,000), whichever is greater, against all costs, damages or expenses arising from actions, claims, demands and proceedings, by whomsoever brought, made or taken as a result of negligent acts or negligent omissions of the City, their employees or agents in the performance of its obligation under the Contract.

## THIRD PARTY AGREEMENTS

### D48. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

D48.1 Funding for the Work of the Contract is being provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada and accordingly, as required by the applicable funding agreements, the following terms and conditions shall apply.

D48.2 For the purposes of D48:

- (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.

D48.3 Indemnification By Contractor

D48.3.1 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.

- D48.3.2 The Contractor agrees that in no event will Canada or Manitoba, their respective officers, servants, employees or agents be held liable for any damages in contract, tort (including negligence) or otherwise, for:
- (a) any injury to any person, including, but not limited to, death, economic loss or infringement of rights;
  - (b) any damage to or loss or destruction of property of any person; or
  - (c) any obligation of any person, including, but not limited to, any obligation arising from a loan, capital lease or other long term obligation;

in relation to this Contract or the Work.

#### D48.4 Records Retention and Audits

D48.4.1 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.

D48.4.2 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 D48.4.1 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.

#### D48.5 Other Obligations

D48.5.1 The Contractor consents to the City providing a copy of the Contract Documents to the Government of Manitoba and/or the Government of Canada upon request from either entity.

D48.5.2 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.

D48.5.3 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.

D48.5.4 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.



- D48.5.5 The Contractor represents and warrants that no current or former public servant or public office holder, to whom the Value and Ethics Code for the Public Sector, the Policy on Conflict of Interest and Post Employment, or the Conflict of Interest Act applies, shall derive direct benefit from this Contract, including any employment, payments, or gifts, unless the provision or receipt of such benefits is in compliance with such codes and the legislation.
- D48.5.6 The Contractor represents and warrants that no member of the House of Commons or of the Senate of Canada or of the Legislative Assembly of Manitoba is a shareholder, director or officer of the Contractor or of a Subcontractor, and that no such member is entitled to any benefits arising from this Contract or from a contract with the Contractor or a Subcontractor concerning the Work.

**FORM H1: PERFORMANCE BOND**  
(See D15.8)

KNOW EVERYONE 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. 990-2023B

CONSTRUCTION OF ~1,045 M OF 1200 MM INTERCEPTOR SEWER – CENTREPORT SOUTH  
REGIONAL WATER AND WASTEWATER SERVICING PHASE 1A (CONTRACT 3)

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 D15.8)

KNOW EVERYONE 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. 990-2023B

CONSTRUCTION OF ~1,045 M OF 1200 MM INTERCEPTOR SEWER – CENTREPORT SOUTH REGIONAL WATER AND WASTEWATER SERVICING PHASE 1A (CONTRACT 3)

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)



## 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 their 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, Purchasing 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:

<u>City Drawing No.</u>	<u>Drawing Name/Title</u>
13439	COVER SHEET
13440	DRAWING INDEX, GENERAL PLAN AND LEGEND
13441	CENTREPORT CANADA WAY – STA 0+100 TO STA 0+360
13442	CENTREPORT CANADA WAY – STA 0+360 TO STA 0+600
13443	CENTREPORT CANADA WAY – STA 0+600 TO STA 0+800
13444	CENTREPORT CANADA WAY – STA 0+800 TO STA 1+010
13445	STURGEON ACCESS – STA 0+985 TO STA 1+260
13446	MISCELLANEOUS DETAILS SHEET 1
13447	MISCELLANEOUS DETAILS SHEET 2

### GENERAL REQUIREMENTS

#### E2. GEOTECHNICAL INVESTIGATION REPORT

- E2.1 Geotechnical Data Report (GDR)
- (a) The GDR summarizes the testing and geotechnical conditions observed along the alignments of the proposed pipeline infrastructure within the project area and provides technical support for the GBR. This report includes geotechnical and geophysical data collected at the project site and summary of encountered subsurface conditions along the alignments. A copy of the GDR is included in Appendix A.
- E2.2 Geotechnical Baseline Report (GBR)
- (a) The GBR presents an interpretation of the geotechnical conditions to be anticipated during construction of the work, based on the GDR, for use by Bidders for Bid preparation and administration of the Contract. Further information is provided in D40 and a copy of the GBR is included in Appendix B.

### **E3. OFFICE FACILITIES**

- E3.1 The Contractor shall supply a Site trailer with available office space for use by the Contract Administrator.
- E3.2 The office facility shall meet the following requirements:
- (a) The field office shall be for the exclusive use of the Contract Administrator and City staff and will be used for site meetings.
  - (b) The field office shall be located within the Contractor's laydown area near an active launch shaft for the Tunnelling work. The Contractor will be required to relocate the office facility during construction so that it is always near an active launch shaft location.
  - (c) The building shall have a minimum floor area of 25 square metres, minimum of two windows and a door entrance with suitable lock.
  - (d) The building shall be suitable for all-weather use. It shall be equipped with an electric heater and air conditioner capable of maintaining a temperature range between 16 °C and 25 °C.
  - (e) The building shall be supplied with adequate lighting and have a minimum of three wall outlets with 120 Volt power supply.
  - (f) The building shall be furnished with two desks, two meeting tables, one drafting table, one filing cabinet and a minimum of 12 chairs.
  - (g) A portable toilet shall be located near the field office building. The toilet shall have a locking door.
  - (h) The field office shall be cleaned on a weekly basis, prior to the Site Meetings to the satisfaction of the Contract Administrator.
- E3.3 The office facilities will be provided from the date of the commencement of the Work to the date of Substantial Performance.
- E3.4 Measurement and Payment
- (a) The Contractor shall be responsible for all installation, transportation and removal costs, all operating costs, provision of furnishings and equipment, cleaning and the general maintenance of the office facilities.
  - (b) Payment for the office facility is considered incidental to Site Development and Restoration.

### **E4. SHOP DRAWINGS**

- E4.1 Description
- E4.1.1 This Specification shall revise, amend and supplement the requirements of CW 1100.
- (a) The term 'shop drawings' means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, including Site erection drawings which are to be provided by the Contractor to illustrate details of a portion of the Work.
  - (b) The Contractor shall submit specified shop drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be shown on all submissions for Engineering review.
- E4.1.2 Shop Drawings



- (a) Original drawings are to be prepared by Contractor, Subcontractor, Supplier, Distributor, or Manufacturer, which illustrate appropriate portion of Work; showing fabrication, layout, setting or erection details as specified in appropriate sections.
- (b) Shop drawings for the following structural components shall bear the seal of a Registered Professional Engineer in the Province of Manitoba.
  - (i) Shoring
  - (ii) Reinforcing steel
  - (iii) Metal Fabrications
  - (iv) Pre-cast concrete structures
  - (v) Reinforced Concrete Jacking Pipe
    - ◆ The Contractor must provide pipes that can be installed with their intended means and methods. The pipe class listed on the Drawings is intended only to meet the final burial depth of the pipe in accordance with ASTM C76 standards. The Contractor must provide a submission that demonstrates that the proposed pipe can support the anticipated loading applied to the pipe.
  - (vi) Thrust Wall/Jacking Wall
    - ◆ A thrust wall shop drawing is required for any trenchless technology that requires applying thrust as part of its process. The interaction of the thrust with respect to shoring, existing soil conditions, existing utilities or other site-specific issues must be addressed by the thrust wall design.
- (c) Additional submittal requirements for each component of Work may be listed within the relevant specification section.
- (d) Construction of any Work item requiring a shop drawing may not commence until the specific shop drawing submittal has been approved.
  - (i) No shaft construction may proceed without approved shop drawings that include engineered stamped drawings demonstrating that the shoring design(s):
    - ◆ Meet all provincial regulations.
    - ◆ Is able to support soil and active loading.
    - ◆ Permits the effective installation of the planned works.
    - ◆ Demonstrates that the shoring also supports the planned tunnelling works as well as interaction with the thrust block design (where shafts are used to facilitate tunnelling).

#### E4.1.3 Contractor's Responsibility

- (a) Review shop drawings, product data and samples prior to submission and stamp and sign drawings indicating conformance to the Contract requirements.
- (b) Verify:
  - (i) Field Measurements
  - (ii) Field Construction Criteria
  - (iii) Catalogue numbers and similar data
- (c) Coordinate each submission with requirements of Work and Contract Documents. Individual shop drawings will not be reviewed until all related drawings are available.
- (d) Notify Contract Administrator, in writing at time of submission, of deviations from requirements of Contract Documents.
- (e) Responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator's review of submission, unless Contract Administrator gives written acceptance of specified deviations.

- (f) Responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.
- (g) The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the required number of corrected copies of Shop Drawings. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on previous submission.
- (h) After Contract Administrator's review and return of copies, distribute copies to subtrades as appropriate.
- (i) Maintain one (1) complete set of reviewed shop drawings, filed by Specification Section Number, at the Site of the Work for use and reference of the Contract Administrator and Subcontractors.

#### E4.1.4 Submission Requirements

- (a) Schedule submissions at least ten (10) Calendar Days before dates reviewed submissions will be needed and allow for a 10 Calendar Day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.
- (b) Submit one (1) digital copy (PDF) of shop drawings.
- (c) Accompany submissions with transmittal letter, containing:
  - (i) Date
  - (ii) Project title and Bid Opportunity number
  - (iii) Contractor's name and address
  - (iv) Number of each shop drawing, product data and sample submitted
  - (v) Specification Section, Title, Number and Clause
  - (vi) Drawing Number and Detail/Section Number
  - (vii) Other pertinent data
- (d) Submissions shall include:
  - (i) Date and revision dates.
  - (ii) Project title and Bid Opportunity number.
  - (iii) Name of:
    - ◆ Contractor
    - ◆ Subcontractor
    - ◆ Supplier
    - ◆ Manufacturer
    - ◆ Separate detailer when pertinent
  - (iv) Identification of product of material.
  - (v) Relation to adjacent structure or materials.
  - (vi) Field dimensions, clearly identified as such.
  - (vii) Specification section name, number and clause number or drawing number and detail/section number.
  - (viii) Applicable standards, such as CSA or CGSB numbers.
  - (ix) Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.

#### E4.1.5 Other Considerations

- (a) Fabrication, erection, installation or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent shop drawings and resubmit.

- (b) Material and equipment delivered to the Site of the Works will not be paid for at least until pertinent shop drawings have been submitted and reviewed.
- (c) Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.
- (d) No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of shop drawings.

#### E4.2 Measurements and Payment

- E4.2.1 Preparation and submittal of Shop Drawings shall be considered incidental to the Works of this Contract and no measurement or payment will be made for this item.

### **E5. ENVIRONMENTAL PROTECTION PLAN**

- E5.1 The Contractor shall plan and implement the Work of this Contract strictly in accordance with the requirements of the environmental protection measures as herein specified.
- E5.2 The Contractor is advised that at least the following Acts, Regulations, and By-laws apply to the Work:
  - (a) Federal
    - (i) Canadian Environmental Protection Act (CEPA) c.16
    - (ii) Canadian Environmental Assessment Act (CEAA) c.37
    - (iii) Transportation of Dangerous Goods Act and Regulations c.34
  - (b) Provincial
    - (i) The Dangerous Goods Handling and Transportation Act D12
    - (ii) The Endangered Species Act E111
    - (iii) The Environment Act c.E125
    - (iv) The Fire Prevention Act F80
    - (v) The Manitoba Heritage Resources Act H39.1
    - (vi) The Manitoba Noxious Weeds Act N110
    - (vii) The Manitoba Nuisance Act N120
    - (viii) The Public Health Act c.P210
    - (ix) The Workplace Safety and Health Act W120
    - (x) Other current applicable associated regulations.
  - (c) Municipal
    - (i) The City of Winnipeg By-law no. 1/2008
    - (ii) Other applicable Acts, Regulations and By-laws.
- E5.3 The Contractor is advised that the following environmental protection measures apply to the Work.
  - (a) Materials Handling and Storage
    - (i) Construction materials and debris shall be prevented from entering drainage pipes or channels.
    - (ii) Construction materials and debris shall also be prevented from accumulating on local roadways and sidewalks when tracked out of the Site by trucks hauling excavated materials.
    - (iii) The Contractor shall provide on-Site measures to mitigate the tracking of sediment off-Site and therefore reduce the amount of street cleaning required. These measures may take the form of a truck wheel wash (automated or manually operated) or other measures as approved by the Contract Administrator.
  - (b) Fuel Handling and Storage

- (i) The Contractor shall obtain all necessary permits from Manitoba Conservation for the handling and storage of fuel products and shall provide copies to the Contract Administrator.
  - (ii) All fuel handling and storage facilities shall comply with The Dangerous Goods and Transportation Act Storage and Handling of Petroleum Products Regulation and any local land use permits.
  - (iii) Fuels, lubricants, and other potentially hazardous materials as defined in The Dangerous Goods and Transportation Act shall be stored and handled within the approved storage areas.
  - (iv) The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage.
  - (v) Products transferred from the fuel storage area(s) to specific Work Sites shall not exceed the daily usage requirement.
  - (vi) When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheet of suitable material (such as HDPE) and size shall be spread on the ground to catch the fluid in the event of a leak or spill.
  - (vii) Refuelling of mobile equipment and vehicles shall take place at least 100 metres from a watercourse.
  - (viii) The area around storage Sites and fuel lines shall be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.
  - (ix) A sufficient supply of materials, such as absorbent material and plastic oil booms to clean up minor spills shall be stores nearby on-site. The Contractor shall ensure that additional material can be made available on short notice.
- (c) Waste Handling and Disposal
- (i) The construction area shall be kept clean and orderly at all times during and at completion of construction.
  - (ii) At no time during construction shall personal or construction waste be permitted to accumulate for more than one day at any location on the construction Site, other than at a dedicated storage area as may be approved by the Contract Administrator.
  - (iii) All resulting debris shall be deposited at a Waste Disposal Ground operating under the authority of Manitoba Regulation #150/91. Exceptions are liquid industrial and hazardous wastes which may require special disposal methods.
  - (iv) Indiscriminate dumping, littering, or abandonment shall not take place.
  - (v) No on-site burning of waste is permitted.
  - (vi) Waste storage areas shall not be located so as to block natural drainage.
  - (vii) Run-off from a waste storage area shall not be allowed to cause siltation of a watercourse.
  - (viii) Waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.
  - (ix) Equipment shall not be cleaned near watercourses; contaminated water from onshore cleaning operations shall not be permitted to enter watercourses.
- (d) Dangerous Goods/Hazardous Waste Handling and Disposal
- (i) Dangerous goods/hazardous wastes are identified by, and shall be handled according to, The Dangerous Goods Handling and Transportation Act and Regulations.
  - (ii) The Contractor shall be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.
  - (iii) The Contractor shall have on-site staff that is trained and certified in the handling of the dangerous/hazardous goods, when said dangerous/hazardous goods are being utilized on-site for the performance of the Work.
  - (iv) Different waste streams shall not be mixed.
  - (v) Disposal of dangerous goods/hazardous wastes shall be at approved hazardous waste facilities.

- (vi) Liquid hydrocarbons shall not be stored or disposed of in earthen pits on-site.
  - (vii) Used oils shall be stored in appropriate drums, or tankage, until shipment to waste oil recycling centres, incinerators, or secure disposal facilities approved for such wastes.
  - (viii) Used oil filters shall be drained, placed in suitable storage containers, and buried or incinerated at approved hazardous waste treatment and disposal facilities.
  - (ix) Dangerous goods/hazardous waste storage areas shall be located at least 100 metres away from the high water line and be dyked.
  - (x) Dangerous goods/hazardous waste storage areas shall not be located so as to block natural drainage.
  - (xi) Run-off from a dangerous goods/hazardous waste storage area shall not be allowed to cause siltation of a watercourse.
  - (xii) Dangerous goods/hazardous waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.
- (e) Emergency Response
- (i) The Contractor shall ensure that due care and caution is taken to prevent spills.
  - (ii) The Contractor shall report all major spills of petroleum products or other hazardous substances with significant impact on the environment and threat to human health and safety (as defined in Table 1 below) to Manitoba Conservation, immediately after occurrence of the environmental accident, by calling the 24-hour emergency phone number (204) 945-4888. The Contract Administrator shall also be notified.
  - (iii) The Contractor shall designate a qualified supervisor as the on-site emergency response co-ordinator for the project. The emergency response co-ordinator shall have the authority to redirect manpower in order to respond in the event of a spill.
  - (iv) The following actions shall be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on-site emergency response co-ordinator:
    - Notify emergency-response co-ordinator of the accident:
      - identify exact location and time of accident
      - indicate injuries, if any
      - request assistance as required by magnitude of accident (Manitoba Conservation 24-hour Spill Response Line (204) 945-4888, Police, Fire Department, Ambulance, company backup)
    - Attend to public safety:
      - stop traffic, roadblock/cordon off the immediate danger area
      - eliminate ignition sources
      - initiate evacuation procedures if necessary
    - Assess situation and gather information on the status of the situation, noting:
      - personnel on-site
      - cause and effect of spill
      - estimated extent of damage
      - amount and type of material involved
      - proximity to waterways, sewers, and manholes
    - If safe to do so, try to stop the dispersion or flow of spill material:
      - approach from upwind
      - stop or reduce leak if safe to do so
      - dike spill material with dry, inert sorbet material or dry clay soil or sand
      - prevent spill material from entering waterways and utilities by diking
      - prevent spill material from entering manholes and other openings by covering with rubber spill mats or diking. Resume any effective action to contain, clean up, or stop the flow of the spilled product.
  - (v) The emergency response co-ordinator shall ensure that all environmental accidents involving contaminants shall be documented and reported to Manitoba Conservation according to The Dangerous Goods Handling and Transportation Act Environmental Accident Report Regulation 439/87.

- (vi) When dangerous goods are used on-site, materials for containment and cleanup of spill material (e.g. absorbent materials, plastic oil booms, and oversized recovery drums) shall be available on-site.
- (vii) Minor spills of such substances that may be contained on land with no significant impact on the environment may be responded to with in-house resources without formal notification to Manitoba Environment.
- (viii) City emergency response, 9-1-1, shall be used if other means are not available.
- (f) Vegetation
  - (i) Vegetation shall not be distributed without written permission of the Contract Administrator. The Contractor shall protect plants which may be at risk of accidental damage. Such measures may include protective fencing or signage and shall be approved in advance by the Contractor Administrator.
  - (ii) Herbicides and pesticides shall not be used adjacent to any surface watercourses.
  - (iii) All landowners adjacent to the area of application of herbicides or pesticides shall be notified prior to the Work.
  - (iv) Trees and shrubs shall not be felled into watercourses.
  - (v) Areas where vegetation is removed during clearing, construction, and decommissioning activities, shall be revegetated as soon as possible in accordance with the landscaping plans forming part of the contract, or as directed by the Contract Administrator.

#### E5.4 Method of Measurement and Payment

- (a) Adherence to the laws that govern the requirements for Environmental Protection are incidental to the Contract.

### **E6. SITE DEVELOPMENT AND RESTORATION**

#### E6.1 Description

- (a) This Specification shall cover all aspects of the Site Development and Restoration Work, including but not limited to mobilization and demobilization, office facilities, Site access, Site security (fencing and gates), utility clearances, traffic control and signage, snow clearing, site runoff and drainage, protection, removal of trees, cleanup, and Site restoration.

#### E6.2 Submittals

- (a) Access and Layout Plans for review and approval by the Contract Administrator, in accordance with D20 and CW 1110, for the following items:
  - (i) All shafts as required for pipeline and manhole construction.

#### E6.3 Equipment

- (a) All equipment, implements, tools and facilities used shall be of a size and type as required to complete the Work in a reasonable time, approved by the Contract Administrator.
- (b) The Contractor shall keep all equipment in good Working order and have sufficient standby equipment available at all times.

#### E6.4 Construction Methods

- (a) All Laydown Areas and Site Access for Launch and Receiving Shafts
  - (i) The Contractor shall be responsible to develop suitable Site access. This includes but is not limited to, removal of curbing, temporary ramping, construction signage, , temporary bridging over structures, temporary safety fencing, protection of trees, any landscaping, grading and pavement repairs, removal and restoration of vegetation necessary to restore any Site and construction access areas to their pre-existing condition.

- (ii) Prior to commencing construction, the Contractor shall submit their site access plan(s) to the Contract Administrator for approval.
  - (iii) The Contractor is responsible for obtaining and paying for all required permits that are necessary for Site access.
- (b) Diversion of Flows
  - (i) Flows such as snowmelt, rainfall, water from water main breaks or any other flow traveling through the Site, into excavations, or through pipes being worked on shall be diverted during construction. Also reference D19.
- (c) Vegetation Removal and Protection
  - (i) Vegetation (living trees smaller than 50 mm and sod) removal may be permitted in order to facilitate Site access and temporary lay-down areas. Existing vegetation shall not be removed without prior approval from the Contract Administrator.
- (d) General Site Cleanup and Restoration
  - (i) All areas of the construction Site shall be restored to a condition to the same or better than the original condition prior to initiation of the Work. This may include but is not necessarily limited to the Contractor's laydown areas, the removal of the Contract Administrator Site trailer, and removal of all temporary access paths and fencing.
- (e) Topsoil, Seeding, and Sod
  - (i) All topsoil, seeding, and sodding Work shall be performed in accordance with CW 3510 and CW 3520. Topsoil and Seeding and/or Sodding Work shall include all existing grassed areas disturbed by the Contractor during construction. The Contractor shall restore all areas disturbed during construction to the condition prior to the initiation of the Work or better, using topsoil and seed and/or sod at the Contractor's own cost.
- (f) Traffic Control and Signage
  - (i) Coordinate, install and maintain traffic control and signage in accordance with the City of Winnipeg Manual of Temporary Traffic Control. The Contractor shall coordinate temporary lane closures required throughout construction with the Contract Administrator. Reference E15.
- (g) Snow Clearing
  - (i) The Contractor will be required to perform snow clearing and sanding operations on City streets and sidewalks within the Site where access to City snow clearing and sanding crews is blocked due to construction activities or where construction activities have created unsafe, icy conditions.
  - (ii) Snow build-up on sidewalks and roadways shall be maintained to the condition of the surrounding sidewalks and roadways
- (h) Construction Fencing
  - (i) The erection of temporary construction fencing is required around the laydown area(s) and all construction activity work activities to ensure provision of a safe work site.
  - (ii) Fencing or barriers shall be suitable to protect workers within the work site and minimize the impact to vehicular and pedestrian traffic or buildings and infrastructure in proximity to the work site.

#### E6.5 Method of Measurement and Payment

- (a) Site development and restoration will be measured and paid for at the Contract Lump Sum Price for "Site Development and Restoration", which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification.
- (b) 50% of the Site Development and Restoration unit price will be paid on the first progress payment following commencement of the Work.

- (c) 20% of the Site Development and Restoration unit price will be paid on subsequent progress payments on a proportional basis based on the extent of progress up to Substantial Performance, as determined by the Contract Administrator.
- (d) 30% of the Site Development and Restoration unit price will be paid on the progress payment following Total Completion.

## **E7. PROTECTION OF EXISTING TREES**

- E7.1 The Contractor shall take the following precautionary steps to avoid damage from construction activities to any existing trees not marked for removal within the limits of the construction area.
  - E7.1.1 Do not stockpile materials and soil or park vehicles and equipment within the tree drip line.
  - E7.1.2 Strap mature tree trunks with 25 x 150 x 2400 wood planks. Smaller trees shall be similarly protected using appropriately sized wood planks.
  - E7.1.3 Safety fencing shall be installed around the tree drip line.
  - E7.1.4 Excavations shall be carried out in a manner to minimize damage to existing root systems. Where roots must be cut to facilitate an excavation they shall be neatly pruned at the face of the excavation. If roots are pruned within 2 meters of the tree, contact Urban Forestry to ensure the tree has not been structurally compromised.
  - E7.1.5 Work on Site shall be carried out in a manner to minimize damage to existing tree branches. Where damage to tree branches does occur, the damaged branches shall be neatly pruned by an approved arborist from the City of Winnipeg Urban Forestry List found on the City's website ([https://legacy.winnipeg.ca/publicworks/parksOpenSpace/UrbanForestry/Homeowner\\_Tree\\_Maintenance\\_Guidelines.stm](https://legacy.winnipeg.ca/publicworks/parksOpenSpace/UrbanForestry/Homeowner_Tree_Maintenance_Guidelines.stm))
  - E7.1.6 American elm trees shall not be pruned between April 1st and August 1st and Siberian elm trees between April 1st and July 1st of any year under provisions of The Dutch Elm Disease Act.
- E7.2 All damage to existing trees due to construction activities shall be repaired to the requirements and satisfaction of the City of Winnipeg, Public Works Department, Forestry Branch at the Contractor's expense.
- E7.3 Costs for protection of trees shall be considered incidental to Site Development and Restoration. No separate measurement or payment will be made.

## **E8. TREE REMOVAL**

- E8.1 Description
  - E8.1.1 The staging areas designated for this project have been established to avoid the need for tree removal, with the exception of the MH-02 shaft and laydown area which will likely require some tree removal. The Contractor shall identify trees requiring removal to the Contract Administrator in advance of mobilizing into the MH-02 laydown area. Provisional items for tree removal have been included in this Tender.
  - E8.1.2 This specification shall cover the removal of existing trees.
  - E8.1.3 The Work to be done by the Contractor under this specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.
- E8.2 Materials
  - E8.2.1 Existing Trees to be Removed



The existing trees to be removed include, but not limited to ash, elm, cottonwood, basswood, oak, pine, maple, spruce, etc., all of which may be cut with standard chain saw equipment. The existing trees range from 50 mm to 1,000 mm diameter.

### E8.3 Construction Methods

E8.3.1 Prior to commencement of the Work the Contract Administrator shall identify all trees for removal. The Contractor shall cut down only trees designated to be removed, and grub out all stumps and roots greater than 100 mm diameter. In general, the Contractor shall start at the top of the tree and remove branches or trunks not longer than 2 m. Trees are to be felled so as to land within the limits of the Works. The Contractor shall load and haul all trees, stumps, roots, logs, brush, rubbish and all other surface litter from the Site and dispose of these materials at an approved disposal Site, acceptable to the Contract Administrator.

E8.3.2 The Contractor shall take all precautions to prevent damage to structures, adjacent property and to trees and shrubs. In the event of damage, the Contractor will be held liable, and shall be required to provide appropriate restoration at his cost, to the satisfaction of the Contract Administrator.

E8.3.3 Any trees damaged during construction activities shall be examined by a bonded tree care professional and pruned as required. Damaged trees which are not viable shall be replaced by the Contractor at his own cost.

### E8.4 Measurement and Payment

E8.4.1 The removal of existing trees shall be measured on a per tree basis and paid for at the Contract Unit Price per unit for the "Items of Work" listed below. The amount to be paid shall be the total number of trees removed in accordance with this specification, accepted and measured by the Contract Administrator.

Items of Work: Tree Removal

i. 50 mm to 249 mm Diameter

ii. 250 mm to 500 mm Diameter

iii. Greater than 500 mm Diameter

E8.4.2 The removal of trees and brush less than 50 mm diameter is considered incidental to the Work and no separate measurement or payment will be made.

## E9. TREE PLANTING

### E9.1 Description

E9.1.1 Should any trees require removal as part of this project, replacement trees will be planted as determined and directed by the Contract Administrator. Plantings will consist of trees in various container sizes.

E9.1.2 The Work to be undertaken by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work as shown on the Drawings and as herein specified.

E9.1.3 Work shall include, but not necessarily confined to, the relocation, supply and installation of trees and shrubs.

### E9.1.4 Reference

- (a) All plants shall be supplied and installed as per the Canadian Standards for Nursery Stock Current Edition, published by the Canadian Nursery Trades Association, except where specified otherwise.

E9.1.5 Source Quality Control

- (a) All plant material shall be randomly inspected at the source upon request of the Contract Administrator.
- (b) Trees are to be grown in nurseries under proper cultural practices as recommended by the Canadian Nursery Trades Association.
- (c) Only those trees that have been grown for at least the four (4) previous years in local Manitoba nurseries located in an Agriculture Canada Plant Hardiness Zone designation of 2(a or b) or 3(a or b) and within a 250 km radius of Winnipeg, will be accepted. Trees that have grown in plant hardiness zones 1 and 4 or greater will be rejected.

#### E9.1.6 Maintenance

- (a) The Contractor shall be responsible for the maintenance of the trees for a period of one (1) year from the date of Total Performance. Any areas planted after September 15<sup>th</sup>, the maintenance period will commence on May 15<sup>th</sup> of the following year or such date as mutually agreed upon by all parties.
- (b) Water to ensure soil moisture conditions for optimum growth and health of plant material. Ensure watering techniques do not cause erosion.
- (c) Reform damaged watering saucers.
- (d) Remove weeds as per overall weed control strategy.
- (e) Replace or re-spread damaged, missing or disturbed mulch.
- (f) For non-mulched areas, cultivate monthly to keep top layer of soil friable.
- (g) If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Contract Administrator prior to application.
- (h) Apply fertilizer as directed by manufacturer's specifications.
- (i) Remove dead, broken or hazardous branches from plant material.
- (j) Keep trunk protection and tree supports in proper repair and adjustment.
- (k) Remove trunk protection, tree supports and level watering saucers at end of warranty period.
- (l) Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
- (m) Submit weekly written reports to Contract Administrator identifying:
  - ◆ Maintenance work carried out.
  - ◆ Development and condition of plant material.
  - ◆ Preventative or corrective measures required which are outside Contractor's responsibility.

#### E9.1.7 Warranty

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

#### E9.1.8 Replacements

- (a) During the Warranty Period, the Contractor shall remove from Site any plant material that has died or failed to grow satisfactorily as determined by the Contract Administrator and replace as per Specifications within a maximum ten (10) day period from notification.
- (b) Defective trees shall be replaced within three (3) days of notification to the Contractor, unless otherwise agreed to by the Contract Administrator.
- (c) The Contractor shall extend Maintenance and Warranty on replacement tree for a period equal to the original Maintenance and Warranty Periods.
- (d) The Contractor shall continue such replacement, Maintenance and Warranty until tree is acceptable.

## E9.2 Materials

### E9.2.1 Planting Soil and Mulch

- (a) As per Planting Preparation.
- (b) Imported soils shall be used to backfill tree and shrub plantings.

### E9.2.2 Miscellaneous Materials

- (a) Water shall be potable and free of minerals which may be detrimental to plant growth.
- (b) Stakes shall be metal T-Bar, steel, 40x40x5x2440 mm.
- (c) ARBORTILE® by Deep Root Canada Corp., or equivalent approved by the Contract Administrator.
- (d) Guying Collar shall be plastic tube, 13mm diameter, nylon reinforced.
- (e) Trunk Protection shall be plastic perforated spiralled strip.
- (f) Fertilizer shall be a slow release formulation of low nitrogen and high phosphorus e.g. 10-50-12. Apply quantities at rates stated by product manufacturer.
- (g) Root Ball Burlap shall be 150 g Hessian burlap, biodegradable.
- (h) Wire Baskets shall be horticultural accepted product designed to carry the weight and to contain a burlap-covered root ball. Minimum diameter basket size is to conform to the same minimum diameter of the tree root ball for the respective minimum tree caliper sizes.

### E9.2.3 Plant Material

- (a) All nursery stock supplied shall be Canadian Prairie nursery grown, and of species and sizes indicated in the plant list on the Drawings. Its quality shall be in accordance with the "Guide Specification for Nursery Stock of the Canadian Nursery Trades Association".
- (b) Any nursery stock dug from native stands, wood lots, orchards, or neglected nurseries and which have not received proper cultural maintenance as advocated by the Canadian Nursery Trades Association shall be designated as "collected plants". The use of "collected plants" will not be permitted unless specified below.
- (c) Nomenclature of specified nursery stock shall conform to the International Code of Nomenclature for Cultivated Plants and shall be in accordance with the approved scientific names given in the latest edition of Standardized Plant Names. The names of varieties not named therein are generally in conformity with the names accepted in the nursery trade.
- (d) Plants larger than specified may be used if approved by the Contract Administrator. The use of such plants shall not increase the Contract price.
- (e) Plants shall be free of disease, insect infestation, rodent damage, or environmental stress.
- (f) Trees:

- (ii) To be characteristically developed for their species and structurally sound, well branched, healthy and vigorous and densely foliated when in leaf. The tree is to have a healthy, well developed, fibrous root system which may be verified through a testing procedure that destructively samples one or more randomly selected root balls;
- (iii) To have been root pruned regularly, but not later than one growing season prior to arrival on-site. The Contractor may be required to furnish documentation to the client on their root-pruning program. Trees in excess of 75 mm caliper are to have been half root pruned during each of two successive growing seasons, the latter at least, one growing season prior to arrival on-site;
- (iv) To have all parts, especially lower branches, moist and show live, green cambium tissue when cut;
- (v) Single stem trees to have only one, sturdy, reasonably straight and vertical trunk, and a well-balanced crown with fully developed leader.
- (vi) To be free of disease, insect infestation, rodent damage, sun scald, frost cracks, abrasions, unhealed scars, scars exceeding 5cm in diameter, major forks or crooks in the trunk, broken branches, or angled leaders. Trees having the above defects will not be accepted by the Contract Administrator;
- (vii) Trees having a leader which has developed at a sharp angle to the trunk as a result of pruning or trunk damage will not be accepted;
- (viii) Trees exhibiting suppressed, weakly developed branches due to competition from other closely spaced trees in the nursery will not be accepted. Trees exhibiting dead branches will not be accepted.
- (ix) Any tree that has come out of dormant stage and is too far advanced will not be accepted unless prior approval obtained. Approval is required for any tree which has been held in cold storage.
- (x) Balled and burlapped trees in excess of a 3 m height must have been dug with large firm ball. Roots in root balls must be comprised of 75% fibrous and feeder root systems. Secure root balls with burlap, heavy twine and rope. For trees 75 mm or more in caliper, wrap ball in double layer of burlap and drum lace with minimum 10 mm diameter rope. Protect root balls against sudden changes in temperature and exposure to heavy rainfall.
- (xi) Tree spade dug trees are to be dug with mechanized digging equipment with hydraulic spade. Lift root ball from hole, place in wire basket designed for purpose and lined with burlap. Tie basket to ball with heavy rope. Take care not to injure trunk of tree with wire basket ties or rope.
- (xii) Use of collected or native trees is not permitted.

#### E9.2.4 Tree Quantity and Size

- (a) Trees are to be planted at the quantities and caliper listed in Form B and broken down in detail below. Any variations to size, caliper or species of specified trees will require a request for approval from the Contract Administrator.
  - (i) Large trees shall be a minimum 75 mm caliper, 2.5 m in height, with a minimum of eight (8) major branches 2 m above grade, have balled and burlapped root balls, and be double stake. Tree species specific to the site shall consist of:
    - ◆ American Elm
    - ◆ Bur Oak
    - ◆ Manitoba Maple
    - ◆ Basswood
    - ◆ Cottonwood
- (b) Planting locations will be determined on-site by the Contract Administrator.
- (c) Trees are to conform to the measurements specified in Form B, except that trees larger than specified may be used if approved by the Contract Administrator.

- (d) Trees are to be measured when the branches are in their normal position. Height dimensions specified are to refer to the main body of the tree and not from branch tip to root base. Where trees have been measured by caliper or diameter, reference is to be made to the diameter of the trunk measured 15 cm above the ground as the tree stands in the nursery prior to lifting. Caliper of tree shall be appropriately designed on a permanently fixed tag on one of the branches.

#### E9.2.5 Shipment and Pre-Planting Care

- (a) Coordinate shipping of trees and excavation of holes to ensure minimum time lapse between digging and planting.
- (b) Tie branches of trees securely, and protect trees against abrasion, exposure and extreme temperature change during transit. Avoid binding of trees with rope or wire which would damage bark, break branches or destroy natural shape of tree. Give full support to root ball of trees during lifting.
- (c) Cover tree foliage with tarpaulin, and protect bare roots by means of dampened straw, peat moss, saw dust or other acceptable material to prevent loss of moisture during transit and storage.
- (d) Remove broken and damaged roots with sharp pruning shears. Make clean cuts, and cover cuts over 10 mm diameter with a tree wound dressing.
- (e) Keep roots moist and protected from sun and wind. Heel-in trees which cannot be planted immediately in shaded areas and water well.

### E9.3 Construction Methods

#### E9.3.1 Workmanship

- (a) All areas and locations provided for planting will be staked out or painted on-Site by the Contract Administrator. Excavation shall not proceed until the layout has been inspected and approved by the Contract Administrator. Excavation shall not be undertaken until all underground utilities have been located and protected.
- (b) Coordinate operations. Keep Site clean and planting holes drained. Immediately remove soil or debris spilled onto street pavement, grass or sidewalk.
- (c) Work to be coordinated with installation of fencing and planting of shrub.

#### E9.3.2 Planting Time

- (a) Plant trees as early as May 15, 2022 but no later than June 30, 2022 depending when topsoil is placed and prepared.
- (b) Plant only under conditions that are conducive to health and physical conditions of trees.
- (c) Provide planting schedule to Contract Administrator. Extending planting operations over long period using limited crew will not be accepted.
- (d) The Contractor must obtain all above and below ground clearances from all the utilities as well as the appropriate District Operations Branch in a timely manner so as not to jeopardize the schedule of the complete tree planting Contract.

#### E9.3.3 Excavation

- (a) Tree pit to be dug with back hoe.
- (b) Excavate tree pits as indicated by stakes or paint marks.
- (c) Protect bottom of excavations against freezing.
- (d) Remove water which enters excavations prior to planting. Ensure source of water is not ground water and notify Contract Administrator.
- (e) Upon excavation of the planting, the excavation shall be backfilled with a Topsoil mixture to a depth to permit adequate installation and stabilization of the plant material. Topsoil shall be placed in accordance with City of Winnipeg Standard Construction Specification CW 3540 to a 300 mm depth.

#### E9.3.4 Installation

- (a) Plantings of trees shall be undertaken as approved by the Contract Administrator. Configuration of planting shall be subject to input and final approval by the Contract Administrator.
- (b) Planting shall be done during periods of suitable weather conditions and in accordance with locally accepted practice.
- (c) Trees are to be planted within forty-eight (48) hours of excavation from the nursery.
- (d) No tree pit is to be left open at the end of the Contractor's Work Day. Planting program is to be planned to ensure that all approved trees delivered to the Site at designated planting locations are installed and thoroughly watered the same day as delivery.
- (e) With balled and burlapped root balls and root balls in wire baskets, burlap shall be loosened and cut away from the top 1/3 without disturbing root ball. Wire shall be cut away and removed from the top 1/3 of the root ball. Burlap or rope shall not be pulled from under root ball. Non-biodegradable wrapping shall be removed.
- (f) To avoid future root girdling, The Contractor shall ensure that roots are not coiled around the root ball. After removal from the container, if it is seen that roots are coiled around the root ball, roots must be loosened and spread out in a more natural form before planting in order to establish healthy root development and root direction after planting.
- (g) After inserting the tree and tamping the root system with Topsoil in layer of 150mm, water shall be poured in until the pit is thoroughly soaked. Filling of the hole shall then be completed and the fill-in soil shall be packed firmly around the roots, leaving a concave surface for convenient watering. After filling, the planting shall be watered at frequent intervals.
- (h) Each tree is to have an earth saucer at its base having a diameter as large as the excavation with a 10 cm lip formed at the perimeter of the saucer to retain water.
- (i) All nursery stock shall be set plumb in the centre of pits and at levels as shown on the planting details after settlement has taken place.
- (j) Nursery stock shall be faced to give the best appearance or relationship to adjacent structure and to the approval of the contract administrator. Trees shall be placed equal to depth they were originally growing in nursery.
- (k) Tree pit depth shall be such that the top of the root ball is even with the existing grade, taking into account that proper planting depth requires the root flare to be at or slightly above the finished grade. It is important to determine how deep the root flare is in the ball before it is placed in the planting hole. Sometimes the top of the ball may need to be raised until the root flare is at the proper planting depth and/or soil must be removed from the top of the ball.
- (l) Each tree must be planted such that the trunk flare is visible at the top of the root ball. Trees where the trunk flare is not visible shall be considered a deficiency and payment for the planting will not be received until the deficiency is addressed. Do not cover the top of the root ball with soil.

#### E9.3.5 Supply and Installation of Mulch

- (a) Contractor to supply and install mulch in tree pit, planters and in areas as indicated in the Drawings. Mulch supplied shall cover entire planting area to a consistent depth of 100 mm.
- (b) Mulch must not be placed within 8 cm (3 in) of tree trunks.

#### E9.3.6 Fertilizing

- (a) When planting is completed, give surface of planting saucer dressing of fertilizer meeting the requirements of Specification. Mix fertilizer thoroughly with top layer of planting soil and water in well.

**E9.3.7 Trunk / Beaver Protection**

- (a) Install trunk protection on trees.
- (b) Install trunk protection prior to installation of tree supports when used.

**E9.3.8 Pruning**

- (a) The Contractor shall provide a licensed Manitoba Certified Arborist for each Work crew or Work Site.
- (b) Employ clean sharp tools and make cuts flush with branch collars. Remove dead and injured branches.

**E9.3.9 Watering**

- (a) Trees are to be watered during the planting procedure as described previously, and once a week thereafter, or more frequently as required, during the growing season.
- (b) Apply 40 litres of water per 25 mm caliper per application using deep root feeder or low/pressure nozzle and hose. The water stream must not gouge out a hole in the soil and mulch.
- (c) A complete record is to be kept of each series of waterings for all planted trees noting: 1) location, and 2) date of watering. This record shall be sent bi-weekly to the Contract Administrator.

**E9.4 Measurement and Payment**

**E9.4.1** Installation and maintenance of trees shall be measured on a per unit basis. The amount to be paid for shall be the total number of trees supplied and installed in accordance with this Specification, and as acceptable to the Contract Administrator.

**E9.4.2** Payment for Installation and maintenance of trees shall be paid for at the Contract Unit Prices for "Tree Revegetation" This price shall be payment in full for supplying all labour, equipment and materials, and performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

**E10. CHANGE IN CONTRACT CONDITIONS**

**E10.1 Description**

- (a) This specification covers changes identified to the scope of work including changes in geotechnical and geological conditions that may impact the shaft construction and tunnelling works
- (b) The basis for the geotechnical and geologic conditions are described in the GBR and GDR as defined in Section D40.
- (c) The method for reviewing, recording and accepting a change to geotechnical and geologic conditions or obstructions is described in section D43.

**E10.2 Measurement and Payment**

- (a) Where a Contractor has made a claim in accordance with C7 or D43 which has been accepted by the Contract Administrator and City, the Contractor will be compensated in accordance with D43 from the allowance under the Contact unit price "Change in Contract Conditions"
- (b) Daily costs for all equipment, including but not limited to the shaft construction, tunnelling and associated equipment, other equipment, construction vehicles, Contractor trucks and their staff's personal vehicles, temporary site/storage facilities, rental equipment, and all other ancillary equipment required to undertake the shaft construction and tunnelling activities and Work belonging to the Contractor or their sub-contractors shall be paid for at the daily rate under the contract unit price of "Daily Equipment Rate"

- (i) The Contractor shall submit a breakdown of the equipment costs included within the Daily Equipment Rate to be used in assessing delay claims from Change in Work. A breakdown of these costs must be submitted prior to Commencement and add up to the total Daily Equipment Rate entered on Form B used to evaluate the Bids.

## **E11. PROVISIONAL ITEMS**

- E11.1 The Provisional Items listed on Form B: Prices are part of the Contract.
- E11.2 The Contractor shall not perform Work included in the Provisional Items without prior authorization from the Contract Administrator. All Work included in the Provisional Items will be carried out within the construction areas shown on the Drawings.
- E11.3 Notwithstanding GC:7, the City reserves the right to diminish all or any portion of the items of work listed in the Provisional Items and no claim shall be made for damages on the grounds of loss of anticipated profit or for any other reason.
- E11.4 Provisional Items listed on Form B: Prices do not form part of the Initial Span calculations as identified in D28.

## **E12. ALLOWANCE FOR MATERIAL SAMPLING AND TESTING**

- E12.1 Description
  - (a) Further to CW 3110 and CW 3410, this specification shall cover additional inspection and testing requirements for all materials used in the Work associated with this Contract.
  - (b) The Contractor shall be responsible to schedule, coordinate and provide material testing, including test reports, for all construction materials as outlined in CW 2110, CW 2130, CW 3110, CW 3410, other relevant City specifications, and the additional specifications within this Contract. The Contractor shall engage an independent material inspection and testing agency and the testing shall be selected by the Contract Administrator for the purpose of conducting the material tests and obtaining associated documentation when directed by the Contract Administrator.
- E12.2 Construction Methods
  - (a) The Contractor shall be responsible for scheduling field testing with an independent material inspection and testing Agency. All material tests conducted on Site shall be attended by the Contract Administrator. It is the Contractor's responsibility to coordinate each of the scheduled tests with the Contract Administrator.
  - (b) The contact information from the Contract Administrator and City staff shall be provided to the testing agencies and all test results from all laboratory and field tests shall be provided to the Contract Administrator for review and/or approval.
  - (c) Copies of invoices from the testing agencies shall be provided monthly to the Contract Administrator.
- E12.3 Measurement and Payment
  - (a) The cost for material sampling and testing shall be paid for under the Contract unit price for "Allowance for Material Sampling and Testing". Costs will be based on actual invoiced costs for inspections, equipment, and monitoring with allowable mark-ups in accordance with the General Conditions.

## **E13. ADDITIONAL WORK ALLOWANCE**

- E13.1 Additional Work may be necessitated due to unforeseen circumstances that may arise during the course of the project due to:
  - (a) Additions to the scope of Work by the Contract Administrator, beyond that defined herein.



- E13.2 A cash allowance has been included on Form B: Prices.
- E13.3 The City reserves the right to delete any or all of the Cash Allowance from the Contract if the Work intended to be covered by the Cash Allowance is not required, or if the Works intended are found to be more extensive than the provisional Cash Allowance.
- E13.4 Cost of additional Work shall be evaluated by the methods outlined in C7.4, and a Change Order prepared by the Contract Administrator. Cost of the Change Order will be paid on the Progress Estimate and deducted from the Cash Allowance. If the valuation of the authorized Work exceeds the value of the Cash Allowance, the Contract Value will be adjusted by the shortfall.
- E13.5 Additional services and/or Work will not be initiated for:
- (a) Reasons of lack of performance or errors in execution.
  - (b) Scheduling changes initiated by the City, where at least 24 hours notice is given prior to the Contractor's scheduled time to be on Site.
- E13.6 Should it be determined that additional material or services are required, the Contract Administrator shall approve the Work, prior to commencement of the additional Work.
- E13.7 Mark-Up Factors:
- (a) Markups on additional Work shall be in accordance with allowable markups outlined in C7.4.2.

## **TRAFFIC MANAGEMENT AND CONTROL**

### **E14. TRUCK WEIGHT LIMITS**

- E14.1 Description
- (a) Spring weight restrictions may apply to streets within the area of Work. The City shall not pay for any portion of material which results in the vehicle exceeding the maximum gross vehicle weight allowed under The City of Winnipeg Traffic By-Law, unless such vehicle is operating under special permit.

### **E15. TRAFFIC MANAGEMENT**

- E15.1 Description
- (a) This specification covers activities related to managing traffic throughout the work Site. Items listed here are to be followed in addition to all standard requirements.
  - (b) The Contractor shall submit temporary traffic control plans to the Contract Administrator for review and approval prior to starting Work.
  - (c) The below traffic requirements must be adhered to within the Contractor's traffic management plans.
- E15.2 Materials and Equipment
- E15.2.1 Further to Clause 3.7 of CW 1130:
- (a) The Contractor shall be responsible for all signage and barricades as identified in the City of Winnipeg Manual of Temporary Traffic Control on City Streets. The Contractor shall provide the Contract Administrator a suitable Traffic Accommodation Strategy covering all the details for traffic management (cones and signage etc.) for each Work element at least three (3) weeks prior to commencement of any lane closures related to the Work.
- E15.3 General Requirements

- E15.3.1 The Contractor shall not park company or private vehicles inside the barricaded work zone in a manner that will block sightlines for vehicles approaching and crossing or create any other safety concern.
- E15.3.2 The Contractor shall minimize the duration of road closures as much as possible such that only areas with active construction are closed off when needed to facilitate the Work.
- E15.3.3 Emergency vehicle access must be maintained at all times.
- E15.3.4 Intersecting streets, private approach and lane access shall be maintained at all times (unless approved within the Specifications or by the Contract Administrator in writing).
- (a) Should the Contractor be unable to maintain an existing access to a private property, he/she shall review the planned disruption with the Contract Administrator and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours notification to the Contractor Administrator, prior to disruption of any access.
- E15.4 Regional Street Requirements
- E15.4.1 Regional Streets impacted by the Work will include:
- (a) Sturgeon Access
- E15.4.2 General
- (a) Intermittent closures will be permitted along Sturgeon Access immediately adjacent to the MH-03 Laydown Area and at the intersection of Sturgeon Access and Sturgeon Road (Right Turn Yield) as required. These closures are to support the shaft construction and tunnelling works at MH-03 and MH-04, respectively.
  - (b) Lane closures outside of the locations noted will not be permitted. These locations are reserved for work on other CentrePort contracts.
  - (c) The Contractor shall submit temporary traffic control plans to the Contract Administrator for review and approval prior to starting Work.
- E15.4.3 For all temporary lane closures and where not shown otherwise in the Drawings, the Contractor shall:
- (a) Maintain a minimum of one lane of traffic that can be used in either direction.
  - (b) Ambulance/ emergency vehicle access must be maintained at all times.
- E15.5 Non-Regional Street Requirements
- E15.5.1 General
- (a) No lane closures permitted on Summit Road
- E15.6 Measurement and Payment
- (a) All Work associated with adhering to the Traffic Management requirements identified are incidental to Site Development and Restoration.

## **UTILITY COORDINATION**

### **E16. EXPLORATION OF EXISTING UTILITIES AND SERVICES**

- E16.1 General
- (a) This specification covers the soft dig exploration of existing buried utilities within the project Site.
  - (b) Further to CW 1120, the Contractor shall perform exploratory excavations by soft dig methods or other methods suitable to the Contract Administrator to verify and locate buried utilities that are in close proximity to shaft construction, including but not limited to

underground hydro services, gas, power and telecommunications ducts and conduits, traffic signal conduits, street lighting and other communication cables.

#### E16.2 Execution

- (a) The exploration shall be done following all utility location surveys and a minimum of ten (10) days prior to any construction. The information obtained will determine if any existing underground lines need to be rerouted/relocated to to minimize conflicts with the Contractor's planned shaft construction.
- (b) All proposed dig locations must be clearly identified and submitted to the Contract Administrator prior to utility exploration work beginning.
- (c) The Contractor shall arrange for all required utility locations, safety watches and other required notifications.
- (d) The Contractor shall provide a minimum of two (2) Business Days' notice to the Contract Administrator prior to conducting utility exposures.
- (e) The Contractor shall arrange for any required traffic control to be set up in advance of the work and notify the Contract Administrator to arrange for lane closures as required.
- (f) The Contractor shall use a soft dig (hydro-excavator) to expose the utility under investigation.
- (g) The Contractor shall record the depth of the utility and provide this information to the Contract Administrator.
- (h) The Contractor is responsible for backfill and restoration of dig locations.

#### E16.3 Measurement and Payment

- (a) Any exploration of existing utilities and services in close proximity to shafts or any other construction activities associated with the Work, whether explicitly shown on the Drawings or not, are the responsibility of the Contractor and are considered incidental to the cost of sewer installation under Shaft and Tunnel Construction.

### **E17. SUPPORT OR TEMPORARY RELOCATION OF EXISTING UTILITIES**

E17.1 The Contractor shall provide support or temporary relocation of existing services and utilities when excavations/shafts expose or require the support of these services (due to proximity or other reasons). Support of the services shall be undertaken to the requirements of the utility owner. Services and utilities may only be interrupted with the permission of the Contract Administrator and the utility owner

- (a) Where these utilities include buried gas or electrical lines, the Contractor shall contact Manitoba Hydro and follow the Safe Excavation & Safety Watch Guidelines listed at [https://www.hydro.mb.ca/safety/pdfs/safe\\_excavation\\_safety\\_watch\\_guidelines.pdf](https://www.hydro.mb.ca/safety/pdfs/safe_excavation_safety_watch_guidelines.pdf)

#### E17.2 Measurement and Payment

- (a) Support of existing pipes and utilities will be incidental to the cost of the sewer installation under Shaft and Tunnel Construction (unless otherwise identified as a separate pay item).

### **SHAFT AND TUNNEL CONSTRUCTION**

#### **E18. SUPPLY AND INSTALLATION OF TEMPORARY SHORING**

##### E18.1 Description

- (a) This Specification shall cover shoring requirements for the Works.

##### E18.2 Construction Methods

###### E18.2.1 Excavation

- (a) Remove excavated material from the Site immediately. Excavated material shall not be stockpiled on Site.
- (b) All Working areas below grade shall be kept adequately and securely supported during and after excavation until the shoring and bracing is in place to prevent loss of ground or injury to any person from falling material.

#### E18.2.2 Basal Heave Requirements

- (a) The base of excavation and shoring for all shaft construction, including launch and receiving shafts, shall be designed to achieve a minimum factor of safety of 1.5 with respect to basal heave.**
- (b) Depressurization can be considered to address basal heave and facilitate the excavation and foundations for the Shafts, however it is anticipated that groundwater depressurization may be ineffective and alternate methods to address the basal heave requirements will be required. Contractor to review and reference the GDR.

#### E18.2.3 Excavation Security Fence

- (a) Further to Clause 3.1 of CW 1130, completely cover the excavation and provide a security fence to completely surround the excavation when unattended generally in accordance with the following.
- (b) Security fence shall be chain link fence as per CW 3550 or approved equal in accordance with B7, a minimum 1.80 metres high with metal support posts embedded far enough into the ground and spaced close enough together so the fence will not sag or collapse.
- (c) Attach fencing securely to posts.
- (d) Secure the gate or end of the fencing to a post with chain and a padlock.

#### E18.2.4 Shoring

- (a) The type, strength, and amount of shoring and bracing shall be such as the nature of the ground and attendance conditions may require, taking into account property lines, existing slopes, utilities and roadways.
- (b) Shoring and bracing shall be so spaced and dimensioned as to prevent caving, loss of ground, surface settlement, or squeezing of the soil beyond the neat lines of excavation. It shall be free from defects that might impair its strength or suitability for the Work. Sheeting/shoring and bracing shall conform to the latest revisions of the "Construction Safety Act" of the Department of Labour of the Government of Manitoba and in accordance with Province of Manitoba "W210 The Workplace Safety and Health Act" and "Guidelines for Excavation Work".
- (c) Supporting design calculations as required to facilitate review of the submission for conformance with the Contract Documents.
- (d) Submit AutoCAD Shop Drawings and design calculations for the shoring/excavation system designed and sealed by a Professional Engineer registered or licensed to practice in the Province of Manitoba and experienced in the structural design of shoring systems. The designer of the shoring system shall inspect the system during construction and certify, in writing to the Contract Administrator, that construction is in conformance with the approved design on a bi-weekly basis.
- (e) Shoring and bracing shall be installed such that the structure size and wall thickness shown on the shop drawings can be obtained subsequent to installation of the shoring system.
- (f) Shoring and bracing shall be designed and installed to prevent settlement and damage to existing structures. In the event of damage, the Contractor will be held liable, and shall be required to provide appropriate restoration at his cost, to the satisfaction of the Contract Administrator.
- (g) Shoring and bracing shall remain in place until concrete has attained 75% of the design strength.

#### E18.2.5 Monitoring Movement of Shoring

- (a) The Contractor shall submit to the Contract Administrator a plan for monitoring the movement of shoring during construction at the same time the shoring design plans are submitted prior to the installation of trench shoring. The monitoring plan shall be performed by approved survey methods for vertical or horizontal movement of the shoring, acceptable to the Contract Administrator. Costs for monitoring shall be incidental to the installation of the temporary shoring.

#### E18.3 Measurement and Payment

- (a) Shoring required for shafts to complete the Work will be incidental to the components of the Work to which shoring is required. No additional payment will be made for supplying materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

### E19. SHAFT EXCAVATION AND SUPPORT

- (a) Description This section outlines the minimum requirements for shaft excavation and support of shaft excavations for microtunnelling operations and construction of stub out(s). The Contractor is responsible for selecting the means and methods to complete construction of shafts at the locations shown on the Drawings.

#### E19.2 Design Criteria

- (a) Excavation support systems shall be designed by a Professional Engineer registered in the Province of Manitoba, who has a minimum of five years' experience in the design of soil/rock retaining structures.
- (b) The Contractor is fully responsible for selection of the support of excavation system, sizes, dimensions, and methods of construction. The size of the shafts shall be adequate to support microtunnelling operations and accommodate permanent structure construction. Shafts shall be designed for the anticipated geotechnical and hydrogeological conditions as indicated in the GBR. Shaft designs are subject to review by the Engineer. Acceptable support of excavation systems include:
  - (i) Secant Piles;
  - (ii) Concrete Caissons (Segmental or Insitu);
  - (iii) Steel Piles Cofferdam with bracing or
  - (iv) The Contractor may propose to use another type of support of excavation or combination of types based on the anticipated geotechnical and hydrogeological conditions as indicated in the GBR, subject to review by the Engineer.
- (c) Excavation support systems shall be designed by the Contractor to support earth pressure, groundwater pressure, utility loads, equipment, jacking loads, traffic loads, surcharge loads, and bottom heave/uplift.
  - (i) **The base of excavation and shoring shall be designed to achieve a minimum factor of safety of 1.5 with respect to basal heave.**
- (d) Excavation support systems shall not damage adjacent structures including buildings, pipelines, and utilities.
- (e) Excavation support systems shall be generally watertight with construction water removal permitted to control nuisance water and seepage.
- (f) The Contractor shall be responsible for selecting ground improvements to maintain a watertight condition. Dewatering outside of the shaft shall not be permitted.
- (g) Blasting will not be permitted during shaft construction. Where rock is encountered, jack hammering may be used.
- (h) The Contractor shall design a tremie or base slab to seal the shaft from groundwater inflows and to resist uplift of the completed shaft. The minimum acceptable factor of safety for resistance to uplift shall be 1.2 under the most extreme loading conditions.

- (i) The Contractor shall incorporate a sump in the design of the base slab to remove any groundwater, rainwater, runoff, or construction water that enters the shaft.
- (j) Extend shaft lining around full perimeter of shaft to a minimum of 0.3 m above grade to prevent surface water overtopping shaft lining.
- (k) The Contractor shall design shafts for staged installations and consider the removal of necessary portions to accommodate construction of connections and backfill sequences.
- (l) Launch and reception seals shall be provided in the microtunnelling shafts. These seals shall consist of one or more rubber flanges attached to a steel housing.
- (m) Deviation from plumb shall not exceed 100 mm in 30 metres. Correction of shaft deviation and any construction and associated costs resulting from relocation of appurtenances inside the shafts, including pipe connections caused by the shaft's deviation or other deficiencies in workmanship, shall be completed at the Contractor's expense.
- (n) Shaft excavations which are exposed to public vehicular traffic, including run-off lanes, shall be barricaded along the exposed side with portable concrete interlocking barriers designed and positioned to deflect errant vehicles. Submittals
- (o) Provide sufficient detail to allow the Engineer to review whether the proposed equipment, materials, and procedures meet the requirements of the Specifications. Review of the Contractor's submittals by the Engineer shall not be construed in any way as relieving the Contractor of their responsibilities under this Specification.
- (p) Shaft Excavation and Support Work Plan: Submit a work plan complete with drawings, written descriptions, procedures, and manufacturer's information identifying the details of the proposed methods of construction, support of excavation systems and dimensions, initial support systems, ground improvements, equipment, materials, and sequence of operations during construction. This work plan shall include:
  - (i) Sequence of shaft construction.
  - (ii) Description of equipment and procedures to be used to construct the shafts through the soils indicated in the GBR.
  - (iii) Description of ground improvement measures and procedures to create watertight conditions.
  - (iv) Description of shoring, bracing, reinforcement, and connection details.
  - (v) Description of dewatering procedures and methodologies.
  - (vi) Description of procedures for providing groundwater control during launch and retrieval of microtunnelling equipment.
  - (vii) Description of methods and procedures of excavation, including methods for hoisting excavated material, stockpiling, and fully containing spoils.
  - (viii) Description of methods for hauling and disposal of excavated materials.
  - (ix) Written documentation signed by a reviewed disposal site indicating that the site will accept the spoils and that the site is in compliance with all applicable Provincial and Federal regulations.
  - (x) Procedures for checking and maintaining plumbness of shaft components.
  - (xi) Connection details to permanent structures.
  - (xii) Description of contingency plans for excessive movement of shaft elements, flooding, bottom heaving, and sloughing or caving earth.
  - (xiii) Description of methods and procedures to remove the upper portions of support of excavation systems below grade as shown on the Drawings.
- (q) Shop Drawings and Layout Drawings
  - (i) Submit shop drawings showing plan and section views of support of excavation systems, including dimensions and sizes. Shop drawings shall describe proposed shaft elements, vertical risers, and equipment staging within staging areas at the shaft locations. Equipment shall include cranes, front-end loader, spoil transfer areas, spoil containment system, spoil hauling equipment, pumps, generators, tool trailers, containers, and other required equipment.

- (r) Calculations:
  - (i) Submit design calculations for the support of excavation systems demonstrating that the systems are capable of supporting the maximum loads anticipated by the Contractor during shaft construction, microtunnelling operations, and backfilling, consistent with the ground conditions outlined in the GBR.
  - (ii) Design calculations shall consider ground and hydrostatic loads, equipment, construction loads (including MTBM lift crane and operational crane), and any other surcharge loads that may be reasonably anticipated during shaft construction or microtunnelling operations.
  - (iii) Submit design calculations for the tremie slab/base slab confirming structural connection to the shaft walls.
  - (iv) Design calculations shall be sealed and signed by a registered Professional Engineer licensed in the Province of Manitoba.
  - (v) The Contractor shall clearly state all assumptions and values used in their calculations.
- (s) Safety Plan:
  - (i) Submit a detailed safety plan for all shaft construction activities. The plan shall include details of air monitoring equipment, frequency of calibrating instruments, and procedures for lighting, ventilation, and electrical safeguards. Provide the name and qualifications for the site safety representative responsible for implementing the plan during the work.
- (t) Contingency Plans: Submit contingency plans for the following list of problems that may be encountered during microtunnelling operations.
  - (i) Difficulties advancing shaft components to required elevations within the geotechnical materials outlined in the GBR.
  - (ii) Excessive groundwater infiltration.
  - (iii) Encountering contaminated media and/or groundwater.

### E19.3 Execution General

- (a) Contractor shall furnish all necessary equipment, materials, power, water and utilities for all shaft construction and excavation activities required to complete this work.
- (b) Shaft construction shall not begin until:
  - (i) All required submittals have been completed, reviewed by the Consultant.
  - (ii) Notification has been submitted by the Contractor to all utility companies and all required permits have been obtained.
  - (iii) Existing structures, utilities, trees, shrubs, and other facilities are adequately protected.
  - (iv) Contractor shall notify the Consultant not less than fifteen (15) days before beginning any excavation.
- (c) The Contractor shall ensure operations on or off the site do not interfere with traffic or create a dust, mud, or noise nuisance.
- (d) The Contractor shall operate with a full crew 24 hours a day if a condition arises that jeopardizes the stability of the excavation or adjacent structures. This work shall include weekends and holidays without interruption until conditions no longer jeopardize the stability of the work.
- (e) Conduct shaft construction activities in accordance with all City of Winnipeg safety regulations and applicable provisions of all relevant Federal, Provincial and regulatory and inspecting authorities. Contractor shall provide temporary safety railing and fencing around all excavations.
- (f) All excavated materials shall be completely contained when stockpiled on site and shall be disposed of by the Contractor at a landfill licensed to accept. Contractor shall immediately clean up any spills.

#### E19.4 Quality Assurance

- (a) All shaft excavation work shall be completed by an experienced Contractor who has a minimum of three (3) years of experience in constructing similar shafts within materials similar to those described in the Geotechnical Reports.
- (b) The Contractor's superintendent shall have a minimum of three (3) years experience with the method(s) of shaft construction employed.
- (c) The Contractor shall allow access to the Engineer and shall provide necessary assistance and cooperation to aid the Engineer in documenting observations, measurements, and sample collection prior to, during and following all shaft construction operations.
- (d) The Contractor shall provide safe access to all equipment in accordance with all safety regulations. The Contractor is responsible for all aspects of safety of the support of excavation systems.
- (e) The Contractor shall take immediate action to limit loss of ground and inform the Engineer should ground fall out or excessive voids occur during shaft construction for any reason.

#### E19.5 Ground Water Control

- (a) Dewatering outside of the shaft perimeter to facilitate shaft construction will not be allowed. Contractor shall use ground improvement techniques such as jet grouting or other grouting measures to isolate the groundwater from the shafts.

#### E19.6 Secant Piles

- (a) If used, concrete piles shall be driven in plumb. Piles shall overlap with adjacent piles to generate a groundwater cutoff and eliminate groundwater infiltration.
- (b) Piles shall be driven and seated into the underlying material. Grout shall be used to seal and isolate groundwater flow around the piles through the existing material.
- (c) Reinforcing steel shall not be used near planned microtunnelling eyes.
- (d) Excavation shall not commence until such time as the concrete has achieved the minimum required strength.

#### E19.7 Concrete Caissons

- (a) If used, caisson lifts shall not be placed until the previous lift has achieved its minimum required strength.
- (b) Where possible, during construction the internal excavation shall be hydrostatically balanced with the natural groundwater to prevent heave, caving or sloughing of material.
- (c) Ports and pipes shall be provided for the supply of bentonite to the outside of the caisson shell to reduce skin friction and aid in the sinking of the shaft.
- (d) Construction joints and waterstops shall be used between caisson lifts and between the cutting shoe and the first lift.
- (e) Reinforcing steel shall not be used near planned microtunnelling eyes.
- (f) Shaft shall be seated into the existing material. Bottom of caisson shall consist of grout ports to aid in sealing the interface between the bottom of the soil and the existing ground.

#### E19.8 Shaft Eyes

- (a) The Contractor shall be responsible to assess the geotechnical conditions and the need for ground improvement at each of the launch shaft and reception shaft locations. If the Contractor determines the need for ground improvement exists, the design shall be included in the shaft submission and noted on the construction schedule. Details including the method, scope, and targeted zone should be noted and clear in the submission for the Engineer's review.

#### E19.9 Backfilling of Shafts

- (a) The Contractor shall backfill shafts with fillcrete.



- (b) Areas to be backfilled shall be free of debris, snow, ice, water, or frozen ground.
- (c) The Contractor is responsible for repairing all damage and correcting all deficiencies which may result from the settlement of backfill areas at no additional cost to the Owner.

#### E19.10 Removal of Support System

- (a) The Contractor shall only remove the upper portions of the shaft wall to three (3) metres below final grade to permit restoration around the shaft.

#### E19.11 Site Clean Up and Restoration

- (a) The Contractor shall remove all construction debris, spoils, oil, grease, and other materials from the shafts and staging areas upon completion of the Work.
- (b) The Contractor shall dispose of all excavated materials. Excavated materials shall be transported in lined trucks. Only those disposal sites identified in the reviewed submittals shall be used.
- (c) The Contractor shall restore and repair any damage resulting from their construction activities. Property damaged shall be restored to a condition equal to or better than existing prior to construction.

#### E19.12 Measurement and Payment

##### (a) Tunnelling Shafts

- (i) Construction of all shafts shall be measured at the contract unit price of "Tunnelling Shafts" for each of the Shafts described below. The price shall be for each shaft location described in these Specifications and as shown on the Drawings. No further shafts are permitted for Tunnelling Works. Rescue shafts are incidental to the costs of Tunnelling Shafts. The price includes but is not limited to shaft excavation, shoring and all appurtenances and miscellaneous materials as required to successfully carry out the tunnelling Works and installation of permanent pre-cast structures as shown on the Drawings.
- (ii) Tunnelling Shafts
  - MH-01 Shaft
  - MH-02 Shaft
  - MH-03 Shaft
  - MH-04 Shaft
- (iii) Payment for each shaft will be made on the monthly progress payment, once the shafts have been excavated and shored in accordance to the Specifications and approved shop drawings, and as approved by the Contract Administrator.
- (iv) Excavation described in section E26 is incidental to Tunnelling Shafts.
- (v) Payment for the temporary or permanent relocation of existing utilities (unless otherwise identified as a separate pay item), and/or temporary support of existing utilities (as defined in E17) required for the placement of shafts are incidental to Tunnelling Shafts.
- (vi) Shoring requirements identified in E18 are incidental to Tunnelling Shafts.

##### (b) MH-05 Shaft

- (i) All costs associated with shaft construction as described herein to support the installation of MH-05 are incidental to the installation of MH-05 (2400mm manhole c/w HDPE lining). No separate measurement or payment will be made.
- (ii) Excavation described in section E26 is incidental to the installation of MH-05 (2400mm diameter manhole c/w HDPE lining).
- (iii) Shoring requirements identified in E18 are incidental to the installation of MH-05 (2400mm diameter manhole c/w HDPE lining).

## **E20. REINFORCED CONCRETE JACKING PIPE**

### **E20.1 Description**

- (a) This section includes the minimum requirements for the reinforced concrete jacking pipe (RCJP) lined with HDPE (minimum 4mm thick liner) for the microtunnelling installation portion of this project.
- (b) This Specification supplements and amends City of Winnipeg Standard Construction Specification CW 2130 Gravity Sewers, and shall cover the installation of sewers not covered under the specifications.

### **E20.2 Design Criteria**

- (a) The contractor is fully responsible for the design of the RCJP in accordance with the design requirements as shown on the Drawings and established in this Specification.
- (b) The design of the RCJP shall consider all installation and service loads. These shall include jacking loads, external loads, external groundwater loads, earth loads, traffic loads, and other live and dead loads. The design of the RCJP shall be completed by direct design to ASCE/CI 27-17. Design calculations and RCJP shop drawings shall be sealed and signed by a registered Professional Engineer in the Province of Manitoba.
- (c) The joints of the pipe shall be watertight and designed for maximum external hydrostatic pressure (groundwater elevation at ground level) and shall be designed considering the Contractor's maximum external lubrication/grouting pressure. The joints of the pipe shall be designed to the specified hydrostatic requirements at the pipe manufacturer's maximum recommended angular deviation.
- (d) The RCJP shall be furnished in lengths that are compatible with transportation requirements, shaft dimensions, allowable work areas, and the Contractor's approved work plans.
- (e) Pipe joints and connections shall be flush bell and spigot joints capable of resisting all anticipated loads with a minimum factor of safety of two (2), with flexible elastomeric seals.
- (f) Pipe materials shall be transported, handled, and stored in accordance with the pipe manufacturer's recommendations. Dunnage (or 4 by 4's) shall be used such that the pipe sections are properly supported in accordance with the pipe manufacturer's recommendations.
- (g) The Contractor shall ensure the pipe is not chipped, crushed, gouged, or damaged. Damaged pipe sections shall be rejected and removed from the site and replaced or repaired using methods and materials approved in writing by the Engineer at no cost to the Owner.
- (h) Compression ring material shall not extend or protrude beyond the outer or inner diameter of the pipe. Compression ring material shall be used in accordance with pipe manufacturer's recommendations.
- (i) Grout/lubrication ports shall be provided along the pipe at intervals chosen by the Contractor as noted in the microtunnelling specifications. Ports and fittings shall not affect the strength of the jacking pipe. Grout holes shall be fitted with countersunk, full face, rubber gaskets to prevent infiltration. The lubrication ports shall have a minimum diameter of 31.25 mm.
- (j) Plugs (provided by the pipe manufacturer) for sealing the grout/lubrication ports shall be capable of withstanding all external and internal pressures and loads without leaking.
- (k) The bell shall be reinforced with a steel band in composite with a reinforced concrete bell or a separate steel bell collar, and manufactured in accordance with ASTM C1885. Steel bands and collars shall have a minimum thickness of 12.7 mm and be epoxy coated.
- (l) The spigot shall be reinforced and manufactured in accordance with ASTM C1417.
- (m) Circumferential reinforcement shall consist of inner and outer cages. Elliptical reinforcement and quadrant reinforcement are not permitted.

- (n) If shear reinforcement (stirrups) is used, the stirrups shall be placed around the full circumference of the pipe, regardless of the actual design requirement.
- (o) The inside of the RCJP shall not vary by more than one (1) percent of the design inside diameter, or plus or minus 10 mm, whichever is greater. Except that in no case shall the inside diameter vary by more than plus or minus 19 mm.
- (p) The outside diameter of the RCJP shall not vary by more than one (1) percent of the design outside diameter, or plus or minus 10 mm, whichever is greater. Except that in no case shall the outside diameter vary by more than plus or minus 19 mm.
- (q) The wall thickness of the RCJP shall not vary by more than five (5) percent of the designated design wall thickness, or plus or minus 6 mm, whichever is greater.
- (r) The variation in the length of two opposite sides of the pipe shall not be more than 6 mm.
- (s) The plane formed by the pipe end (pipe end squareness) shall not deviate from perpendicular to the longitudinal axis by more than 0.5% of the design inside diameter for pipes 1200 mm and smaller, and 0.45% of the design inside diameter for pipes larger than 1200 mm.
- (t) The underrun in length of a section of pipe shall not be more than 10 mm/m, with a maximum of 12.7 mm in any length of pipe.
- (u) HDPE lining and Epoxy Coating in accordance with E23 and as identified on the Drawings.

### E20.3 Submittals

- (a) Provide sufficient detail to allow the Engineer to review whether the proposed equipment, materials, and procedures meet the requirements of the Specifications. Review of the Contractor's submittals by the Engineer shall not be construed in any way as relieving the Contractor of their responsibilities under this Specification.
- (b) The Contractor shall submit written descriptions of procedures and specifications used in the manufacture of the RCJP. Submit details of pipe restraint to prevent movement of jacking pipe back into the shaft during stoppages and main jack retractions.
- (c) Design/Fabrication Drawings: Submit shop drawings illustrating the details of the pipe wall thickness, design concrete strength, jacking capacity of the pipe, location of lubrication/grout ports, pipe joint details, HDPE lining (minimum 4mm thick), compression ring details, gaskets, and reinforcement including tolerances shall be submitted. Reinforcement details shall include reinforcement specification, reinforcement type, design yield strength of reinforcement, placement and design concrete cover, cross-sectional diameters, spacing, cross-sectional area, description of longitudinal members, and if stirrups are used, stirrup shape, placement, and anchorage details. RCJP shop drawings shall be sealed and signed by a registered Professional Engineer licensed in the Province of Manitoba.
- (d) The Contractor shall submit joint details including details of the cross-section.
- (e) The Contractor shall submit details of the bentonite/grout ports.
- (f) Calculations: Submit design calculations for the RCJP demonstrating that the jacking pipe is capable of supporting the maximum loads during pipe jacking with respect to the Contractor's means and methods, and intermediate jacking station placement strategy. Design calculations shall be completed in accordance with ASCE/CI 27-17. Design calculations shall be sealed and signed by a registered Professional Engineer licensed in the Province of Manitoba.
- (g) Provide manufacturer recommendations for allowable jacking loads and ultimate jacking loads.
- (h) The Contractor shall submit concrete mix design including admixture data sheets for approval by the Engineer.
- (i) Test Reports:
  - (i) Submit test results with respect to the physical properties of the jacking pipe. Test results shall be submitted for approval prior to shipment of the pipe to the site.

#### E20.4 Quality Assurance

- (a) The Contractor shall use an experienced pipe jacking pipe manufacturer to manufacture the jacking pipe as per this Specification. Qualifications of the pipe manufacturer shall be submitted for acceptance by the Engineer prior to manufacturing.
- (b) All work shall be performed under the review of quality control personnel or as approved by the Engineer.
- (c) The Contractor shall immediately notify the Engineer, in writing, when any problems are encountered with materials or during manufacturing of the jacking pipe.
- (d) The Contractor shall furnish all labor necessary to assist the Engineer in inspecting pipe upon delivery. The Contractor shall remove rejected pipe immediately.
- (e) Individual sections of pipe may be rejected due to: fractures, or cracks passing through the wall prior to installation; defects that indicate proportioning, mixing, and molding not in compliance with ASTM C1417 or surface defects indicating honey-combed or open textures; variations in the pipe dimensions, length, and squareness noted in this Specification and ASTM C1885; damage or cracked ends, where such damage is unreparable and would affect the proper function of the jacking pipe, and any continuous longitudinal crack with a minimum surface width of 0.25 mm and extending a length of 300 mm or more, regardless of the position in the wall of the pipe.
- (f) Testing Requirements:
  - (i) Compression tests for determining the compressive strength of the concrete used in the manufacture of the RCJP shall be made on concrete cylinders. Concrete cylinders shall be prepared in accordance with ASTM C497. A minimum of five (5) test cylinders shall be prepared per one (1) day's production of pipe sections.
  - (ii) Hydrostatic joint testing shall be completed in accordance with ASTM C497 at the required design hydrostatic pressures noted in this Specification.

#### E20.5 Pipe Manufacturing

- (a) RCJP shall be manufactured in conformance with ASTM C1417 and ASTM C1885.
- (b) Joints shall be manufactured in conformance with ASTM C361.

#### E20.6 Pipe Materials

- (a) Cement, used in the manufacturing of the jacking pipes, shall be Type 50 Sulphate Resistance Portland in conformance with CSA A3001 (Type V in conformance with ASTM C150).
- (b) Aggregates shall conform to the requirements of ASTM C33, except that the requirement for gradation shall not apply.
- (c) Admixtures shall not be introduced into the concrete mixes without the prior authorization of the Engineer.
- (d) HDPE lining and Epoxy Coating in accordance with E23 and as identified on the Drawings.
- (e) The basis of acceptance of RCJP manufactured in compliance with these specifications shall be in accordance with ASTM C1417 and as follows:
- (f) Basis of Acceptance of Design
  - (i) Engineer review of all submittals required including manufacturing design data and direct design calculations.

#### E20.7 Measurement and Payment

- (a) All costs associated with reinforced concrete jacking pipe as described herein are incidental to Microtunnelling. No separate measurement or payment will be made.

## **E21. MICROTUNNELLING**

### **E21.1 Description**

- (a) This section outlines the minimum requirements for the installation of jacking pipes using microtunnelling construction techniques. The Contractor is responsible for selecting the means and methods to complete construction of the sewer using a one-pass installation of jacking pipe between the shaft locations shown on the Drawings.

### **E21.2 Design Criteria**

- (a) The microtunnelling equipment shall be compatible with the geologic conditions described in the GBR and anticipated by the Contractor. The Contractor is solely responsible for evaluating the ground conditions and ensuring appropriate equipment and installation procedures are employed during the work. The tooling shall be capable of excavating material with the properties as identified in the GBR.
- (b) The MTBM shall be equipped for automatic, continuous, real-time, electronic data logging with automatic information backup system.
- (c) The articulated joints between the segments of the MTBM shall be watertight. The tail of the MTBM shall be gasketed to prevent material from entering the machine and the first jacking pipe.
- (d) The MTBM shall be steerable in both the vertical and horizontal directions to install the jacking pipe on the line and grade shown on the Drawings. Variations from the design line shall not exceed six (6) percent of the MTBM diameter or 50 mm, whichever is greater. Variations from the design grade shall not exceed three (3) percent of the MTBM diameter or 25 mm, whichever is greater. Under no circumstances shall the steering deviation exceed one half (1/2) of the allowable pipe joint deflection recommended by the jacking pipe manufacturer. Steering corrections shall be made in accordance with criteria provided in this Specification.
- (e) A laser or theodolite guidance system shall be used to guide and continuously monitor line and grade. The guidance system shall be capable of functioning at the intended maximum drive length without loss of accuracy or reliability.
- (f) The cutter wheel shall have a reversible drive system to allow rotation in either clockwise or counterclockwise directions to minimize rotation or roll of the MTBM. The cutter wheel of the MTBM shall be accessible to allow manned entry to access, inspect, and replace worn out tooling during a drive without the use of a rescue shaft. Cutter discs are to be rear mounted to allow removable from inside the excavation chamber.
- (g) The Contractor shall determine the appropriate radial overcut for the anticipated ground conditions, however in no case shall the radial overcut exceed 40 mm. The Contractor shall ensure that their selected overcut does not cause pipe joint deflections that exceed the allowable values as recommended by the pipe manufacturer.
- (h) The Contractor shall use a properly formulated drilling fluid engineered to the ground conditions outlined in the GBR.
- (i) Lubrication/grout ports shall be provided at a minimum as frequently as every third pipe. A lubrication port shall also be provided in the shield of the MTBM. The Pipe manufacturer shall install these ports within the pipe segments at the time of pipe manufacture. The lubrication ports shall have a minimum diameter of 31.25 mm and be threaded to allow connection of the lubrication and grouting systems. All ports shall be fitted with a one-way valve.
- (j) Lubrication shall be continuously injected during pipe jacking operations to reduce frictional resistance between the excavated bore and the outside of the jacking pipe. Lubrication shall include a mixture of bentonite and/or polymers (including anti-swelling additives) and water and shall be suitable for the ground conditions described in the GBR.
- (k) Upon completion of the microtunnel drive, grout shall be injected into the annular space through all ports. Once grouting has been completed, each port shall be sealed as per the manufacturer's recommendations.

- (l) The thrust block shall be designed to withstand the maximum jacking force that the jacking system can produce without excessive deflection or displacement set by the shaft designer, with a factor of safety of 1.5. Launch and reception seals shall be provided at the launch and reception shafts, respectively.
- (m) The jacking system shall be capable of uniformly distributing the jacking force to the end of the jacking pipe. The maximum allowable jacking force applied to the pipe shall not exceed the pipe manufacturer's recommended allowable eccentrically applied jacking load.
- (n) Intermediate jacking stations (IJSs) shall be designed using a continuous steel casing fabricated to the same outside diameter as the jacking pipe. The steel cylinder shall be protected from corrosion with an approved epoxy paint system. Special recessed interjack pipe shall be used to accommodate the IJS. Mechanical joint shall be used between the shell and the interjack pipe to provide a watertight pipe joint during operation and after IJS removal. The steel casing and closed IJSs shall have an equal level of protection to the regular jacking pipe joints. The Contractor shall determine the required spacing of IJSs based on the ground conditions outlined in the GBR, estimated jacking forces, and thrust capacities of the jacking pipe and jacking frame.
- (o) The spoil conveyance and separation system shall be designed for the full range of ground conditions as described in the GBR. The separation system shall be compatible with the anticipated excavation rate, effective in removing the spoils from the slurry, compatible with the available staging area, and compatible with noise control requirements. Slurry disposal is the responsibility of the Contractor and all costs associated with slurry disposal shall be borne by the Contractor.
- (p) The MTBM shall be equipped with a continuous flammable gas monitor (with alarms if gas concentrations exceed regulatory thresholds).

### E21.3 Submittals

- (a) Provide sufficient detail to allow the Engineer to review whether the proposed equipment, materials, and procedures meet the requirements of the Specifications. Review of the Contractor's submittals by the Engineer shall not be construed in any way as relieving the Contractor of their responsibilities under this Specification.
- (b) Microtunnelling Work Plan: Submit a work plan complete with drawings, written descriptions, procedures, and manufacturer's information identifying the details of the proposed method of construction, equipment, materials, and the sequence of operations during construction. This work plan shall include:
  - (i) MTBM specifications from the manufacturer.
  - (ii) Description of the tooling that will be used to excavate the materials identified in the GBR. Submit confirmation that the proposed equipment and methods can complete the required drive lengths within the identified geotechnical materials for the project. Explain the suitability of the proposed equipment for the ground conditions identified in the GBR.
  - (iii) Provide procedures for tooling inspection and changes during a microtunnelling drive.
  - (iv) Description of the alignment control and guidance systems. Provide details of surveying methods that will be used to set guide rails, jacking system, and guidance system positions. Provide description of procedures to check and reset guidance system during microtunnelling. Provide details of guidance system confirming the required line and grade can be achieved within the specified tolerances for the required drive lengths and curved section. Provide manufacturer's literature, drawings, and certificate of the calibration for the laser or theodolite system.
  - (v) At least one of the tunnel drives is expected to transition from underlain bedrock to the overburden material. Explain how pipe grade will be maintained in the transition zones between the underlain bedrock and clay till overburden materials. Detail the controls that will be used to stabilise the face in the mixed face ground conditions.

- (vi) Description and capacity of the jacking system including details of the thrust ring, thrust block, jacking controls, hydraulic pressure to jacking force conversions, and hydraulic jack calibration data.
  - (vii) Description and capacity of the IJSs including placement, number of hydraulic cylinders, hydraulic pressure to jacking force conversions, calibration data, interjack pipe and shell materials, proposed spacings, and method of operation. Submit details including dimensions, seals, measures for corrosion protection, and method of abandonment and final seal configuration.
  - (viii) Description of lubrication system including materials to be used, manufacturer's literature, safety data sheets (SDS) sheets, mix equipment, procedure for lubricating the jacking pipe, and volume requirements.
  - (ix) Description of the slurry separation system including details of course and fine shaker screens, hydrocyclones, centrifuge equipment, holding tank capacity, separation rates, slurry additives (including SDS sheets), noise abatement provisions, and procedures for handling contaminated media.
- (c) Shop Drawings and Equipment Layout Drawings:
- (i) Submit shaft layout drawings detailing dimensions and locations of all equipment within available staging areas at each shaft location required to support microtunnelling operations. Equipment shall include cranes, front-end loader, jacking pipe stockpiling, spoil transfer areas, spoil hauling equipment, pumps, generators, lubrication plant, control cabin, separation plant, tool trailers, containers, and any other required equipment.
  - (ii) Submit MTBM shop drawings including configuration of cutter wheel and overcut tolerances.
- (d) Construction Schedule:
- (i) Submit a detailed schedule showing all major construction activities and durations including mobilization, site preparation, shaft construction, working slab construction, base slab construction, jacking equipment setup, launch seal installation, microtunnelling, exit seal installation, MTBM retrieval, contact grouting, shaft backfilling, site restoration and cleanup, and demobilization. Schedule is to be maintained and updated by the Contractor every two (2) weeks. Copies of revised schedules shall be provided to the Consultant.
- (e) Calculations: Submit the following supporting design calculations. The Contractor shall clearly state all assumptions and values used in their calculations.
- (i) Theoretical jacking force calculations for each drive based on the jacking pipe size and material, geometry, IJS placement strategy, installation depth, ground and groundwater conditions outlined in the GBR and drive length.
  - (ii) Maximum allowable jacking force calculations with respect to the Contractor's means and methods and IJS placement strategy.
  - (iii) Maximum allowable lubrication pressure calculations based on the lubrication mix design, system operating parameters, installation depth, and ground and groundwater conditions outlined in the GBR with the intent of preventing inadvertent returns.
  - (iv) Maximum allowable grouting pressure calculations based on contact grout mix design, system operating parameters, installation, depth, and ground and groundwater conditions outlined in the GBR with the intent of preventing inadvertent returns.
- (f) Jacking Pipe Details: Provide manufacturer recommendations for allowable jacking loads and ultimate jacking loads. Submit details of pipe restraint to prevent movement of jacking pipe backwards into the launch shaft during stoppages and main jack retractions.
- (g) Safety Plan: Submit a detailed safety plan for all work activities. The plan shall include details of air monitoring equipment, frequency of calibrating instruments, and procedures for lighting, ventilation, and electrical safeguards. Provide the name and qualifications for the site safety representative responsible for implementing the plan during the work. Safety

plan shall be in accordance with Provincial Regulatory and City of Winnipeg safety guidelines.

- (h) Daily Records: Daily records shall be submitted to the Engineer for review by noon on the day following the shift for which the data or records were taken. These records shall include date, time, operator, tunnel drive designation, jacking pipe number and installed length, time required to jack each pipe, , jacking force, rate of advance, cutter wheel speed and torque, , line and grade offsets, machine roll, IJS usage and force, lubrication type, volume injected, material properties, and pressures, slurry inflow and outflow rates and pressures, , use of high pressure jets, face pressure, spoil volume, geotechnical conditions encountered, guidance system adjustments, ground water inflow rates, tooling replacements, slurry additives and properties, and problems encountered. Manual machine recordings of these parameters shall be recorded at intervals of no less than three times per pipe. Computer recorded data of machine performance parameters should be referenced to time and distance and should be recorded at time intervals of one minute or less.
- (i) Contingency Plans: Submit contingency plans for the following list or problems that may be encountered during microtunnelling operations.
  - (i) Inability to advance the MTBM.
  - (ii) Jacking forces exceeding the allowable limits for the jacking pipe, IJSs, main jacking system, or thrust block.
  - (iii) Wearing out of tooling prior to reaching the reception shaft.
  - (iv) Steering difficulties resulting in line and grade tolerances being exceeded.
  - (v) Excessive pipe separation at joints.
  - (vi) Pipe movement into launch shaft during stoppages and main jack retractions.
  - (vii) Guidance system misalignment or distortion by heat, humidity, or physical disturbance.
  - (viii) Damage or failure of jacking pipe.
  - (ix) Inadvertent returns to the surrounding formation (loss of drilling fluid) or to the ground surface (hydrofracture).
  - (x) Obstruction removal.
  - (xi) Over excavation.
  - (xii) Encountering unexpected ground / geotechnical conditions.

#### E21.4 Quality Assurance

- (a) The Contractor's surveyor responsible for line and grade control shall have a minimum of 5 years experience in tunnelling and precision surveying. The Contractor's surveyor shall have a minimum of three tunnelling projects for which they were responsible for line and grade. All survey work shall be completed in SI units.
- (b) The Contractor shall allow access to the Engineer and shall provide necessary assistance and cooperation to aid the Engineer in documenting observations, measurements, and sample collection prior to, during and following all pipe jacking operations. Access shall include, but is not limited to:
  - (i) Full access to the MTBM, and jacking system during all site activities to visually observe jacking forces, tooling wear, and steering corrections.
  - (ii) Full access to the operator control room prior to, during, and following all microtunnelling operations. This shall include providing visual access to real-time operator control screens, gauges, and indicators. The display language of digital readouts, gauges and indicators shall be translated to English and denoted on site in English if the output is not natively in English. The operating readings and parameters shall be displayed and recorded in SI units.
  - (iii) Full access to the launch and reception shafts and installed pipeline to visually inspect installed jacking pipes, shaft seals, and line and grade.



- (iv) Full access to the slurry separation plant to collect samples a minimum of once per installed pipe section or every three (3) metres from the shaker screens. This shall include access to the shaker screens, hydrocyclones, conveyor belts, centrifuge equipment, and slurry and spoil holding tanks.
  - (v) Full access to the lubrication plant to visually inspect storage and mixing tank levels, lubrication pressures and pumping rates, amount and type of additives, and collection of samples to determine lubrication properties.
- (c) The Contractor shall provide safe access to all equipment in accordance with all safety regulations.

#### E21.5 General Execution

- (a) Contractor shall furnish all necessary equipment, materials, power, water, and utilities for all microtunnelling activities required to complete this work.
- (b) Microtunnelling operations shall not begin until:
  - (i) All required submittals have been completed and reviewed by the Engineer.
  - (ii) Orientation and grade of the jacking frame and guide rails have been properly surveyed and verified. Guide rails shall be securely attached to the concrete working slab to prevent movement or shifting during pipe jacking operations.
  - (iii) Required geotechnical instrumentation has been installed and baseline readings have been established.
  - (iv) Start-up inspection of mechanical and hydraulic systems have been performed. Start-up inspection shall be completed in the presence of the Engineer.

#### E21.6 Site Clean Up and Restoration

- (a) The Contractor shall remove all construction debris, spoils, oil, grease, and other materials shall be removed from the launch shaft, reception shaft, jacking pipes, and staging areas upon completion of microtunnelling activities.
- (b) The Contractor shall dispose of all excavated materials. Excavated materials shall be transported in lined trucks. Slurry shall be pumped into tanker trucks and disposed of at acceptable facilities in accordance with current provincial regulations for disposal of these materials. Only those disposal sites identified in the reviewed submittals shall be used.
- (c) The Contractor shall restore and repair any damage resulting from their construction activities. Property damaged shall be restored to a condition equal to or better than existing prior to construction. Restoration shall be completed no later than 30 days after microtunnelling activities are complete.

#### E21.7 Measurement and Payment

- (a) Supply and Install minimum 1200mm diameter RCJP with HDPE Liner (minimum 4mm thick) by Microtunnel.
  - (i) Pipe installed by Microtunnell shall be measured on a lineal meter basis and paid for at the Contract Unit Price for "Microtunnelling". Measurement for length of tunnel will be made horizontally at grade above the centreline of pipe through shafts from the downstream face of the upstream manhole to the upstream face of the downstream manhole. The price shall include all Work described herein (with the exception of shaft installation).
  - (ii) The unit price for this item shall include all costs to supply and install the reinforced concrete jacking pipe, 4mm thick HDPE liner, cap strips, welding and QAQC, lubrication, contact grouting, and microtunnelling plan development. Costs shall include the supply and use of microtunnel boring machines, slurry management units, lubrication and grouting systems, and ancillary equipment needed to install the interceptor sewer on line and grade as outlined in the Drawings and Specifications herein.

- (iii) Price shall include all water, drilling fluids, polymers, and admixtures required for the installation. Price shall also include all management, testing, and disposal for the disposal of drilling fluids and cuttings.
- (b) Payment Schedule
  - (i) Microtunnelling listed on Form B: Prices will be paid out in accordance with the following payment schedule:
    - ◆ 20% paid upon completion of pipe installation
    - ◆ 50% paid upon completion of contact grouting
    - ◆ 30% paid upon completion of joint welding and QAQC documentation

## **E22. CONTACT GROUTING**

### **E22.1 Description**

- (a) This section outlines the minimum requirements for contact grouting following microtunnel drive completion. The Contractor shall furnish all materials and equipment necessary for contact grouting the annular space and any voids created or encountered during microtunnelling and any voids created or encountered during shaft construction.

### **E22.2 Design Criteria**

- (a) The Contractor shall provide all equipment, materials, and personnel necessary to completely fill the annular space and all voids outside of the installed jacking pipe and any voids along the outside of the shaft support system.
- (b) The Contractor shall develop one or more grout mixes designed to completely fill the annular space and all voids, and to provide acceptable strength based on the size of the voids. All grout mix proportions shall be subject to review by the Engineer.
- (c) Minimum compressive strength of 1 MPa in 24 hours.
- (d) Grout shall consist of Portland cement, fluidifier as necessary and water in the proportions specified herein or as reviewed by the Engineer. Up to two (2) percent bentonite by weight of cement may be added to the mix. Additional cement, water, and fluidifier may also be added in instances of very high grouting volumes, as reviewed by the Engineer.
- (e) Grout mix ratios (water/cement) shall be varied as needed to fill all voids and shall be between 1:1 and 2:1 by volume.

### **E22.3 Submittals**

- (a) Provide sufficient detail to allow the Engineer to review whether the proposed equipment, materials, and procedures meet the requirements of the Specifications. Review of the Contractor's submittals by the Engineer shall not be construed in any way as relieving the Contractor of their responsibilities under this Specification.
- (b) Contact Grout Work Plan: Submit a work plan detailing methods, equipment, procedures, and sequencing of grout work. This work plan shall include:
  - (i) Description and details of injecting methods and minimum and maximum grout pressures based on overburden geotechnical materials, depth of cover, jacking pipe joint design, and adjacent utility protection.
  - (ii) Description of monitoring and recording equipment.
  - (iii) Pressure gauge calibration data.
  - (iv) Description of methods to control grout pressure.
  - (v) Description of methods to transport grouting equipment and materials.
  - (vi) Descriptions of provisions to protect the jacking pipe or support of excavations system.

- (c) The Contractor shall submit details of grout mix proportions, admixtures, manufacturer's information, and laboratory test data verifying strength of proposed grout mixtures (24 hour and 28-day strengths).
- (d) The Contractor shall submit anticipated volumes of grout to be injected for each application.
- (e) The Contractor shall maintain and submit daily logs of grouting operations detailing locations and times of injection, maximum and minimum pressures, volumes, and grout mix details.

#### E22.4 Quality Assurance

- (a) The Contractor shall allow access to the Engineer and shall provide necessary assistance and cooperation to aid the Engineer in documenting observations, measurements, and sample collection prior to, during and following all contact grout activities. Access shall include, but is not limited to:
  - (i) Full access to the grout mixing equipment, launch and reception shafts, and completed drive pipe string to visually inspect the grouting procedure and record grout parameters (pressures, volumes, locations, etc.).
- (b) The Contractor shall immediately notify the Engineer, in writing, when any problems are encountered with equipment or materials.
- (c) The Contractor shall provide safe access to all equipment in accordance with all safety regulations.
- (d) The Contractor shall prepare four (4) samples of each proposed grout mix and determine 24-hour and 28-day strength in accordance with ASTM C109. Four samples of grout shall be obtained from the nozzle of the grout injection line for each fifty (50) cubic meters of grout that is injected, but not less than one set for each grouting shift unless directed otherwise by the Engineer.

#### E22.5 Equipment

- (a) Mixing and injection equipment shall be capable of mixing, agitating, and injecting grout into grout holes/ports in a continuous flow at the desired injection pressure.
- (b) Grout pumps shall be capable of developing a sustained pressure of 350 kPa. A pressure regulator shall be used to control maximum grouting pressures and prevent damage to the jacking pipe or support of excavation system. Grout pressures will be controlled to minimize the risk of inadvertent returns to ground surface.
- (c) Grouting equipment shall be fitted with a meter to determine the volume of grout injected.
- (d) Two pressure gauges shall be provided: one at the grout pump and one at the collar of the grout port being injected.
- (e) Grout hoses shall have an inside diameter of not less than 37.5 mm.
- (f) Provide suitable stop valves at the collar of each injection point for use in maintaining pressure as required, until grout has set.

#### E22.6 Materials

- (a) Cement shall be Type V Portland Cement conforming to ASTM C150.
- (b) Bentonite shall be commercially processed Wyoming type powdered bentonite.
- (c) Fluidifier shall hold constituents in colloidal suspension, be compatible with the cement and water, contain an expansive shrinkage compensator, and comply with the requirements of ASTM C937.
- (d) Admixtures may be used subject to the approval of the Engineer. Admixtures may be used to improve the pump-ability, control set time, hold sand in suspension, and to prevent segregation and bleeding.

#### E22.7 Execution - General

- (a) Contractor shall furnish all necessary equipment, materials, power, water and utilities for all contact grouting activities required to complete this work.
- (b) The Contractor shall take all necessary precautions to protect and preserve the interior surfaces of the jacking pipe.
- (c) Contact grouting operations shall be initiated upon completion of microtunnelling drives.
- (d) Grouting of voids around shafts shall be completed immediately upon completion of each shaft. Where required, grout holes shall be drilled through support of excavation systems to allow delivery of grout into voids.
- (e) The Contractor shall ensure operations on or off the site do not interfere with traffic or create a dust, mud, or noise nuisance.
- (f) All personnel in contact with grout admixtures shall wear appropriate hoods equipped with respiratory masks, gloves, and necessary protective clothing. Eye baths shall be readily available.

#### E22.8 Execution – Mixing and Injecting Grout

- (a) Inject grout through grout ports in such a manner as to completely fill all voids outside the jacking pipe. Grout pressures shall be controlled to prevent damage to the pipe and inadvertent returns to ground surface.
- (b) Completely fill all voids between shaft support system surround formation. Grout pressures shall be controlled to prevent damage to the support of exaction system, existing utilities near the shafts, and to avoid movement of the surrounding ground.
- (c) All materials shall be free of lumps when placed into the mixer and mixed grout shall be continuously agitated. Grout that is not injected into the bore within 90 minutes of mixing shall be wasted.
- (d) The grouting process shall be operated such that grout is delivered at a uniform rate.
- (e) The Contractor shall recirculate grout mixes for at least two minutes when any new mix is batched or after adding water, fluidifier, or sand to the mix prior to injecting grout into the grout port/hole.

#### E22.9 Execution – Site Clean Up and Restoration

- (a) The Contractor shall immediately clean up any grout spills.
- (b) The Contractor shall restore and repair and damage resulting from their grouting activities. Property damaged shall be restored to a condition equal to or better than existing, prior to construction. Restoration shall be completed no later than 30 days after contact grouting activities are complete.
- (c) The Contractor shall properly dispose of all wastewater arising from grouting operations. Contents of grout lines shall not be discharged into the jacking pipe, sanitary sewers, storm drains, or surface waters.

#### E22.10 Measurement and Payment

- (a) All costs associated with contact grouting as described herein are incidental to Microtunnelling. No separate measurement or payment will be made.

### **E23. CONCRETE PROTECTIVE LINERS AND COATINGS**

#### E23.1 Description

- (a) This Specification shall cover the protective liner requirements for the pipe and manholes for this Project.

#### E23.2 Reference Standards

ASTM International

- (a) ASTM D792, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
- (b) ASTM D4218, Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
- (c) ASTM D5199, Standard Test Method for Measuring the Nominal Thickness of Geosynthetics
- (d) ASTM D5596, Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
- (e) ASTM D6365, Standard Practice for Nondestructive Testing of Geomembrane Seams Using the Spark Test
- (f) ASTM D6392, Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produces Using Thermo-Fusion Methods
- (g) ASTM D6693, Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes
- (h) ASTM D7234, Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers
- (i) ASTM D7853, Standard Test Method for Hydraulic Pullout Resistance of a Geomembrane with Locking Extensions Embedded in Concrete  
Geosynthetic Institute
- (j) GRI-GM19a, Standard Specification for Seam Strength and Related Properties of Thermally Bonded Homogeneous Polyolefin Geomembrane/Barriers

#### E23.3 Submittals

- (a) Submittals to be in accordance with E4 and E20.
- (b) Submit manufacturer's instructions, printed product literature, and data sheets for the concrete protective liner (CPL).
- (c) Submit written certification from the CPL manufacturer that the CPL meets or exceeds the requirements of this specification.
- (d) Submit manufacturer's instructions, printed product literature, and data sheets for the epoxy coating.
- (e) Submit the precast concrete manufacturer's Factory Quality Control Program for the CPL including welding procedures, equipment details, qualifications of the factory welding technicians, extruder trial procedures and trial frequencies, and non-destructive test methods and test frequencies.
- (f) Submit the CPL installer's Field Quality Control Program including welding procedures, equipment details, qualifications of the field welding technicians, extruder trial procedures and trial frequencies, and non-destructive test methods and test frequencies.

#### E23.4 Closeout Submittals

- (a) Submit final records of all the extruder trials and non-destructive tests for both the factory and field CPL seaming.
- (b) Submit a final record of all field tests for the epoxy coating.

#### E23.5 Delivery, Storage and Handling

- (a) Deliver, store and handle Materials in accordance with E20 and with manufacturer's written instructions.
- (b) Delivery and Acceptance Requirements: deliver Materials to site in original factory packaging, labelled with manufacturer's name and address.
- (c) Storage and Handling Requirements:
  - (i) Store Material in accordance with manufacturer's recommendations.

- (ii) Store and protect Materials from damage.
- (iii) Replace defective or damaged Materials with new.

**E23.6 Materials**

- (a) Concrete Protective Liner (CPL) shall be smooth HDPE liner with a minimum nominal thickness of 4.0mm (or as indicated elsewhere in the Contract Documents), measured in accordance with ASTM D5199, complete with locking extensions on one side of the liner for embedment into concrete.
- (b) Locking extensions shall be manufactured during the extrusion process in one homogenous piece with the CPL and shall not be attached by secondary manufacturing processes such as welding or mechanical finishing.
- (c) CPL for precast concrete sewer sections (e.g., concrete pipes and manholes) shall be cast-in-place at the factory. Precast concrete sections with CPL shall be manufactured by wet-cast method. A maximum of one longitudinal CPL seam is permitted for each precast concrete sewer section (i.e., individual pipe segment or manhole barrel).
- (d) CPL cap strips for overlapping joints shall be smooth HDPE liner with a minimum nominal thickness of 4.0 mm (or as indicated elsewhere in the Contract Document), measured in accordance with ASTM D5199, and a nominal width range of 60 to 200 mm unless otherwise approved by the Engineer.
- (e) The CPL shall be repairable at any time during the life of the structure.
- (f) Openings or discontinuities in the CPL for the relief of weep water and vapor pressure shall be provided as indicated on the Drawings. If no openings or discontinuities in the CPL are indicated on the Drawings the CPL shall be a fully sealed system.
- (g) The CPL shall meet the following properties:

Property	Test Method	Minimum Average Values		
		2.0	3.0	5.0
Nominal Thickness (mm)	ASTM D5199	2.0	3.0	5.0
Density (g/cc)	ASTM D792, Method B	0.935		
Tensile Yield Strength (N/mm)	ASTM D6693, Type IV	30.8	46	77
Break Elongation (%)	ASTM D6693, Type IV	300	300	300
Carbon Black Content (%)	ASTM D4218	2 - 3		
Carbon Black Dispersion (category)	ASTM D5596	Only near spherical agglomerates for 10 views: 9 views in Cat. 1 or 2, and 1 view in Cat. 3		
Hydraulic Pullout Resistance (kPa)	ASTM D7853	206.9 for min. 200 hr		

- (h) Approved products:
  - (i) AGRU Ultra-Grip or equivalent.

**E23.7 Extrudate Rod**

- (a) Extrudate material shall be manufactured from the same parent material as the CPL.
- (b) Extrudate material shall be free of contamination by moisture or foreign matter.

**E23.8 Epoxy Coating**

- (a) Epoxy coatings for wastewater infrastructure concrete protection shall be hand-applied or sprayable to a minimum final film thickness of 6 mm.

- (b) Epoxy coatings shall be used to protect wastewater infrastructure concrete not protected by factory or field cast-in-place CPL (e.g., cast-in-place manhole benching, mortared pipe-to-manhole connections, exposed ends of precast concrete pipe penetrations at manholes, and precast concrete grade rings).
- (c) Approved products:
  - (i) Neopoxy NPR-5305.

#### E23.9 Construction/Execution

##### E23.9.1 CPL Field Seams

- (a) The installation contractor shall be trained and licensed to install the CPL product. Welders shall be IAGI Certified.
- (b) Field seaming shall not occur if the material temperature is lower than 0°C. All CPL surfaces to be seamed shall be dry, free from dirt, mud, and debris, and free from standing water.
- (c) Seaming shall be performed by extrusion welding.
- (d) Hot air welding may only be used for tacking materials prior to extrusion welding.
- (e) Joints between CPL panels greater than or equal to 10 mm in width require overlapping CPL cap strips seamed with extrusion fillet welds. Joints between CPL panels less than 10 mm in width may be seamed with extrusion butt welds.
- (f) If grinding of the surfaces to be welded is required, the grinding marks shall be orientated perpendicular to the seam direction and no marks shall extend beyond the extrudate after placement.
- (g) Clean overlapped areas and maintain state of cleanliness until the weld is complete. Inspect cap strips and liner structures for flaws and repair as required.
- (h) Insert a continuous electrically conductive material into field seams immediately prior to or during fabrication to facilitate spark testing in accordance with ASTM D6365.
- (i) The extruder identification, date, time, technician initials, and barrel and air temperatures shall be recorded on the CPL.

##### E23.9.2 Extruder Trial Seams

- (a) Extruder trial seams are required:
  - (i) At the start of each welding period.
  - (ii) If welding has ceased for four hours or more.
  - (iii) If a new operator or new machine starts welding.
- (b) Extruder trail seams are to be completed using the CPL cap strip materials in the same conditions or in as close as practicable conditions to the conditions of the field welding.
- (c) Extruder trial seams shall be at least 1 m long with the seam centred lengthwise. Prepare and test specimens in accordance with ASTM D6392 for peel and shear.
- (d) Peel and shear strengths shall meet or exceed the extrusion fillet seam strengths specified in GRI-GM19a Table 1(b). If the nominal thickness of the trail seam material is greater than 3 mm, the peel and shear strengths shall meet or exceed the extrusion fillet seam strengths specified in GRI-GM19a Table 1(b) for 3 mm nominal thickness geomembrane.

##### E23.9.3 Spark Testing

- (a) The Contractor shall non-destructively test all field seams over their full length by Spark Testing in accordance with ASTM D6365.
- (b) Each seam shall be numbered or otherwise designated. The date, time, tester initials, and outcome of the testing shall be recorded both on the CPL and in a log for submission to the Engineer.

- (c) Testing should be done as the seaming work progresses. All defects found during testing shall be numbered and marked immediately after detection. All defects found should be repaired, retested, and remarked to indicate acceptable completion of the repair.

#### E23.9.4 CPL Defects and Repairs

- (a) All seams and non-seam areas of the CPL shall be inspected by the Contractor for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter.
- (b) Defective seams shall be restarted/re-seamed. Defective seams shall be grinded prior to rewelding a new seam. Welding shall commence where the grinding started and must overlap the previous seam by at least 75 mm.
- (c) Small holes less than 5 mm in diameter may be repaired by extrusion cap welding.
- (d) Holes larger than 5 mm in diameter shall be repaired by patching.
- (e) Tears shall be repaired by patching. Where the tear is on an area of stress and has a sharp end, it must be rounded prior to patching.
- (f) Blisters, large holes, undispersed raw materials, and contamination by foreign matter shall be repaired by patches.
- (g) CPL surfaces, which are to be patched shall be abraded and cleaned no more than 15 minutes prior to the repair. No more than 10% of the thickness shall be removed.
- (h) Patches shall be round or oval, made from material equivalent to the CPL cap strip, and extend a minimum of 75 mm beyond the edge of the defect. Conductive inserts or backing materials are required to facilitate post-repair spark testing.
- (i) All patches shall have their top (or outside) edge beveled with an angle grinder either prior to or after the patch is placed on the CPL.

#### E23.9.5 Epoxy Coating Application

- (a) The temperature of the surface to be coated shall be between 5 and 26°C.
- (b) Fill any voids with epoxy patching material or cementitious fast set grout. For flowing or weeping water conditions, rapid setting cementitious plug materials may be used instead of epoxy grouts.
- (c) Clean the surface to be coated by removing any laitance, dust, contaminated materials, plaster, oil, paint, grease, etc.
- (d) All new concrete surfaces to be coated must cure at least 28 days prior to application of the coating product.
- (e) Epoxy coating may commence when surface is visibly dry.
- (f) Application procedures shall conform to the recommendations of the manufacturer, including material handling and mixing.
- (g) Specified surfaces shall be coated by trowel or spray application.
- (h) Thickness measurements shall be made using a wet film thickness gauge at a grid spacing of 1 m, vertically and horizontally.
- (i) When the epoxy coating product has cured to a hard surface, the area of application shall be visually inspected for discontinuities and/or pinholes. Visible discontinuities shall be marked for subsequent repairs.

#### E23.9.6 Pull-off Adhesion Testing

- (a) The Contractor shall destructively test all coated surfaces by Pull-Off Adhesion Testing in accordance with ASTM D7234. The minimum pull-off strength shall be 1.7 MPa and not less than 80% of the break shall be cohesive failure in the concrete substrate.



- (b) A minimum of one representative test shall be completed for each day of coating. The representative tests for each day shall be completed within the respective area coated for that day.
- (c) Pull-off adhesion testing shall not be completed until the coating has fully cured to ensure cohesive strength and adhesion.

#### E23.10 Measurement and Payment

- (a) All costs associated with concrete protective liners and coatings as described herein are incidental to Reinforced Concrete Jacking Pipe, Microtunnelling, and Large Diameter Manholes. No separate measurement or payment will be made.

### **E24. INSTRUMENTATION AND MONITORING**

#### E24.1 Description

- (a) The Work specified in this Section includes furnishing and installing instrumentation to monitor potential movements of surface features and the ground around and above Tunnelling operations. The work includes, but is not limited to, installing: SubSurface Monitoring Points.
- (b) The Contractor is responsible for surveying the elevations and locations of the instruments in accordance with the requirements herein. Baseline readings and elevations shall be determined before tunnel construction begins to establish a baseline, and during and after operations to monitor any settlement related to the Tunnelling Work.
- (c) Minimum instrumentation requirements are shown on the Drawings and specified herein.

#### E24.2 Materials

- (a) SubSurface Monitoring Point: Install as indicated in the Drawings. The settlement rod shall be secured to the PVC casing with a 300-mm length of loose cable or chain to prevent the rod from falling more than approximately 300 mm. The casing shall be flush with pavement or recessed, and capped and protected with a traffic rated road box in accordance with permit requirements.

#### E24.3 Submittals

- (a) Submittals shall be made in accordance with the requirements identified in E4 and as listed below.
- (b) Qualifications: Submit surveying personnel qualifications in accordance with the requirements herein.
- (c) Submit the following, at least two (2) weeks before scheduled installation of instruments:
  - (i) Instrumentation Installation Schedule: Submit the proposed schedule for installing the instruments.
  - (ii) Description of methods and materials for installing and protecting instruments.
  - (iii) Confirmation that monitoring points will be installed at locations shown in the Drawings and as specified herein, or if deviations are proposed, submit Shop Drawings with locations of proposed monitoring points shown in plan and profile.
- (d) Reports and Records:
  - (i) Submit all reports of monitoring data to the Contract Administrator within 24 hours.
  - (ii) Within 72 hours following installation of the instruments, submit drawings showing the actual as-built installed location, the instrument identification number, the instrument type, the installation date and time, and the tip elevation and instrument length where applicable. Include details of installed instruments, accessories and protective measures, including all dimensions and materials used.
  - (iii) Submit surveyed measurements of all instruments at least fourteen (14) days prior to commencing shaft excavation to establish baseline readings.

- (iv) Submit pre and post construction surveys including photographs, video, field notes, and sketches along the entire alignment. Surveys should concentrate on significant man made features along the alignment including buildings, gutters, sidewalks, driveways, and other structures or improvements.

#### E24.4 Quality Control

- (a) Settlement surveying shall be performed by a competent individual with previous experience surveying for the detection of surface and subsurface deformations. Record the initial elevations of movement detection instruments to 0.001 meter.
- (b) Install all monitoring points and instrumentation at locations shown in the drawings or as directed by the Contract Administrator.
- (c) Should actual field conditions prevent installation of instruments at the location shown on the Drawings or specified herein, obtain acceptance from the Contract Administrator for new instrument location and elevation.
- (d) Surveying of instrumentation shall be referenced to the same Control Points and Benchmarks established for setting out the work. Control Points shall be tied to Benchmarks and other monuments outside of the zone of influence of the tunnelling Works.
- (e) Installation of instrumentation shall, at all times, be performed in the presence of the Contract Administrator.

#### E24.5 Construction Methods

- (a) General Requirements
  - (i) Instrumentation shall be installed at the locations shown in the Instrumentation Schedule on the Drawings, and as specified herein. Instruments shall be installed in accordance with the submitted and approved installation schedule.
  - (ii) The Contractor shall confirm locations of conduits and underground utilities in all areas where holes are to be drilled and instruments installed in accordance with E16. Instrument locations shall be modified, as approved by the Contract Administrator, to avoid interference with the existing conduit and utilities. Repair damage to existing utilities resulting from instrument installations at no additional cost to the City.
  - (iii) The Contractor shall install and perform a baseline survey (minimum of 3 readings over a 2 week period) of all surface settlement monitoring points at least fourteen (14) days prior to the commencement of tunnelling and/or shaft excavation.
  - (iv) Once Tunnelling commences, survey all monitoring points daily until 30 meters past the last monitoring array (SSM-01) and continue as required until no movement occurs. Survey all monitoring points once a day for a period of 1 week following completion of grouting, and once again at 14 days after grouting is complete.
  - (v) The Contractor shall provide access and assistance to the Contract Administrator for obtaining supplemental monitoring data, as requested by Contract Administrator.
- (b) Installation of Instruments
  - (i) Following completion of the work all instrumentation shall be removed or abandoned according to applicable codes and standards unless otherwise noted.
- (c) Instrument Protection, Maintenance, and Repair
  - (i) Protect the instruments and surface Control Points from damage. Damaged installations shall be replaced or repaired prior to continuing excavation, or Tunnelling, unless permitted otherwise in writing by the Contract Administrator.
- (d) Response Values
  - (i) Instrument Response Values:

NAME	PURPOSE	ID	NORTHING	EASTING	Threshold Value	Response Value
					(mm)	(mm)
Array-01	SUB-SURFACE MONITORING	SSM-01N	5530091.618	623067.628	7	13
	SUB-SURFACE MONITORING	SSM-01C	5530089.258	623070.437	7	13
	SUB-SURFACE MONITORING	SSM-01S	5530086.899	623073.245	7	13
Array-02	SUB-SURFACE MONITORING	SSM-02N	5530097.608	623090.242	7	13
	SUB-SURFACE MONITORING	SSM-02C	5530095.249	623093.050	7	13
	SUB-SURFACE MONITORING	SSM-02S	5530092.889	623095.859	7	13
Array-03	SUB-SURFACE MONITORING	SSM-03N	5530103.418	623112.175	7	13
	SUB-SURFACE MONITORING	SSMA-03C	5530101.058	623114.983	7	13
	SUB-SURFACE MONITORING	SSMA-03S	5530098.699	623117.791	7	13

- (ii) When the instruments indicate movement equal to the Threshold Value, the Contractor shall meet with City to discuss their construction means and methods to determine what changes, if any, shall be made to better control ground movement. Instrument readings shall be required on a daily basis until readings remain unchanged for 5 consecutive days.
- (iii) When the instruments indicate movement equal to the Response Value, the Contractor shall actively control ground movement in accordance with the approved plan to prevent reaching the Maximum Allowable Value. Instrument readings shall be required on a daily basis until readings remain unchanged for 5 consecutive days.
- (e) Abandonment of Instruments
  - (i) Control Points: All surface Control Points on public property shall remain in place at the completion of the work. Remove all surface Control Points on private property during the cleanup and restoration work, or as required by the Contract Administrator.
  - (ii) Monitoring Instruments:
    - (i) Properly abandon all subsurface monitoring point boreholes, by grouting drilled holes and casing with cement bentonite grout conforming to the requirements of Contact Grouting.

#### E24.6 Measurement and Payment

- (a) Installation and Monitoring will be paid for each type at the contract unit prices described below:
  - (i) Sub-Surface Monitoring Array
- (b) The price shall include but not be limited to the installation and protection of the instruments, replacement of damaged utilities, performing baseline measurements, ongoing monitoring, providing electronic monitoring results within 24 hours of taking the measurements, submitting formal data, and abandoning of the instruments.
- (c) 50% of the price will be paid following the installation of each instrument; and the remaining 50% will be paid once the particular instrument no longer requires monitoring as described within the Specifications.

## SEWER AND MANHOLE CONSTRUCTION

### E25. SEWER CONSTRUCTION – STUB CONNECTIONS

#### E25.1 Description

- (a) This specification covers the pipe installation method for the installation of the 1200 mm diameter stub connection from MH-03 to Property Line, as shown on the Drawings.
- (b) The Contractor is responsible for the selection of the means and methods for the installation of the primary trenchless liner and the method of blocking and grouting of the 1200mm diameter stub with bulkhead provided they meet the requirements set out herein and are constructed as shown on the Drawings.
- (c) This Specification supplements and amends City of Winnipeg Standard Construction Specification CW 2130 Gravity Sewers, and shall cover the installation of sewers not covered under the specifications.
- (d) Further to Clause 3.4.1 of CW 2130, sewers shall be installed by trenchless methods.
- (e) A temporary bulkhead shall be built on the downstream side of the stub at the end of the PVC pipe (at property line).
- (f) A temporary inflatable plug shall be installed within the upstream section of the stub (just downstream of the MH-03 connection).

#### E25.2 Materials

- (a) Selection of the primary liner of the stub trenchless installation and bulkhead shall be at the discretion of the Contractor.
- (b) Pipe material of the stub connections shall be 1200mm diameter PVC DR35.
- (c) Blocking material shall be at the discretion of the Contractor.
- (d) Grouting material shall have a minimum 28-day compressive strength of 5 MPa. Materials shall be tested to ASTM C109.
- (e) Temporary inflatable plug for the isolation of the two contract scopes shall be suitable to be installed within the 1200mm PVC stub. Plug shall be watertight and capable of withstanding internal water pressures (surcharge to surface) and external soil pressures without leakage. Shop Drawing for plug shall be submitted to the Contract Administrator for review and approval prior to installation.

#### E25.3 Construction Methods

- (a) Selection of equipment, means, and methods for installation of sewer stub by trenchless methods shall be the responsibility of the Contractor and shall be made based on expected soil conditions as detailed in the geotechnical report.
- (b) The Contractor shall provide a Trenchless Methodology Submission that should include the following:
  - (i) Primary liner design for the trenchless stub and temporary bulkhead installation stamped by a Professional Engineer licenced in the Province of Manitoba.
  - (ii) Carrier pipe blocking details and grouting plan which includes calculations that demonstrate the suitability of the installation plan. Calculations shall be provided for confirming forces exceeding its capacity in terms of buckling, ovality, floatation, and heat of hydration of the grouting material. Refer to drawings. Calculations shall be stamped by a Professional Engineer licenced in the Province of Manitoba.
- (c) Grouting may be done in more than one lift.
- (d) Contractors selected method must provide ground support such that the connections may be constructed as shown on the Drawings.
- (e) The temporary plug must be installed in the stub prior to the Lift Station Contractor commencing their connection work and must be kept in place until the manhole is backfilled and work at MH-03 is complete. The Interceptor Sewer Contractor will be

required to relocate the plug as required to the upstream MH-02 working shaft (assumed one relocation required) as required to facilitate the connection Work and prevent any potential drilling fluid from entering the sewer piping and stub. Coordination with the Lift Station Contractor will be required.

- (f) Where plug or bulkhead is installed at the end of a pipe section where a manhole is not present, above grade markers shall be installed to indicate the location of the plug/future pipe connection. Where the plug is within a grassed area, the marker shall be a 19 mm rebar, 1 m long installed in the ground with 50 mm exposed above surface. A 1.5 m 4x4 wooden post shall be installed adjacent to the rebar with 0.6 m below grade and 0.9 m above grade. Where the plug is within finished concrete or asphalt, the marker shall be a 3 inch bolt drilled and grouted into the surface with the head of the bolt 3 mm below surface.
- (g) Locations of plug end/bulkhead end shall be surveyed for final grade and location. Surveyed information shall be provided to the Contract Administrator.

#### E25.4 Measurement and Payment

- (a) Payment for the sewer installation shall be made the under Contract Unit Price of “Trenchless Stub-Out” for the diameter of the stub outs listed on the Form B: Prices. The pipes shall be measured on a linear meter basis from the edge of the Carrier Pipe to the downstream face of MH-03.
- (b) The price shall include all Works and materials necessary to complete the installation as identified herein and as indicated on the Drawings, with the exception of the installation of the temporary plug which is measured and paid under a separate line item – See (g) below.
- (c) Payment for the temporary or permanent relocation of existing utilities, and or temporary support of existing utilities required for the placement of shafts shall be incidental to Sewer Construction.
- (d) The cost of shaft construction and associated shoring required for the installation of the works described herein, is incidental to Sewer Construction.
- (e) Connecting new sewers to new manholes will be incidental to Sewer Installation.
- (f) Repair of damage to underground and surface structures due to surface subsidence and soil heaving caused by auger boring installation methods will be at own expense.
- (g) Further to (a), Payment for the installation of the temporary inflatable plug shall be paid on a lump sum basis for “Temporary Sewer Plug” listed on the Form B: Prices. The price shall include all Works and materials necessary to complete the installation as identified herein and as indicated on the Drawings, including one (1) relocation as required.

### **E26. EXCAVATION, BEDDING AND BACKFILL**

#### E26.1 General

- (a) In addition to CW 2030, this Specification covers requirements for excavation, bedding and backfill.

#### E26.2 Related Specifications

- (a) Environmental Protection Plan – E5
- (b) Tunnelling and Shaft Construction – E20 and E25
- (c) Surface Restoration– Section E30
- (d) Permanent Surface Restoration – Section E31

#### E26.3 Methods

##### E26.3.1 General

- (a) Location of Existing Utilities

- (i) The Contractor shall arrange and provide temporary or permanent relocation of existing utilities, and or temporary support of existing utilities required for the excavation of the shafts. Work on private utilities may not occur without submittal and approval of your utility plan to the Contract Administrator and approval from the utility owner.
- (ii) See Specification Section E16 for further requirements.
- (b) Disposal of Unsuitable or Surplus Excavated Material
  - (i) The Contractor is responsible for arranging for a disposal site for all excavated material, and associated works including transportation and payment of tipping fees.
  - (ii) There will be no measurement and payment for surplus soil material disposed at any disposal site.

#### E26.3.2 Foundation, Bedding and Initial Backfill

- (a) Cement Stabilized Fill (CLSM) in accordance with CW 2030 and Table CW 2160.1 shall be used as initial backfill for all shafts unless otherwise indicated on the Drawings. Further to Table CW2160.1 the maximum compressive strength at 28 days to be no more than **1 MPa**
  - (i) The Contractor shall install fill in lifts and provide sufficient supports to resist uplift of piping or structures due to backfilling.

#### E26.3.3 Backfill

- (a) Excavations under or within one (1) metre of paved areas on Regional Streets shall be Class 1 as per SD-002 unless otherwise noted below or on the Drawings.
- (b) Excavations under or within one (1) metre of paved areas on other roadways shall be Class 3 as per SD-002 (Class 2 backfill would also be acceptable, but at no additional cost), unless otherwise noted below or on the Drawings.
- (c) Excavations made within the alignment of the proposed tunnel prior to Tunnelling operations shall be backfilled with CLSM.
- (d) Launch Shafts (MH-02 and MH-03)
  - (i) CLSM backfill, cement stabilized fill (further to Table CW 2160, the maximum compressive strength at 28 days to be no more than 1 MPa).
- (e) Receiving Shafts (MH-01 and MH-04)
  - (i) CLSM backfill, cement stabilized fill (further to Table CW 2160, the maximum compressive strength at 28 days to be no more than 1 MPa).
- (f) MH-05 (Intermediate) Shaft
  - (i) CLSM backfill, cement stabilized fill (further to Table CW 2160, the maximum compressive strength at 28 days to be no more than 1 MPa).
- (g) Material excavated when frozen, or when air temperature is less than 0°C shall not be used as fill or backfill until material completely thaws.
- (h) Supply heating and hoarding in accordance with CW 2160 if required to ensure material does not freeze before compaction is complete.
- (i) Notify the Contract Administrator at least one (1) full Working Day in advance of any backfilling operation. No Backfill shall be placed against concrete until approved by the Contract Administrator and in no case before field cured test cylinders show the concrete strength to be 75% of that specified.
- (j) The Contractor shall have personnel available for immediate repairs of settlement at shaft locations from the start of construction until final restoration is complete.

#### E26.4 Measurement and Payment

- (a) All costs associated with Excavation, Bedding and Backfill as described herein are incidental to the installation of the sewer pipe covered in Tunnelling, Trenchless Sewer Installation, Large Diameter Manholes, and Shaft Construction.

- (b) Unless specified as alternate items on the Form B, payment for the temporary or permanent relocation of existing utilities, and or temporary support of existing utilities required for the placement of shafts shall be incidental to the installation of the sewer piping in Tunnelling Shafts and Trenchless Sewer Installation.

## E27. CAST-IN-PLACE CONCRETE CONSTRUCTION

### E27.1 Description

- (a) This Specification will cover construction of cast-in-place concrete and shall supplement, revise and amend CW 2160.

### E27.2 Materials

#### E27.2.1 Concrete Mix Design

- (a) The Contractor shall be responsible for the design and performance of all concrete mixes supplied under this Specification. Concrete shall be supplied in accordance with the requirements of CSA A23.1-14/A23.2-14 with the minimum properties as provided below:

(i) Concrete Chamber Construction

Class of Exposure	S-2
Maximum Size of Aggregate	19 mm
Cement Type	Type HS
Minimum Compressive Strength at 7 Days	20 MPa
Minimum Compressive Strength at 56 Days	32 Mpa
Slump/Flow	80 mm +/- 20 mm
Air Content	6.5% +/- 1.5
W/C	0.45

(ii) Lean Mix Concrete (working base)

Cement Type	Type HS
Minimum Compressive Strength at 28 Days	15 Mpa
Slump/Flow	80 mm
Air Content	nil
Maximum W/C	0.49

(iii) Flowable cement-stabilized backfill

Cement Type	Type GU
Minimum Compressive Strength at 28 Days	2.5 Mpa
Slump/Flow	80 mm
Air Content	Nil

- (b) Provide a "Mix Design Statement" for each type of concrete to be used certifying constituent materials and mixing proportions to the Contract Administrator at least 2 weeks prior to delivery of Concrete to the Site. Supply reasonable evidence to the Contract Administrator that the mix proportions selected will produce concrete meeting the specified strength, workability and yield.

#### E27.2.2 Admixtures

- (a) All admixtures shall be compatible.  
 (b) Air entraining agent shall meet ASTM C260.  
 (c) Chemical water reducing admixtures shall meet ASTM C494.

#### E27.2.3 Grout

- (a) Grout shall be Sika Grout 212 SR or approved equivalent in accordance with B7.

- (b) Hydraulic cement for form hole patching shall be Xypex Patch-n-Plug or approved equivalent in accordance with B7.

#### E27.2.4 Reinforcing Steel

- (a) Deformed bars in accordance with CSA G30.18 (  $F_y = 400$  Mpa)
- (b) Bar accessories:
  - (i) To be made of a non-corroding material
  - (ii) Shall not stain, blemish or spall the concrete surface for the life of the concrete
  - (iii) Shall be approved by the Contract Administrator
  - (iv) Bar chairs shall be PVC.

E27.2.5 Bonding Agent shall be Sika Latex R, Acryl 60 or approved equivalent in accordance with B7.

#### E27.2.6 Shop Drawings:

- (a) Provide shop drawings in accordance with Specification Section E4.
- (b) Submit shop drawings for reinforcing steel a minimum of two (2) weeks prior to the fabrication of any reinforcing steel.

### E27.3 Construction Methods

#### E27.3.1 General

- (a) No Work shall commence on construction of cast-in-place concrete until after the Contract Administrator's review of the Contractor's Construction Method submission.

#### E27.3.2 Construction Method Submission

- (a) The Contractor shall prepare for the Contract Administrators review a Construction Method submission detailing:
  - (i) Construction sequence to be followed including all methods to be employed.
  - (ii) Specialized equipment to be used.
  - (iii) Any design revisions proposed to accommodate the Contractor's proposed construction method.
- (b) The Contractor shall respond to any concerns that may be raised by the Contract Administrator after review of Construction Method submission.

#### E27.3.3 Backfill

- (a) Place and compact backfill material as indicated in the drawings and in accordance with CW 2030 and E26.

#### E27.3.4 Grout

- (a) Mix and apply grout in accordance with the manufacturer's instructions. Consistency is to be suitable for the intended application.

### E27.4 Measurement and Payment

- (a) Cast-in-place concrete will be considered incidental to the Work listed in individual Part E specifications and shall be included in the associated price for each applicable item. No direct measurement for payment will be made for this item.

## E28. COLD WEATHER REQUIREMENTS

### E28.1 Description

- (a) Should any concrete Work be required to be carried out when the mean daily temperature is below 5°C or anticipated to be below 5°C within the next 24 hours, cold weather requirements will be required as specified herein.
- (b) All freshly placed concrete shall be protected from the elements and from defacements due to construction operations.



## E28.2 Construction Methods

- (a) The following are minimum requirements for protecting concrete during and after placement during freezing weather, but mere adherence to these requirements will not relieve the Contractor of the necessity for producing concrete which has not been weakened or injured by frost or freezing, or replacing such damaged Work at no additional expense to the City;
  - (i) Before any concrete is placed, all ice, snow, and frost shall be completely removed from all formwork, and other surfaces against which concrete temperatures of such surfaces raised above 7°C for twenty-four (24) hours minimum prior to concreting. Where concrete Work is to come in contact with the earth, the surface of the earth shall be completely free of frost when concrete is placed thereon.
  - (ii) Concrete aggregates and water shall be heated to not over 80°C. Concrete shall be not less than 20°C or more than 30°C in temperature when deposited. Concrete when placed during freezing weather, or if freezing is anticipated during curing period, shall be fully enclosed and the temperature of same maintained at not less than 20°C for five (5) days nor less than 5°C for an additional five (5) days.
  - (iii) Heating enclosures shall be strong and wind-proof, well ventilated with heating units so located as to prevent local overheating or drying of the concrete or damage from combustion gases. Only indirect fired heaters will be accepted. Units must be vented outside the enclosure. No direct fired units will be accepted.
  - (iv) The Contractor shall inform the Contract Administrator well in advance as to the methods of enclosure and frost protection they propose to employ.

## E28.3 Measurement and Payment

- (a) Cold weather requirements shall be considered incidental to the construction of cast-in-place concrete and no measurement or payment will be made for this item.

## E29. LARGE DIAMETER MANHOLE

### E29.1 Description

- (a) This Specification supplements and amends City of Winnipeg Standard Construction Specification CW 2130 Gravity Sewers and shall cover the installation of large diameter manholes.
- (b) For the purposes of this specification, large diameter manholes are precast concrete manholes sized to accommodate pipe larger than 525 mm as shown on the Drawings.

### E29.2 Submittals

- (a) Submit shoring design, Shop Drawings for pre-cast sections and pipe to manhole connections, reinforcing steel Shop Drawings, and concrete mix design in accordance to CW 2160.

### E29.3 Materials

- (a) Precast concrete sections and adjusting rings, ladder rungs, joint gaskets and cast-iron frames and covers in accordance with CW 2130.
- (b) HDPE lining and Epoxy Coating in accordance with E23 and as identified on the Drawings.

### E29.4 Construction Methods

- (a) Manhole installation as per CW 2130 and as shown on the Drawings.
- (b) Manhole benching shall be completed in the field and approved by the Contract Administrator. All surfaces shall slope to the manhole outlet and the channel shall extend from inlet to outlet. Benching shall be constructed as follows:
  - (i) Depth of bench to invert: minimum one-half of largest pipe diameter.
  - (ii) Slope of invert bench: 4% minimum; 12% maximum, unless otherwise noted on the Drawings.

## E29.5 Measurement and Payment

- (a) Construction of Large Diameter Manholes shall be measured on a vertical metre basis at the contract unit price for each type a manhole as listed below. The price shall include but not be limited to excavation, shoring, backfill, reducers, adjusting rings, frames and covers, benching, rungs, couplings, pipe to manhole connections, appurtenances and miscellaneous metals and materials.
  - (i) Large Diameter Manholes
    - ◆ MH-01(2700mm diameter c/w HDPE lining)
    - ◆ MH-02 (2400mm diameter c/w HDPE lining)
    - ◆ MH-03 (3000mm diameter c/w HDPE lining)
    - ◆ MH-04 (2700mm diameter c/w HDPE lining)
    - ◆ MH-05 (2400m diameter c/w HDPE lining)
- (b) Further to (a), prices include connections of the proposed sewer piping as described in E20 and E25 to the manholes as detailed on the Drawings as required for the select installation methodology.
- (c) **Further to (a), Pricing for MH-05 (2400 mm diameter c/w HDPE lining) shall include all costs associated with excavation and shaft construction as required to install the MH-05 structure. Reference also E19 Shaft Excavation and Support.**

## RESTORATION

### E30. TEMPORARY SURFACE RESTORATION

#### E30.1 General

- (a) This specification applies to temporary surface restoration Work.
- (b) Further to clause 3.3 of CW 1130 where permanent surface restorations cannot be made due to cold weather, the Contractor shall temporarily restore surfaces as follows:

#### E30.2 Construction Methods

- (a) Backfill under Temporary Surface Restoration
  - (i) Backfill and level boulevards and grassed areas to match existing surface elevations,
  - (ii) Use Class 2 backfill in excavation under temporary street pavement and sidewalk where Class 3 backfill cannot be jetted and flooded due to cold weather.
  - (iii) Class 2 backfill may be compacted in 600 mm lifts where backhoe operated pneumatic plate compactors are used.
  - (iv) Jet and flood Class 2, Class 3 and Class 5 backfilled excavations in spring when ground is not frozen prior to permanent restoration.
- (b) Temporary Surface Restoration
  - (i) Cap excavations in concrete pavement with a 100 mm layer of concrete for "Temporary Restoration of Utility Pavement Cuts" as specified in CW 3310,
  - (ii) Cap excavations in sidewalk pavement with a 50 mm layer of concrete for "Temporary Restoration of Utility Pavement Cuts" as specified in CW 3310,
  - (iii) Insulate temporary concrete as required during 48 hour curing period,
  - (iv) Where curb has been removed as part of the pavement cut pour temporary curb using "Concrete for Temporary Restoration of Utility Pavement Cuts" as specified in CW 3310.
  - (v) Remove all temporary pavements prior to permanent restorations.
- (c) Maintenance
  - (i) The Contractor shall monitor and maintain temporarily restored surfaces as required until permanent restoration is complete.

- (ii) If, in the opinion of the Contract Administrator, temporarily restored surfaces are not being adequately maintained or were not properly constructed and pose a danger to the public, maintenance or reconstruction will be done by the City forces with no advance notification the Contractor.
- (iii) All costs associated with the maintenance or reconstruction of temporary pavement incurred by the City shall be deducted from future payments to the Contractor.

**E30.3 Measurement and Payment**

- (a) Temporary restoration associated with the shaft locations will be paid on a square meter basis at the Contract unit price for “Temporary Surface Restorations”.
- (b) Temporary restoration of other road cuts not defined in (a) will be considered incidental to Site Development and Restoration.
- (c) No extra payment will be made for the installation of Class 2 backfill under temporary street pavement and sidewalk.
- (d) No measurement or payment will be made for the temporary restorations of boulevards and grassed areas.
- (e) No measurement or payment will be made for the removal of temporary pavement prior to permanent restoration.

**E31. PERMANENT RESTORATION**

**E31.1 Description**

- (a) This specification identifies the requirements for permanent surface restorations.
- (b) The specification amends the Surface Restorations defined in CW 2130 and places the cost of permanent surface restorations upon the particular Work item being undertaken.

**E31.2 General**

- (a) The Contractor will follow the City’s Street By-law No. 1481/77 and Street Cuts Manual (2017) for all pavement restoration unless otherwise shown on the Drawing or specifications or as directed by the Contract Administrator.
- (b) The Street Classification and Surface Type within the project work area are classified as follows:

Street Name	Segment	Pavement Type	Condition
Sturgeon Access	Centreport Canada Way to Sturgeon Road	Concrete	Good
PTH 190 Service Road	Summit Road to Sturgeon Access	Gravel	Poor
Sturgeon Road	Sturgeon Access to Tonka Point	Asphalt	Good
NOTE: values were obtained from the City of Winnipeg Street Conditions Map available at <a href="http://winnipeg.ca/publicworks/maps/streetconditions.asp">http://winnipeg.ca/publicworks/maps/streetconditions.asp</a> and may not reflect existing conditions.			

- (c) All street segments within the work area impacted by the Work as determined by the Contract Administrator shall be maintained and restored with the following additional requirements.
  - (i) Review and record the condition of each street segment with the Contract Administrator and a City Representative from Public Works prior to the initiation of Work.
  - (ii) Review and record the condition of each street segment with the Contract Administrator and a City Representative from Public Works prior to surface

restoration. The surface restoration required for each street segment will be agreed upon at this review meeting.

- (iii) Pavement Restoration Guidelines can be found in the City of Winnipeg Street Cuts Manual.

### E31.3 Methods

- (a) The Contractor shall permanently restore all existing surface areas disturbed by construction activities including but not limited to areas disturbed by; construction equipment, placement of equipment trailers and where construction materials were stockpiled, shall be restored as follows:
  - (i) Boulevards, ditches and grassed areas - sodding using imported topsoil in accordance with CW 3510. The Contractor shall restore all areas disturbed during construction to existing condition or better, using topsoil and sod at its own cost.
  - (ii) Asphalt surfaces – match existing base course and asphalt thickness or a minimum of 150 mm of base course and 75 mm of Type 1A Asphaltic Concrete, whichever is greater, in accordance with CW 3410.
  - (iii) Miscellaneous concrete slabs, including sidewalk - in accordance with CW 3235
  - (iv) Interlocking stones – in accordance with CW 3330.
  - (v) Concrete curb and gutter – in accordance with CW 3240.
  - (vi) Trees - requiring replacement due to construction activities (as directed by the Contract Administrator) shall be installed in accordance with CW 3510 and E7. The Contractor will not be reimbursed under a separate pay item for replacing trees damaged by construction activities. The work will be considered incidental to Site Development and Restoration.
  - (vii) Topsoil - All Topsoil Work shall be performed in accordance with CW 3510. Topsoil Work shall include all existing grassed areas disturbed by the Contractor during construction. The Contractor shall restore all areas disturbed during construction to existing condition or better, using topsoil and sod at its own cost.

### E31.4 Measurement and Payment

- (a) This specification amends CW 2130 such that:
  - (i) All costs associated with Permanent Restoration as described herein are incidental to the Work items for the Work activity being carried out, including but not limited to Tunnelling, Shaft Construction, and Installation of Manholes.

## **E32. FORCE MAIN CONNECTION TO MH-04**

E32.1 As noted on the Drawings and Form B, this Work is included as a Provisional Item as the exact date(s) of the 150 mm diameter PVC force main piping installation is not known and dependent on the Force main Contract schedule.

E32.2 If the force main Contractor completes the force main installation in the MH-04 area prior to the installation of MH-04, then the Interceptor Sewer Contractor shall:

- (a) Remove the 150mm end cap/temporary plug at end of existing 150mm diameter force main.
- (b) Connect to existing 150mm diameter PVC C900 DR18 force main piping and install approximately 5.0 m – 150mm diameter PVC C900 DR18.
  - (i) For the purpose of this Specification, any piping installed beyond the estimated 5.0 meters is not included and Contractor may submit a Change in Work in accordance with the General Conditions (C7.4).
- (c) Complete the connection of the 150 mm C900 DR18 PVC force main to MH-04 by coring into the existing pre-cast manhole and grouting pipe in place complete with installation of a concrete manhole adapter.
  - (i) Approved Manhole Adapter: Fernco or approved equivalent in accordance with B7.

E32.3 Further to E32.2, connection of the 150 mm PVC force main to MH-04 shall not proceed without written approval from the Contract Administrator.

E32.4 Measurement and Payment

E32.4.1 Force main Connection to MH-04 will measured and paid for at the Contract Lump Sum price for "Force main Connection to MH-04" which shall be payment in full for supplying all materials, including but not limited to piping, fittings, and appurtenances, and for performing all operations as described herein and all other items incidental to the Work.

## 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 their place of residence. Or
- (a) Sterling BackCheck – for existing account holders, log into your account to send individual invitations to employees requiring security clearance. For those that do not have an account, click on the following link to open an account:  
<https://forms.sterlingbackcheck.com/partners/platform2-en.php?&partner=winnipegcity>; 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 The following is a link to information for obtaining the Police Information Check from the City of Winnipeg Police Service. <http://winnipeg.ca/police/pr/PIC.stm>
- F1.2.1 The Police Information Check shall include a Vulnerable Sector Screening. This can be obtained by following the link below <http://winnipeg.ca/police/pr/PIC.stm>
- (a) Individuals will need to state in the form, that they may be working in City of Winnipeg pools, libraries and community centres;
- F1.2.2 The original Police Information Check (Form P–612) will be provided by the Winnipeg Police Service to the individual applicant. The original has a validation sticker from the Winnipeg Police Service in the top right hand corner. The applicant shall:
- (a) Provide the original Police Information Check (Form P–612) to the Contract Administrator.
- F1.3 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.
- F1.4 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.
- F1.5 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.
- F1.6 Notwithstanding the foregoing, at any time during the term of the Contract, the City may, at their 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.