THE CITY OF WINNIPEG

TENDER

TENDER NO. 427-2024

CENTREPORT SOUTH REGIONAL WATER AND WASTEWATER SERVICING
PHASE 1A CONTRACT 2A - FORCE MAIN

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B1. CONTRACT TITLE

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B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, August 7th, 2024.

B2.2 The Contract Administrator or the Manager of Purchasing 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 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.

B3.3 The Bidder/Proponent 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. BIDDERS' CONFERENCE

B4.1 Further to C3.1, the Contract Administrator will hold a Bidders' conference at KGS Group's south office at 895 Waverley Street at:

(a) 10:30 am on July 22nd, 2024.

(b) 9:30 am on July 24th, 2024.

B4.2 If attending, it is recommended to arrive 15 min ahead of the time(s) listed above to be directed to the correct meeting room. Attending the bidders conference meeting is not mandatory.

B5. ENQUIRIES

B5.1 All enquiries shall be directed to the Contract Administrator identified in D7.

B5.2 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.

B5.3 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.

B5.4 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.

B5.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B5 unless that response or interpretation is provided by the Contract Administrator in writing.

B5.6 Any enquiries concerning submitting through MERX should be addressed to:

MERX Customer Support
Phone: 1-800-964-6379
Email: merx@merx.com

B6. CONFIDENTIALITY

B6.1 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.

B6.2 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.

B7. ADDENDA

B7.1 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.

B7.2 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.

B7.3 Addenda will be available on the MERX website at www.merx.com.

B7.4 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.

B7.5 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.

B7.6 Notwithstanding B5, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D7.

B8. SUBSTITUTES

B8.1 The Work is based on the Plant, Materials and methods specified in the Tender.

B8.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B8.3 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.

B8.4 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.

B8.5 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.

B8.6 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.

B8.6.1 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.

B8.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

B8.8 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 B19.

B8.9 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.

B9. BID COMPONENTS

B9.1 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.

B9.2 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.

B9.3 The Bid shall be submitted electronically through MERX at www.merx.com.

B9.3.1 Bids will **only** be accepted electronically through MERX.

B9.4 Bidders are advised that inclusion of terms and conditions inconsistent with the Tender document, including the General Conditions, will be evaluated in accordance with B19.1(a).

B10. BID

B10.1 The Bidder shall complete Form A: Bid/Proposal, making all required entries.

B10.2 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.

B10.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B10.2.

B10.3 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.

B10.4 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.

B10.4.1 The name and official capacity of all individuals signing Form A: Bid/Proposal should be entered below such signatures.

B10.5 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.

B11. PRICES

B11.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B11.2 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.

B11.3 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.

B11.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B11.5 The Bidder shall enter the Total Bid Price from Form B: Prices into the Total Bid Price field in MERX.

B11.5.1 Bidders are advised that the calculation indicated in B19.4 will prevail over the Total Bid Price entered in MERX.

B12. DISCLOSURE

B12.1 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.

B12.2 The Persons are:

(a) J-CON Civil Ltd. –Utility Locating Program (Soft Dig and Test Pitting)

(b) Nelson River Construction Inc. – Utility Locating Program (Soft Dig and Test Pitting)

(c) The Tunneling Company – Rail Crossing Constructability Review

(d) Primus Line – Rail Crossing Constructability Review

(e) IPEX – Product Availability

(f) Wolseley – Product Availability

(g) SFE Global – Pipeline Pigging Review

(h) Lafarge Canada Inc – Availability of Reinforced Concrete Jacking Piping with HDPE liner

(i) Decast Ltd. - Availability of Reinforced Concrete Jacking Piping with HDPE liner

(j) Northern Mat & Bridge – Temporary Bridge Structure Feasibility and Costing for the Temporary Crossing of East Colony Creek

(k) Friesen Drillers Ltd. - Groundwater Depressurization Budget Pricing

(l) Maple Leaf Drilling - Groundwater Depressurization Budget Pricing

B13. CONFLICT OF INTEREST AND GOOD FAITH

B13.1 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.

B13.2 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.

B13.3 In connection with their Bid, each entity identified in B13.2 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.

B13.4 Without limiting B13.3, 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.

B13.5 Without limiting B13.3, 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 B13.4 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.

B13.6 The final determination of whether a perceived, potential or actual Conflict of Interest exists shall be made by the City, in their sole discretion.

B14. QUALIFICATION

B14.1 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.

B14.2 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

B14.3 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;

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

(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 B14.4 and D9);

(e) Further to (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:

(f) 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

(g) 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/.

(h) The Bidder shall submit the following required qualifications for the operator(s) completing the following aspects of the Work:

  (i) Trenchless CPKC Railway Crossing Works using Horizontal Directional Drilling:

    - The operator shall have horizontal direction drilling experience as an operator on at least (3) three successful projects using the same equipment required for this project.
    - Past installations shall involve pipes with an outside diameter of 450 mm or larger completed within the last ten (10) years. The three (3) projects must meet the following requirements:
    - Two (2) of the three (3) projects listed must include HDD installations through rock using a mud motor to be considered similar work.
    - One (1) of the three (3) projects listed must include the use of entry and exit casing to be considered similar work.
    - A detailed description of projects on which this system has been successfully used including the names, addresses and telephone numbers of owner's representatives for these projects as well as length, diameter, and pipe material used.

  (ii) Trenchless CN Railway Crossing Works using Auger Boring & Pipe Ramming:

    - The operator shall have Auger Boring or Pipe Ramming experience as an operator on at least three successful projects using the same equipment required for this project.
    - A detailed description of projects on which this system has been successfully used including the names, addresses and telephone numbers of owner's representatives for these projects as well as length, diameter, and pipe material used.

  (iii) Inkster Blvd & Brookside Blvd Tunneling:

    - The operator shall have Tunneling experience as an operator on at least three successful projects using the same equipment required for this project.

- A detailed description of projects on which this system has been successfully used including the names, addresses and telephone numbers of owner's representatives for these projects as well as length, diameter, and pipe material used.

(iv) The Bidder undertaking the force main Work, if requested by the Contract Administrator, must provide proof satisfactory to the Contract Administrator to demonstrate the following qualifications:

- A minimum of two (2) successful 350 mm or larger PVC pressure pipe projects completed within the last ten (10) years for the project Superintendent proposed for this Work utilizing the proposed force main installation method required for this project.

B14.4 Further to B14.3(d), the Bidder acknowledges they and all Subcontractors have obtained training required by the Accessibility for Manitobans Act (AMA) available at Accessibility Training for anyone that may have any interaction with the public on behalf of the City of Winnipeg.

B14.5 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B14.6 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B15. BID SECURITY

B15.1 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/Bidsecurity.pdf.

B15.2 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 B15.2(a).

B15.3 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 B19.1(a).

B15.4 Bonds passing the verification process will be treated as original and authentic.

B15.4.1 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.

B15.5 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.

B15.6 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.

B16. OPENING OF BIDS AND RELEASE OF INFORMATION

B16.1 Bids will not be opened publicly.

B16.2 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.

B16.3 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.

B16.4 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).

B16.4.1 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.

B17. IRREVOCABLE BID

B17.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid/Proposal.

B17.2 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.

B18. WITHDRAWAL OF BIDS

B18.1 A Bidder may withdraw their Bid without penalty at any time prior to the Submission Deadline.

B19. EVALUATION OF BIDS

B19.1 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 B14 (pass/fail);

(c) Total Bid Price;

(d) economic analysis of any approved alternative pursuant to B8.

B19.2 Further to B19.1(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.

B19.3 Further to B19.1(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.

B19.4 Further to B19.1(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.

B19.4.1 Bidders are advised that the calculation indicated in B19.4 will prevail over the Total Bid Price entered in MERX.

B19.4.2 Further to B19.1(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.

B20. AWARD OF CONTRACT

B20.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B20.2 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.

B20.2.1 Without limiting the generality of B20.2, 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.

B20.3 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 B19.

B20.3.1 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

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 South Program (referred to as Phase 1A) includes four separate construction contracts. The current project (Tender 427-2024) is to install a 450 mm force main from the planned lift station (being constructed under Tender 301-2024) and extend approximately 7.5 km to the intersection of Brookside Boulevard and Inkster Boulevard. At this location the force main transitions to a 1200 mm gravity sewer that extends across the intersection of Brookside Boulevard and Inkster Boulevard and connects to the existing 1350 mm interceptor sewer on Inkster Boulevard.

(a) The other three contracts with Phase 1A are being constructed separately from the current project under the following City of Winnipeg Tenders

(i) Tender 990-2023B - Interceptor Sewer (Contract 3)

(ii) Tender 304-2024 – Wastewater Lift Station (Contract 1A)

(iii) Tender 220-2024 – Feeder Main (Contract 4A)

(b) Additional information on the above tenders can be found on the City of Winnipeg website at Bid Opportunities - Purchasing - Corporate Finance - City of Winnipeg

D3.3 The Scope of Work describing the main elements of the current force main project is presented below in Section D4.

D3.4 The Work associated with this contract is intended to be installed by both open-cut and Trenchless methods as noted on the Drawings to address the soil conditions and various crossings that exist throughout the project extents. Till and bedrock exist at variable elevations throughout the project area and will need to be removed as part of the Work. The Bidders should review the Drawings and the Geotechnical Reports to familiarize themselves with the anticipated soil conditions.

(a) For the open-cut portions of the work, bedrock and boulder removal are defined within the Specifications and paid for within the unit rates on Form B. The Bidder shall be aware that no claims for delays will be considered when encountering till or bedrock as the time and effort shall be included within the unit prices.

(b) For the Trenchless portions of the Work, the anticipated bedrock and till conditions are identified within the GBR. Each Trenchless method shall support the excavation of the bedrock and the till that falls within the anticipated range with the costs for the removal being incidental to the pipe being installed by the specific Trenchless method listed on the Form B and as described within the Specifications.

D3.5 Shallow groundwater elevations exist across portions of the project Site that will require groundwater depressurization to facilitate the pipe installation. In these areas where excavations extend through the confining overburden layer, groundwater pressures from within the till and bedrock zones may result in elevated water levels within excavations in the open trenches for the force main. It is anticipated that groundwater depressurization will be required in these areas as identified in the Geotechnical Reports and in accordance with E25 and E26.

D3.6 The alignment of the Work associated with this contract extends through three (3) different jurisdictions, The City of Winnipeg, The RM of Rosser and The Province of Manitoba. Permits to complete the Work in each jurisdiction have been initiated by the City and are anticipated to be in place in advance of the commencement of the Work.

(a) The City of Winnipeg – The portion of the Work south of the north limit of Selkirk Avenue (also referred to as Four Mile Road), and east of the west limit of Brookside Boulevard, fall within the City of Winnipeg. Work within the City of Winnipeg is approved through the Underground Structures application process that has been initiated by the Contract Administrator.

(b) Province of Manitoba – The Work along CentrePort Canada Way falls under the jurisdiction of Manitoba Transportation and Infrastructure (MTI). The approval to construct this portion of the work is covered under the Utility Installation Application process that has been initiated by the City.

(c) RM of Rosser – The Work along Sturgeon Road north of Selkirk Avenue, as well as the work on Red Fife Road, are located within the RM of Rosser. The City has initiated an agreement with the RM to construct these portions of the work.

(d) The City of Winnipeg Construction Standards will be used for all Work unless otherwise stated in these Specifications or shown on the Drawings.

D3.7 During construction, the Contractor must coordinate with the Contract Administrator to ensure that the Province/ MTI, and the RM of Rosser are aware of Work activities within their jurisdictions. The Contractor will need to prepare a Detailed Work Schedule in accordance with D19 that will be provided to MTI and the RM of Rosser prior to the Commencement of any Work. The Contractor will also be required to provide notification to MTI and the RM of Rosser of upcoming Work within their jurisdiction a minimum of 2 weeks prior to any actual planned Work. MTI and the RM of Rosser are permitted to attend Site meetings pertaining to any Work within their jurisdiction.

(a) The RM of Rosser Construction Management Plan provided in Appendix H must be adhered to whenever Work is taking place within the RM's jurisdiction.

D3.8 The project includes several unique elements that require various Trenchless technologies to complete the Work. These include:

(a) Canadian Pacific Kansas City (CPKC) mainline and Omand's Creek Crossing

(i) Horizontal Directional Drilling (HDD) is required to support the combined crossing of the creek and rail line as shown on Drawings 13495 and 13497.

(ii) The crossing will be completed using a High-Density Polyethene (HDPE) pipe as a casing pipe installed through bedrock, with a Primus Liner used for the carrier pipe.

(iii) Steel conductor casing will be used to support the overburdened soil during drilling and will extend from the surface and into the bedrock at the launch and receiving ends of the drive.

(iv) The force main alignment on both sides of the Crossing is within a dry pond. The pond supports stormwater flows from the adjacent overpass for CentrePort Canada Way. A temporary working platform is required to support the Work within the dry pond as shown on the Drawings.

(v) The CPKC crossing application is anticipated to be approved prior to the commencement of the rail crossing Work.

(b) Canadian National (CN) Rail Crossing

(i) A Trenchless Crossing using Pipe Ramming or Auger Boring is required to cross the CN rail line as shown on Drawings 13496 and 13498.

(ii) The crossing will be completed using a steel casing pipe and restrained joint PVC pipe for the carrier pipe.

(iii) The CN crossing application is anticipated to be approved prior to the commencement of the rail crossing Work.

(c) Highway Approach Crossings

(i) Two crossings of approaches to Centerport Canada Way exist at Burgen Cutoff Road, and Oak Point Highway and are shown on Drawings 13486 and 13488.

(ii) MTI requires that the force main beneath these highway approaches be installed trenchlessly within a steel casing pipe.

(iii) The method of installation for these two highway approach crossings will be the same method used for the CN Rail crossing described above.

(d) Brookside Boulevard and Inkster Boulevard

(i) The gravity sewer crossing Brookside Boulevard and Inkster Boulevard will be installed by Tunnelling using an Open Face Tunnel Boring Machine (TBM) and Pipe Jacking as shown on Drawing 13490.

(ii) The launch shafts for both drives shall be located within the southeast corner of the intersection. Traffic Management plans have been developed to support this work and are presented in Section E11 and Appendix G. The contractor may also make arrangements to obtain additional laydown area within the privately owned lands adjacent to the launch shafts by contacting Paul Kostas via email at pkostas@mymets.net or via phone at (204) 290-5571.

(iii) Shallow utilities exist along the tunnel alignment that will require either utility monitoring points, temporary supports, or relocation. Of note are the two concrete-encased BellMTS ducts that will require utility monitoring points, two 400 mm gas mains that will need to be supported during construction, and the 300 mm water main that will need to be relocated as per the Drawings.

D3.9 The project also includes an open-cut creek crossing of East Colony Creek. Based on the need to deal with wet weather events in the summer months, this work is anticipated to be completed in the winter months. The backfill requirements are unique to this crossing and are further explained in E28.

D3.10 Portions of the Work fall within privately owned lands. Temporary and permanent easements are being prepared to support the Work within the private lands. The easement figures are presented in Appendix I and include the following two locations:

(a) Toowoomba Land Company owns the lands from Station 6+980 to 7+425 on Drawings 13488, 13489, and 13490. This includes the developed lands where Maxim Truck and Trailer are located and the undeveloped lands to the west.

(i) A temporary parking area will be constructed within the undeveloped lands to relocate vehicles that the Work within the developed portions of the lands will displace.

(ii) The work within the Toowoomba owned lands will be staged to minimize the impact to the businesses and maintain their available parking. The staging plan is included in Appendix I.

(iii) A temporary staging area has been included within the temporary easement application. The use of this staging area is only permitted for Work within the Toowoomba owned lands.

(iv) Critical Stages have been included within this contract in section D23 to limit the impact to the businesses on this property.

(b) Exemplar Developments owns lands from Station 3+370 to 3+725 on Drawings 13475 and 13476.

(c) It is anticipated that agreements to access these privately owned lands will be in place before the Commencement of Construction.

D3.11 A commissioning plan will be required to support the pigging and pressure testing of the force main due to the length of the force main and the limited water and wastewater infrastructure that exists within CentrePort South. A sample commissioning plan has been developed to provide insight into the construction challenges, and can be found in Appendix F. The actual plan shall be prepared by the Contractor and submitted to the Contract Administrator as described in E47.

(a) Water supply does not currently exist within the CentrePort South Lands. However, a new 750 mm feeder main will be installed by others as part of Tender 220-2024. That contract includes a 350 mm standpipe adjacent to Offtake Structure 3 (located on the east side of Sturgeon Road at Station 6+790 of the force main as shown on Drawing 13464). The standpipe will be available for use by the Contractor after August 15, 2025. Alternate water supply options are at the discretion of the Contractor.

(b) To use the feeder main as a water source, the Contractor will need to remove the blind flange and install the spool piece stored in Offtake Structure 2, shown on Drawing 1-0798F-C0018-001 from Tender 220-2024 in Appendix F; and arrange for the City to operate the 750 mm valve in the same Offtake Structure.

(c) Following commissioning the Contractor will need to arrange to shut off the valve in Offtake structure 2, remove the spool piece, and reinstate the blind flange.

(d) No sewers currently exist within CentrePort South for discharging water into. The Contractor will need to develop a strategy for collecting and discharging the water used for cleaning and pressure testing. Water cannot be discharged directly to the environment without dechlorination. See the requirements within E49. However, the contractor will be entitled to discharge to the existing 1350 mm interceptor sewer in Inkster Boulevard through a permit application with the City of Winnipeg Water and Waste Department.

D3.12 Portions of the Site and areas adjacent to the site will be occupied by the contractors for the other three CentrePort South contracts in 2024 and 2025. Critical Stages have been included within each CentrePort South contract to ensure that there is only a single contractor working on any piece of land at any given time, and to provide sufficient time for each contractor to complete their respective work. A figure is included in Appendix K that presents the working areas of the various contractors and the associated timelines.

D4. SCOPE OF WORK

D4.1 The Work to be done under the Contract shall consist of the installation of a new force main system. The complete scope is described within the applicable Specifications and Drawings.

D4.2 The major components of the Work are as follows:

(a) Utility locations and elevations are to be confirmed prior to commencement of construction as required to allow for preventative or corrective actions if required;

(b) Temporary modifications to existing ditches within working and laydown areas as required to deal with drainage throughout the duration of construction;

(c) Construction of 450 mm DR25 PVC force main utilizing open cut and Trenchless installation methods;

(d) Construction of Combined Air Valve (CAV) Chambers;

(e) Construction of 450mm Gate Valves;

(f) Construction of 600 mm DR9 HDPE force main with Primus Liner for the CPKC railway and Omand's Creek crossing utilizing horizontal direction drilling;

(g) Construction of 450 mm DR18 Restrained Joint PVC force main encased within a 900mm Steel Casing for the CN railway, Bergen Cutoff Road, and Oak Point Highway crossings utilizing Auger Boring or Pipe Ramming;

(h) Construction of 1200mm wastewater sewer that crosses the Inkster Blvd and Brookside Blvd Intersection utilizing Tunnelling;

(i) Supporting and backfilling below key utilities to support Tunnelling Work as shown on Drawings;

(j) Connection to the 1350mm CONC WWS at the intersection of Inkster Boulevard and Brookside Boulevard;

(k) Construction of Wastewater Sewer Manholes;

(l) Relocating 300 mm water main as shown on the Drawings;

(m) Coordination of the relocation of existing Telus utilities;

(n) Supporting existing utilities as required

(o) Pigging and pressure testing the force main; and

(p) Surface restoration and related Works.

D4.3 The following shall apply to the Work:

(a) City of Winnipeg Green Building Policy: New City-Owned Buildings and major additions;

http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeId=2&DocId=5989

(b) Universal Design Policy

http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeId=2&DocId=3604

D5. SITE INVESTIGATION DUE DILIGENCE AND RISK

D5.1 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

this newly discovered site condition, such additional Work will be considered by the City under Changes in Work.

D6. DEFINITIONS

D6.1 When used in this Tender:

(a) **"Auger Boring"** means a pipe jacking technique for forming a cased bore from a drive pit to a reception pit. Excavation is accomplished by means of a rotating cutting head. Spoil is removed back to the drive shaft by helically wound auger flights rotating in a steel casing.

(b) **"Benchmark"** is a permanent reference Control Point established by the Contractor;

(c) **"Carrier Pipe"** means the permanent pipe for operational use that is used to convey flows;

(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) **"CPKC"** means Canadian Pacific Kansas City Railway;

(h) **"CN"** means Canadian National Railway;

(i) **"CPM"** means Critical Path Method;

(j) **"Force Main"** means a pressurized pipe used to convey sewer flows from a pump station to a local sewer system network;

(k) **"GBR"** means Geotechnical Baseline Report;

(l) **"GDR"** means Geotechnical Data Report;

(m) **"Grout Port"** means a port located within the Carrier Pipe, fitted with a one-way valve, for injection of grout into the annular space between the Carrier Pipe and the excavation. Pipe plugs are inserted after grouting is completed;

(n) **"HDD"** means Horizontal Directional Drilling, HDD is the installation of a pipeline by drilling a pilot bore from an entry pit to a predetermined exit location. The drilling head is then replaced with a reamer and the borehole is enlarged to a predetermined size. Once completed the product pipeline is pulled into place;

(o) **"HDPE"** means High Density Polyethylene;

(p) **"Jacking Pipe"** means a reinforced concrete pipe jacked behind a TBM. The Jacking Pipe shall be specifically designed to be installed by Pipe Jacking to support the anticipated loading. The Jacking Pipe will be the Carrier Pipe for the Pipe Jacking method;

(q) **"Jacking Record"** means a manually automatically recorded report that contains information on Tunnelling (and Pipe Jacking) operations as defined herein;

(r) **"MTI"** means Manitoba Transportation and Infrastructur;.

(s) **"Open Face Rotary Tunnel Boring Machine"** means a steerable Tunnelling shield that achieves soil excavation by means of a rotating cutter-wheel. Excavation operations are performed from within the shield, and excavated soil is discharged to a conveyor or muck cart where it is transported to the ground surface for disposal. An EPBTBM shield may also be used and operated in an open-face mode. The guidance system consists of a laser or theodolite and EDM device mounted in the launch shaft and at intermediate points along the tunnel communicating a reference line(s) to a target mounted in the tunnel boring machine's articulated steering head. The target in the tunnel boring machine provides the operator with information about machine attitude and pitch, and allows for accurate steering control;

(t) **"Pipe Jacking"** means a guided, steerable process that uses a Tunnel Boring Machine jacked at the leading end of a string of Jacking Pipe from a launch shaft to a receiving shaft;

(u) "**Pipe Ramming**" means a non-steerable system of forming a bore by driving an open-ended casing using a percussive hammer from a pit and only displacing the wall thickness of the case. The soil will remain in the casing until the bore has been completed and then may be removed by water, auguring, jet-cutting or compressed air;

(v) **"PVC"** means Polyvinyl Chloride;

(w) **"Radial Overcut"** means the Radial Overcut determined as the difference between the maximum diameter created by the cutting teeth or overcut band on the TBM (whichever is greater) and the outer diameter of the tail shield or Jacking Pipe, divided by two;

(x) **"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;

(y) **"Site"** means the lands and other places on, under, in or through which the Work is to be performed;

(z) "**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;

(aa) **"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;

(bb) **"Surface Monitoring Point" (SMP)** means monitoring points established to measure elevation of the ground surface;

(cc) **"Trenchless"** means installing pipe inside a hole that has been made between shafts by coring, boring, horizontal directional drilling, pipe ramming, jacking, tunnelling and extraction of an existing pipe or similar methods with minimal excavation and surface disruption;

(dd) **"Tunnelling"** means the trenchless construction method used to install pipelines using an Open Face Rotary Tunnel Boring Machine and Pipe Jacking;

(ee) **"Tunnel Face"** means the vertical (or near vertical) soil face at the end of the tunnel heading;

(ff) **"Utility Monitoring Point"** (UMP) means a monitoring point set on top of an existing pipeline using a steel rod within a cased hole; and

(gg) **"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.

D7. CONTRACT ADMINISTRATOR

D7.1 The Contract Administrator is KGS Group, represented by:

Tristan Eldridge, C.E.T.
Municipal Engineering Technologist

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

D7.2 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.

D8. CONTRACTOR'S SUPERVISOR

D8.1 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.

D9. ACCESSIBLE CUSTOMER SERVICE REQUIREMENTS

D9.1 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.

D9.1.1 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.

D9.1.2 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.

D10. UNFAIR LABOUR PRACTICES

D10.1 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 conventions as ratified by Canada.

D10.2 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.

D10.3 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.).

D10.4 Failure to provide the evidence required under D10.3, may be determined to be an event of default in accordance with C18.

D10.5 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.

D10.5.1 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.

D10.5.2 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 D10.5. The City may also hold back the amount of the Unfair Labour Practice Penalty from payment for any amount it owes the Contractor.

D10.5.3 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.

D11. FURNISHING OF DOCUMENTS

D11.1 Upon award of the Contract, the Contractor will be provided with 'issued for construction' Contract Documents electronically, including Drawings in PDF formal only.

SUBMISSIONS

D12. AUTHORITY TO CARRY ON BUSINESS

D12.1 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.

D13. SAFE WORK PLAN

D13.1 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.

D13.2 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

D13.3 Notwithstanding B14.3(e) 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.

D14. INSURANCE

D14.1 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 and Canadian Pacific Railway Company and Canadian Nation Railway Company 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.

D14.2 Deductibles under the policy not to exceed $50,000 maximum of any one loss and shall be borne by the Contractor;

D14.3 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 its ministers, officers, employees and agents and Canadian Pacific Railway Company to be listed 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, Tunnel Boring Machines and their related equipment and tools used on the Project that may be owned, rented, leased or borrowed.

(e) Contractors pollution liability (CPL) in the amount of at least two million dollars ($2,000,000) per occurrence and five million dollars ($5,000,000) in the annual aggregate insuring against claims covering thirty-party injury and property damage claims and including clean-up costs and transported cargo as a result of pollution conditions arising suddenly or gradually from the Contractors operations and completed operations. Such policy to name the City and Canadian Pacific Railway Company as additional insureds and remain in place during the performance of the Work and for 12 months following total performance.

D14.4 Deductibles shall be borne by the Contractor.

D14.5 All policies shall be taken out with insurers licensed in the Province of Manitoba.

D14.6 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.

D14.7 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.

D14.8 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.

D15. CONTRACT SECURITY

D15.1 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.

D15.1.1 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 D15.1(b).

D15.1.2 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.

D15.1.3 Digital bonds passing the verification process will be treated as original and authentic.

D15.2 The Contractor shall provide the Contract Administrator identified in D6.1 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.

D15.3 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 D15.1(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.

D16. SUBCONTRACTOR LIST

D16.1 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.

D17. REQUIREMENTS FOR SITE ACCESSIBILITY PLAN

D17.1 The Contractor shall provide the Contract Administrator with an Accessibility 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.

D17.2 The Accessibility Plan shall demonstrate how the Contractor will accommodate the safe passage of pedestrians and cyclists in accordance with the Manual of Temporary Traffic Control, the Contract Drawings, Staging Plans, and Streets By-Law No. 1481/77 at all times for the duration of the Construction. Unless noted in the Contract, the Accessibility Plan must include a written plan for the following:

(a) How the Contractor will maintain at least one crossing in each direction for each intersection (one north/south crosswalk and one east/west crosswalk).

(b) How the Contractor will maintain access to bus stops within the site.

(c) How the Contractor will maintain access to pedestrian corridors and half signals.

(d) How the Contractor will maintain cycling facilities.

(e) How the Contractor will maintain access to residents and businesses unless otherwise noted in the Contract.

(f) Any required detour signage at adjacent crossings to facilitate sidewalk or active transportation pathway closures.

D17.3 The Accessibility Plan may also include figures, sketches, or drawings to demonstrate the proposed plan.

D17.4 The Accessibility Plan shall include written details on how the Contractor intends to review, maintain, and document all items related to the Accessibility Plan on-site during Construction, including, but not limited to:

(a) Signage

(b) Temporary Ramping

(c) Transit Stops

(d) Detour Signage

D17.5 At minimum, the Contractor shall review the site conditions on a daily basis to ensure that all features related to the Accessibility Plan are in place. The site review is intended to correct deficiencies as a result of unforeseen events such as wind, traffic, or the general public. Deficiencies that are direct result of the Contractors actions must be corrected immediately.

D17.6 Any changes to the Accessibility Plan must be approved by the Contract Administrator.

D17.7 Upon request from the Contract Administrator, the Contractor shall provide records demonstrating that the site has been maintained.

D17.8 Deficiencies as a direct result of actions by the Contractor that are not immediately corrected and/or failure to produce records that demonstrate that the site was maintained in compliance with the Accessibility Plan may result in a pay adjustment via the monthly Progress Payment. The rate of pay adjustment will be as per the following schedule:

(a) First Offence – A warning will be issued and documented in the weekly or bi-weekly site meeting.

(b) Second Offence – A field instruction to immediately correct the site will be issued by the Contract Administrator.

D17.9 Third and subsequent Offences – A pay reduction will be issued in the amount of $250.00 per instance and per day.

D18. DEWATERING AND DRAINAGE PLAN

D18.1 In addition to C6, 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.

D18.2 The Contractor is responsible for the control, diversion, storage and pumping of all water including without limitation rain, snow melt, groundwater, leaking infrastructure and water in pipes throughout all stages of the Work.

D18.3 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 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, and 50dBa outside these hours);

(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.

D18.4 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.

D18.5 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.

D18.6 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.

D18.7 All dewatering equipment and discharge hoses shall be protected from freezing and shall remain fully operational in freezing weather.

D18.8 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.

D18.9 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.

D18.10 All Work associated with the Dewatering and Drainage plan will be considered incidental to Site Development and Restoration.

SCHEDULE OF WORK

D19. DETAILED WORK SCHEDULE

D19.1 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.

D19.2 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.

D19.3 Further to D19.2(a), the CPM schedule shall identify the start and completion dates of the following Work items:

(a) Commencement date

(b) Utility locates

(c) Site preparation and access

(d) Supply and installation of force main piping, complete with all required fittings, air release valve chambers and appurtenances

(e) Specific dates for completion of Works for the following crossing locations:

(i) Sturgeon Road Crossing

(ii) CPKC Rail and Omand’s Creek Crossing

(iii) East Colony Creek Crossing

(iv) CN Rail Crossing

(v) Inkster and Brookside Crossing

(f) Force main connections to the existing sewer system at Inkster Blvd/Brookside Blvd.

(g) Pigging and pressure testing of force main pipe

(h) Site restoration

(i) Critical Stages, Substantial Performance and Total Performance

D19.4 Timelines and staging for pedestrian and traffic management identified in E11 as required to complete the Work should be included in the schedule.

D19.5 All Work within the Province of Manitoba/ MTI, or the RM of Rosser jurisdiction shall be clearly marked on the detailed work schedule. The schedule will be provided to MTI and the RM of Rosser for their planning and coordination.

D19.6 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.

D20. COMMENCEMENT

D20.1 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.

D20.2 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 D12;
  (ii) evidence of the workers compensation coverage specified in C6.15;
  (iii) the Safe Work Plan specified in D13;
  (iv) evidence of the insurance specified in D14;
  (v) the contract security specified in D15;
  (vi) the Subcontractor list specified in D16;
  (vii) the Requirements for Site Accessibility Plan specified in D17; and
  (viii) the Dewatering and Drainage Plan specified in D18;
  (ix) the direct deposit application form specified in D38.

(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.

D20.3 The Contractor shall commence the Work on the Site within seven (30) Working Days of receipt of the award letter.

D20.3 The City intends to award this Contract by October 11, 2024.

D20.3.1 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.

D21. WORK BY OTHERS

D21.1 Further to C6.25, the Contractor's attention is directed to the fact that other Contractors, the personnel of Utilities and the staff of the City may be working within the project limit, approach roadway, adjacent roadways or right-of-way. The activities of these agencies may coincide with the Contractors execution of Work and it will be the Contractor's responsibility to cooperate to the fullest extent with other personnel working in the area, and such cooperation is an obligation of the Contractor under the terms of Contract.

D21.2 As referenced in Section D3, Work by others on or near the Site will include but not necessarily be limited to:

(a) Telus - A Telus line exists along the alignment of the force main on the west side of Strugeon Road. The line will be relocated to support the current project. The Contractor will be required to coordinate the Work by Telus as per Specification E20.

(b) CentrePort Feeder Main Contractor. Work by the successful bidder of Tender 220-2024 will be occuring concurrently with this Contract. The primary zone of conflict is along the west side of Sturgeon Road from Sturgeon Access to Offtake Structure 3.

(i) Critical Stages have been included within tender 2020-2024 to ensure that the feeder main work is completed by specific dates (See sequencing section D22)

(c) CentrePort Interceptor Contractor – Work by the successful bidder of Tender 990-2023B Construction of ~1,045 m of 1200 mm Interceptor Sewer will be occurring concurrently to the force main contract. The primary zone of conflict is at the intersection of Surgeon Road and Strugeon Access.

(i) Critical Stages have been included within Tender 990-2023B to ensure that the interceptor work within the conflict area is completed by specific dates (See sequencing section D22)

(d) CentrePort Lift Station Contractor – Work by the successful bidder of Tender 301-2024 will be occurring concurrently with the force main contract

(i) Coordination will be required between the Contractor and the Contractor for the lift station contract (Tender 301-2024) to make the final connection to the 450 mm force main at Station 2+831.95 on Drawing 13460. Bid items have been included for both an in-line plug and an in-line connection within both contracts to make this final connection. Coordination between the two contracts and the Contract Administrator will be required to determine which contractor completes this piece of the work.

D21.2.1 Further to D21.1 the Contractor shall cooperate and coordinate all activities with all parties performing required Work by Others identified in D21.1 and accommodate the necessary area on Site required for the Work by Others to complete the Work.

D22. SEQUENCE OF WORK

D22.1 Further to C:6.1, the sequence of Work shall be as follows

(a) Coordination with the other three CentrePort Contracts will be required to ensure that only a single Contractor occupies any specific area at any given time, Appendix J presents the following:

(i) To ensure no conflict with Contract 1A (Lift Station) and Contract 3 (Interceptor) no work shall commence on Drawings 13460 to 13462 from the plug at station 2+825 to bend at station 3+140 until after July 1st, 2025.

(ii) To ensure no conflict with Contract 4A (Feeder Main) no work on Drawings 13461 to 13464 from the bend at station 3+014 to 3+815 can be started until after December 15th, 2024.

(iii) Due to the Substantial Completion date of July 31st for Contract 4A (Feeder Main) it shall be assumed that the use of water from the standpipe at Offtake Structure 3 will not be available for use to accommodate commissioning until after August 15th, 2025.

(b) Due to the restriction within the CPKC Railway Mile 6.46 Carberry Subdivision Crossing permit, no work on the CPKC Crossing as shown on Drawing, 13479, 13480, and 13495 from stations 4+410 to 4+644 shall be completed between December 15th, 2024, and March 31st, 2025.

(c) Due to the restriction within the CN Railway Mile 8.53 Rivers Subdivision Crossing permit, no work on the CN Crossing as shown on Drawing, 13481 and 13496 from stations 4+980 to 5+087 shall be completed between December 15th, 2024, and March 31st, 2025.

(d) Work within East Colony Creek ROW is intended to occur in winter from December 15th, 2024, to March 1st, 2025, when the creek is not flowing. Any additional costs associated with the Work occurring outside of these time ranges would fall upon the Contractor.

(e) The access agreement for the Exemplar Developments lands from Station 3+375 to 3+725 on Drawings 13475 and 13476 is intended in place by December 15th, 2024. The Contractor shall not undertake work within these lands until after this date.

(f) The open-cut force main Work within Toowoomba Land Company lands shall be completed from May 15th, 2024, to September 31st, 2025.

(g) For the Tunneling Work at Inkster Blvd and Brookside Blvd, once shafts are installed Tunneling must continue until completion, including removal of shafts, backfilling and road repairs. If the Contractor chooses to pause work for a period greater than two weeks during Tunneling, then the areas where the shafts are must be reopened to traffic.

(h) The utility exploration Work shall commence immediately upon the award of the project.

(i) The Pump Test and Depressurization Plan Work shall commence within 7 days of the award of the project to ensure that the Contractor has their plan in place to support their pipe installation.

D23. CRITICAL STAGES

D23.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

(a) Critical Stage 1: All Work within the paved portions of the property owned by Toowoomba Land Company as shown on Drawings 13489 to 13490 from Station 7+095 to 7+430 must be completed including force main installation, backfill, pressure testing, and permanent restoration within 8 weeks of commencement of these Works.

(i) The Tunneling Work will be exempt from Critical Stage 1 if completed in the winter as per Critical Stage 2 below.

(b) Critical Stage 2: The installation of MH01, backfill of the shaft, and temporary restoration of the parking lot shall be undertaken within two weeks of the retrieval of the TBM, if the Contractor undertakes the Tunneling Works within the winter months.

(i) The intent of this Critical Stage is to reduce the construction impact on Toowoomba Land Company lands.

(c) Critical Stage 3: All roadway surfaces along Red Fife Road (RM of Rosser) must be restored with permanent or temporary restoration within 3 weeks of the completion of any pipe Work along this segment.

(i) The Contractor shall maintain any temporary surface restorations until permanent surface restorations are installed.

(d) Critical Stage 4: Work within East Colony Creek ROW must be completed by March 1st, 2025. This date has been established to ensure that all in water works are completed prior to the spring melt.

D24. SUBSTANTIAL PERFORMANCE

D24.1 The Contractor shall achieve Substantial Performance by November 30, 2025.

D24.2 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.

D24.3 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.

D25. TOTAL PERFORMANCE

D25.1 The Contractor shall achieve Total Performance by June 30, 2026. or within 30 days if seasonal inclement weather does not allow permanent restorations to commence immediately after Substantial Performance, whichever comes first. The Contract Administrator will advise the Contractor when seasonal conditions will allow permanent restorations to begin. The Contractor will start final restorations no later than 14 (fourteen) Calendar Days after formal notification by the Contract Administrator.

D25.2 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.

D25.3 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.

D26. LIQUIDATED DAMAGES

D26.1 If the Contractor fails to achieve, Critical Stages, Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Calendar Day for each and every Calendar Day following the days fixed herein for same during which such failure continues:

(a) Critical Stage 1 – Two Thousand Six Hundred dollars ($2,600.00)

(b) Critical Stage 2 – Two Thousand Six Hundred dollars ($2,600.00)

(c) Critical Stage 3 – Two Thousand Six Hundred dollars ($2,600.00)

(d) Critical Stage 4 – Five Thousand Two Hundred dollars ($5,200.00)

(e) Substantial Performance – Two Thousand Six Hundred dollars ($2,600.00);

(f) Total Performance - One Thousand Eight Hundred dollars ($1,800.00).

D26.2 The amounts specified for liquidated damages in D26.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve, Critical Stages, Substantial Performance or Total Performance by the days fixed herein for same.

D26.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D27. SUPPLY CHAIN DISRUPTION SCHEDULE DELAYS

D27.1 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.

D27.2 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.

D27.3 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.

D27.4 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 D27.3. Failure to provide this notice will result in no additional time delays being considered by the City.

D27.5 The Work schedule, including the durations identified in D22 to D25 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.

D27.6 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.

D27.7 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.

D28. SCHEDULED MAINTENANCE

D28.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

(a) Sodding as specified in CW 3510;

(b) Watering and maintenance of all new vegetation until established.

D28.2 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

D29. JOB MEETINGS

D29.1 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.

D29.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever they deem it necessary.

D30. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D30.1 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).

D31. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D31.1 Further to B14.3(e), 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 B14.3(e).

D32. TRAFFIC CONTROL

D32.1 Further to Clause 3.7 of City of Winnipeg Standard Specification CW 1130:

(a) The Contractor shall make arrangements 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

D32.2 Additional traffic management requirements are outlined in E10 and E11.

D33. PEDESTRIAN SAFETY

D33.1 Further to clause 3.6 of CW 1130:

(a) The Contractor shall maintain a closed Site around all Work elements to restrict pedestrian and vehicular access. Temporary fencing or an alternative as approved by the Contract Administrator shall be installed at all open excavations, trench cages, cans and shafts for the project duration in accordance with Provincial requirements.

(b) The Contractor shall be responsible for maintaining fencing in a proper working condition at all times. Pedestrian Safety requirements shall be incidental to Site Development and Restoration.

D34. WORK UNDERNEATH AND IN THE VICINITY OF HYDRO POWER INFRASTRUCTURE

D34.1 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.

D34.2 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.

D35. WORK IN PROXIMITY TO LARGE NATURAL GAS MAINS

D35.1 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: https://www.hydro.mb.ca/docs/safety/safe_excavation_safety_watch_guidelines.pdf

D35.2 Work precautions and procedures required for working near gas mains will be incidental to the Contract.

D36. CONFINED SPACE ENTRY

D36.1 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).

D36.2 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.

D37. GEOTECHNICAL BASELINE REPORT (GBR) AND GEOTECHNICAL DATA REPORT (GDR)

D37.1 The primary purpose of the GBR is to establish a contractual understanding of the geotechnical conditions anticipated to be encountered during the Trenchless construction elements 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. Secondarily, 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.

D37.2 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 D40. 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.

D37.3 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.

D37.4 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.

D37.5 Geophysical seismic refraction surveys were conducted to estimate the depth to bedrock along portions of 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.

D37.6 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 D40.

D37.7 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.

D37.8 If all of the foregoing conditions are satisfactorily met, additional compensation and schedule will be negotiated, based on the provisions described in D40 and E15.

MEASUREMENT AND PAYMENT

D38. PAYMENT

D38.1 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.

D39. FUEL PRICE ADJUSTMENT

D39.1 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) x Q x FF; and

(b) where the price of fuel has decreased - ((CFI/BFI)-0.85) x Q x 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.

D39.1.1 Eligible Work will be determined in accordance with D39.5.

D39.1.2 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.

D39.1.3 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.

D39.1.4 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.

D39.2 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.

D39.3 The fuel escalation or de-escalation adjustment will not be applied if the CFI is within ±15% of the BFI.

D39.4 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.

D39.5 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.

D40. CHANGES IN WORK

D40.1 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 Total Performance under the Contract Documents.

(c) No claim by the Contractor related to the Trenchless Work 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 the performance of the Work. The contractor shall within 30 calendar days after notification to the City that Contractor believes a material difference exists, provide the documentation, backup, justification, and compensation for the alleged impact to the Contractor's cost of and/or time required for the 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.

(d) If City agrees that there is a material difference that impacts the 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. The 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. The City will be sole judge of what is reasonable and customary.

(e) 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 the 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 Form B and as defined in E15. The failure of the Contractor to maintain said logs or to obtain signatures on the logs shall render the Contract Administrator daily records definitive.

WARRANTY

D41. WARRANTY

D41.1 Notwithstanding C13.2, the warranty period shall begin on the date of Total Performance and shall expire **two (2) years** thereafter unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

DISPUTE RESOLUTION

D42. DISPUTE RESOLUTION

D42.1 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 D42.

D42.2 The entire text of C21.4 is deleted, and amended to read: "Intentionally Deleted"

D42.3 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.

D42.4 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.

D42.4.1 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.

D42.4.2 As these negotiations are not an adjudicative hearing, neither party may have legal counsel present during the negotiations.

D42.4.3 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.

D42.4.4 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 D42.4.3, 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

D43. INDEMNITY

D43.1 Indemnity shall be as stated in C17.

D43.2 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.

D43.3 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

D44. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

D44.1 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.

D44.2 For the purposes of D44:

(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.

D44.3 Indemnification By Contractor

D44.3.1 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.

D44.3.2 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.

D44.4 Records Retention and Audits

D44.4.1 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.

D44.4.2 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 D44.4.1 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.

D44.5 Other Obligations

D44.5.1 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.

D44.5.2 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.

D44.5.3 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.

D44.5.4 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.

D44.5.5 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.

D44.5.6 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)

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. 427-2024

CentrePort South Regional Water and Wastewater Servicing Phase 1A Contract 2A - Force Main

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)

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. 427-2024

CentrePort South Regional Water and Wastewater Servicing Phase 1A Contract 2A - Force Main

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

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

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

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

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

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

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

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

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

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

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

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

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness as to Principal if no seal)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

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

FORM J: SUBCONTRACTOR LIST
(See D16)

CENTREPORT SOUTH REGIONAL WATER AND WASTEWATER SERVICING PHASE 1A CONTRACT 2A - FORCE MAIN

Name	Address

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 B8. 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 B8.

E1.4 The following are applicable to the Work:

Drawing No.	Drawing Name/Title
13457	COVER PAGE
13458	INDEX PAGE
13459	KEY PLAN
13460	STURGEON ACCESS - STA 2+700 TO STA 2+955
13461	STURGEON ACCESS - STA 2+955 TO STA 3+075
13462	STURGEON ROAD - STA 3+050 TO STA 3+305
13463	STURGEON ROAD - STA 3+305 TO STA 3+560
13464	STURGEON ROAD - STA 3+560 TO STA 3+815
13465	STURGEON ROAD - STA 3+815 TO STA 4+070
13466	STURGEON ROAD - STA 4+070 TO STA 4+325
13467	STURGEON ROAD - STA 4+325 TO STA 4+580
13468	STURGEON ROAD - STA 4+580 TO STA 4+835
13469	STURGEON ROAD - STA 4+835 TO STA 5+090
13470	STURGEON ROAD - STA 5+090 TO STA 5+345
13471	STURGEON ROAD - STA 5+345 TO STA 5+600
13472	STURGEON ROAD - STA 5+600 TO STA 5+750
13473	STURGEON ROAD - STA 2+875 TO STA 3+100
13474	STURGEON ROAD - STA 3+125 TO STA 3+375
13475	STURGEON ROAD - STA 3+375 TO STA 3+625
13476	CENTREPORT CANADA WAY - STA 3+625 TO STA 3+875
13477	CENTREPORT CANADA WAY - STA 3+875 TO STA 4+130
13478	CENTREPORT CANADA WAY - STA 4+130 TO STA 4+390
13479	CENTREPORT CANADA WAY - STA 4+390 TO STA 4+650
13480	CENTREPORT CANADA WAY - STA 4+650 TO STA 4+900
13481	CENTREPORT CANADA WAY - STA 4+900 TO STA 5+150
13482	CENTREPORT CANADA WAY - STA 5+150 TO STA 5+410
13483	CENTREPORT CANADA WAY - STA 5+410 TO STA 5+670
13484	CENTREPORT CANADA WAY - STA 5+670 TO STA 5+930

13485	CENTREPORT CANADA WAY - STA 5+930 TO STA 6+190
13486	CENTREPORT CANADA WAY - STA 6+190 TO STA 6+450
13487	CENTREPORT CANADA WAY - STA 6+450 TO STA 6+710
13488	CENTREPORT CANADA WAY - STA 6+730 TO STA 7+010
13489	CENTREPORT CANADA WAY - STA 7+010 TO STA 7+290
13490	CENTREPORT CANADA WAY - STA 7+290 TO STA 7+585
13491	MISCELLANEOUS DETAILS - SHEET 1
13492	MISCELLANEOUS DETAILS - SHEET 2
13493	MISCELLANEOUS DETAILS - SHEET 3
13494	MISCELLANEOUS DETAILS - SHEET 4
13499	MISCELLANEOUS DETAILS - SHEET 5

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 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 geotechnical data collected during the project geotechnical exploration (KGS Group, 2024) and provides construction considerations for use by Bidders for Bid preparation and administration of the Contract. Further information is provided in D37 and a copy of the GBR is included in Appendix B.

GENERAL REQUIREMENTS

E3. OFFICE FACILITIES

E3.1 The Contractor shall supply a separate Site trailer for exclusive use by the Contract Administrator.

E3.2 The Site trailer will serve as the Contract Administrators' office facility and 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 near the Site of Work at a location acceptable to the Contract Administrator.

(c) The Contractor shall relocate the office facility during construction upon the request of the Contractor Administrator up to three (3) times.

(d) The building shall have a minimum floor area of 25 square metres, minimum of two windows and a door entrance with suitable lock.

(e) 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.

(f) The building shall be supplied with adequate lighting and have a minimum of three wall outlets with 120 Volt power supply at all times.

(g) The building shall be furnished with two desks, two meeting tables, one drafting table, one filing cabinet and a minimum of 12 chairs.

(h) A portable toilet shall be located near the field office building. The toilet shall have a locking door.

(i) 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, relocation, all operating costs, provision of furnishings and equipment, cleaning and the general maintenance of the office facilities.

(b) Payment for the office facility to be included in Site Development and Restoration.

E4. SHOP DRAWINGS

E4.1 Description

E4.1.1 This Specification shall revise, amend and supplement the requirements of CW 1110.

(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 the Contractor, Subcontractor, Supplier, Distributor, or Manufacturer, which illustrate an 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 and Shaft Layout
(ii) Reinforcing Steel
(iii) Pre-Cast Concrete Structures
(iv) Primus Liner
(v) Combination Air Valves
(vi) Large Diameter Manholes
(vii) Utility Supports
(viii) Pipe

(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) Note that no shaft construction may proceed without approved shop drawings that include engineered stamped drawings demonstrating that the shoring design(s):
(ii) Meet all provincial regulations.
(iii) Is able to support soil and active loading.
(iv) Permits the effective installation of the planned Works.
(v) Where shafts are used for boring that the shoring also supports the planned boring works as well as interaction with the thrust block design.

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 the following metrics against what's indicated in the Shop Drawings:
   (i) Field Measurements
   (ii) Field Construction Criteria
   (iii) Catalogue numbers of material delivered to the Site 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 the time of submission, of deviations from the requirements of Contract Documents.

(e) Responsibility for deviations from requirements of Contract Documents in the submission is not relieved by the Contract Administrator's review of the submission unless Contract Administrator gives written acceptance of specified deviations.

(f) Responsibility for errors and omissions in submission is not relieved by the 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 the previous submission.

(h) After the 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 the dates on which reviewed submissions will be needed, and allow for a 10 Calendar Day period for review by the Contract Administrator of each submission and re-submission unless noted otherwise in the Contract Documents.

(b) Submit one (1) digital copy (PDF) of the shop drawings.

(c) Accompany submissions with a transmittal letter, containing:
   (i) Date
   (ii) Project title and Tender 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 Tender 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) Verification that field dimensions are 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

(ix) Contractor's stamp, initialled or signed, certifying review of the 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 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.

(e) Where a Contractor is providing a shop drawing for an element that contains other elements that require shop drawings, the Contractor is responsible for ensuring that the shop drawings are coordinated with each other (example shoring systems supporting construction activities and structures, or a concrete structure supporting internal piping and other ancillary elements).

E4.2 Measurements and Payment

E4.2.1 Notwithstanding E5, 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. EXPEDITED SHOP DRAWINGS

E5.1 In order to expedite Shop Drawings with critical timelines, the Lowest Responsive Bidder 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) Pre-Cast Concrete Structures

(c) Large Diameter Manholes

(d) Primus Liner

(e) Pipe

(f) Gate Valves

(g) Air Release Valves

(h) Utility Clearances for Groundwater Depressurization Plan and Utility Exploration Plan

E5.2 If Award is made to the Lowest Responsive Bidder, then no specific payment for the preparation of Shop Drawings will be made.

E5.3 If no contract is awarded, then the City of Winnipeg will pay the requested Bidder five hundred dollars ($500.00) per item listed above. Delivery of the Shop Drawings to the City and payment of the above 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.

E6. ENVIRONMENTAL PROTECTION PLAN

E6.1 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.

E6.2 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 Maitoba 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.

E6.3 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 (see SC:21.4 D).

(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 disturbed 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.

E6.4 Method of Measurement and Payment

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

E7. COLD WEATHER REQUIREMENTS

E7.1 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.

E7.2 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 of 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.

E7.3 Measurement and Payment

(a) Cold weather requirements shall be considered incidental to the Work.

E8. HERITAGE RESOURCES PROTECTION AND MONITORING PROGRAM

E8.1 The Contractor shall plan and implement the Work of this Contract strictly in accordance with the requirements of the Heritage Resources Act (1986), Section 12, which outlines the protections against the disturbance of heritage resources.

E8.2 Description

E8.2.1 The Historic Resources Branch (HRB) in their assessment of the heritage potential for this project (AAS File # AAS-23-20756), issued conditional approval for all areas of the project.

E8.2.2 The Heritage Resource Protection Plan (HRPP) included in Appendix C includes measures and requirements that the Contractor must follow if artifacts are encountered while completing the Works, regardless of location.

E8.2.3 A land acknowledgement must be included as part of the daily safety meeting before work commences, as described in the HRPP.

E8.2.4 The HRPP included in Appendix C is a draft and is not formally approved by HRB. A finalized document will be provided to the Contractor prior to Commencement.

E8.3 Construction Methods

E8.3.1 The Contractor shall be responsible for the implementation of the HRPP that details the procedures to be followed in the event that heritage resources are accidentally encountered during construction activities. The plan shall be reviewed and discussed with the Contract Administrator prior to mobilization.

E8.3.2 Heritage objects recovered during the course of the monitoring are owned by the Crown with the custody residing in the HRB. All archaeological materials will be processed, packaged, and submitted to the HRB by the date specified on the relevant Heritage Permit and in accordance to Archaeological Artifact Submission Standards (2009).

E8.3.3 Should heritage resources be found at any point during construction outside of the monitoring area designated above, the Contractor the meet all requirements of the HRPP.

E8.4 Basis of Payment

E8.4.1 Costs incurred by the Contractor related to heritage resource monitoring and reporting shall be paid for under the allowance for “Heritage Resources Mitigation Measures”. Payment will be based on actual invoiced costs for HRIA activities with allowable mark-ups in accordance with the General Conditions.

E9. SITE DEVELOPMENT AND RESTORATION

E9.1 Description

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

(b) The Tender quantities listed on Form B: Prices include an expected quantity of Topsoil Placement and Seeding based on the proposed Works. All Topsoil Placement and Seeding beyond the quantities listed on Form B: Prices will be considered incidental to Site Development and Restoration, and no additional payment will be made for the additional quantities as described in Section E51.

(c) The Tender quantities listed on Form B: Prices include an expected quantity of road reconstruction based on the proposed Works. All road and parking lot reconstruction quantities beyond those listed on Form B: Prices will be considered incidental to Site Development and Restoration, and no additional payment will be made for the additional quantities as described in Section E52.

E9.2 Submittals

(a) Access and Layout Plans for review and approval by the Contract Administrator, in accordance with CW 1110 and E11, for the following items:

(i) Traffic management plans.

(ii) Launch and receiving shafts for Tunneling and Trenchless construction.

E9.3 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.

E9.4 Construction Methods

(a) Temporary Workspace and Site Access

(i) The Contractor shall be responsible to develop suitable Site access. This includes but is not limited to, removal of curbing, temporary ramping, temporary approach construction, construction signage, temporary bridging over structures, removal and replacement of bollards, 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) The Contractor is responsible for obtaining and paying for all required permits that are necessary for Site access.

(iii) Potential Contractor laydown areas near the intersection of Inkster Boulevard and Brookside Boulevard have been identified on Drawing 13490. The Contractor may coordinate with Paul Kostas (pkostas@mymets.net) at (204)-290-5571 for the temporary use of this land.

(iv) Contractor laydown areas have been identified within the temporary easement locations as shown in Appendix I. Contractor to coordinate with Toowoomba Land Company as required.

(v) Laydown areas other than those identified must be approved by the Contract Administrator.

(b) Dewatering and Drainage Plan – The Contractor shall develop and maintain whatever means and methods are required to address the various potential flows and water levels defined in D18, including:

(i) Snowmelt, rainfall, water from water main breaks or any other flow traveling through the Site, into excavations, or through pipes being worked on.

(ii) The Contractor shall acquire any permits required from the City for redirecting of flows to City sewers.

(iii) The Contractor shall schedule and perform Work in a manner that does not cause or contribute to incidences of basement flooding, overflows, releases or spills of sewage from the sanitary sewer system or bypass operations.

(iv) The Contractor shall ensure that any component of their Drainage and Dewatering Plans will be adequately protected from damage and protected from freezing.

(c) Maintaining Flows in Existing Sewers and Providing Temporary Pressurized Water Supply

(i) The Contractor shall maintain sewer flows in the existing combined sewers, land drainage sewers, and sanitary sewer services; and water flow within water mains and water services that are in conflict with the force main installations or are impacted in any way as part of the Work.

(ii) Maintaining Flows in the Existing Sewer shall be in accordance with City Specification CW 2130.

(iii) Provide Temporary Pressurized Water Supply in accordance with City Specification CW 2110.

(iv) Where impacting a private service, sewer or water, the Contractor shall provide two (2) business days' notice to the business manager or homeowner of the building being impacted.

(v) 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 or sewage backing up, flowing through, overflowing or excessive surcharge of drainage or sanitary systems.

(d) Vegetation Removal and Protection

(i) Vegetation (living trees smaller than 50 mm and sod) removal may be permitted to facilitate Site access and temporary lay-down areas. Existing vegetation shall not be removed without prior approval from the Contract Administrator.

(e) General Site Cleanup and Restoration

(i) All areas of the construction Site shall be restored to the same condition or better than the original condition prior to initiation of the Work. This may include, but is not necessarily limited to, the Contractor's lay down areas, shaft location, the removal of the Contract Administrator's Site trailer, and removal of all temporary access paths and fencing.

(f) Topsoil and Sod

(i) All topsoil and sodding Work shall be performed in accordance with CW 3510. Topsoil and 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 sod at their own cost.

(g) Topsoil Placement and Seeding

(i) Topsoil Placement and Seeding Work shall include all grassed areas as that are disturbed by the Contractor during construction. The Contractor shall restore all areas disturbed during construction using topsoil and seed as described in Section E51.

(h) Traffic Control and Signage

(i) Coordinate, install and maintain traffic control and signage in accordance with E10, E11, and D32.

(i) 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.

(j) Surface Restoration

(i) Prior to construction, the Contractor shall inspect the grassed, pavement, and gravel surfaces within the site. After construction and site cleanup are complete, the Contractor shall re-inspect the conditions with the Contract Administrator.

(ii) The Contractor shall restore the condition and appearance of the site to pre-construction conditions or better in accordance with the following:

(i) Grassed areas damaged by construction activities will be restored in accordance with Section E51.

(ii) Road reconstruction will be paid for in accordance with Section E52.

(iii) Any other pavement damaged by construction activities will be restored in accordance with CW 3230 – Full-Depth Patching of Existing Slabs and Joints, and CW 3410 – Asphaltic Concrete Pavement Works.

(iv) Any other concrete damaged by construction activities will be restored in accordance with CW 3310 – Portland Cement Concrete Pavement Works, and CW 3325 – Portland Cement Concrete Sidewalk.

(v) Gravel surfacing damaged by construction activities will be restored in accordance with CW 3150 – Gravel Surfacing.

(vi) Items outside of the City specifications shall be restored to a condition equal to or better than the preconstruction condition.

E9.5 Method of Measurement and Payment

(a) Site Development and Restoration will not be measured and will be paid for at the Contract Lump Sum Price for "Site Development and Restoration", which price shall be paid 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) 10% of the Site Development and Restoration unit price will be paid on the first Progress Payment following the commencement of the Work.

(c) 10% of the Site Development and Restoration unit price will be paid on the Progress Payment following the mobilization of the Horizontal Directional Drilling and equipment to the Site.

(d) 10% of the Site Development and Restoration unit price will be paid on the Progress Payment following the mobilization of the Tunnel Boring Machine and equipment to the Site.

(e) 10% of the Site Development and Restoration unit price will be paid on the Progress Payment following the mobilization of the Auger Boring or Pipe Ramming equipment to the Site.

(f) 30% 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.

(g) 30% of the Site Development and Restoration unit price will be paid on the Progress Payment following Total Completion.

E10. TRAFFIC CONTROL

E10.1 Further to 3.6, 3.7 and 3.8 of CW 1130:

(a) Where directed by the Contract Administrator, the Contractor shall construct and maintain temporary asphalt ramps to alleviate vertical pavement obstructions such as manholes and planing drop-offs to the satisfaction of the Contract Administrator. Payment shall be in accordance with CW 3410.

(b) In accordance with the Manual of Temporary Traffic Control on City Streets (MTTC), the Contractor ("Construction Agency" in the Manual) shall be responsible for placing, maintaining and removing the appropriate temporary traffic control devices as specified by the MTTC, the Contract Drawings, Staging Plans and Traffic Management Plans or by the Traffic Management Branch of the City of Winnipeg Public Works Department. The Contractor shall bear all costs associated with the placement of temporary traffic control devices by their own forces or Subcontractor.

(c) In addition, the Contractor shall be responsible for supplying, removing, placing and maintaining all regulatory signing including but not limited to:

(i) Parking restrictions;
(ii) Stopping restrictions;
(iii) Turn restrictions;
(iv) Diamond lane removal;
(v) Full or directional closures on a Regional Street;
(vi) Traffic routed across a median;
(vii) Full or directional closure of a non-regional street where there is a requirement for regulatory signs (turn restrictions, bus stop relocations, etc.) to implement the closure.
(viii) Custom advanced information signage as noted on the Conceptual Traffic Management Plans will be fabricated and installed by the City.
(ix) Designated Construction Zone signs.

(d) The Contractor shall remove and stockpile any regulatory signage not required during construction such as, but not limited to, parking restrictions, turn restrictions and loading restrictions.

E10.2 Upon request from the Contract Administrator, the Contractor shall provide records demonstrating that the Site has been maintained.

E10.3 Further to E10.1(c) and E10.1(d), the Contractor shall make arrangements with the Traffic Services Branch of the City of Winnipeg to reinstall the permanent regulatory signs after the Contract Work is complete. At this time the Contractor shall make arrangements to drop off the stockpiled materials to Traffic Services at 495 Archibald Street.

E10.4 Any changes to the approved traffic management plan must be submitted to the Contract Administrator a minimum of (ten) 10 Working Days prior to the required change for approval.

E10.5 If the Contract Administrator determines that the Contractor is not performing Traffic Control in accordance with this specification, Traffic Services may be engaged to perform the Traffic Control. In this event the Contractor shall bear costs charged to the project by the Traffic Services Branch of the City of Winnipeg in connection with the required Works.

E10.5.1 The City of Winnipeg Manual of Temporary Traffic Control on City Streets is available online at:

(a) http://winnipeg.ca/publicworks/trafficControl/manualTempTrafficControl.stm

E11. TRAFFIC MANAGEMENT

E11.1 Description

(a) This specification covers activities related to managing traffic throughout the Site. Items listed here are to be followed in addition all standard requirements.

(b) Inkster Boulevard and Brookside Boulevard are Regional Streets and designated trucking routes. Minimizing the impact of construction activities related to the Work required to complete this contract is a priority.

(c) CentrePort Canada Way (PTH 190) is a provincially controlled highway and a designated trucking route. Minimizing the impact of construction activities related to the Work required to complete this contract is a priority.

E11.2 General

(a) Conceptual traffic management plans for Works within the City of Winnipeg (included in Appendix G) have been developed for use in planning traffic control for this Contract. The traffic management plans include control measures for the following works:

(i) Sturgeon Road Open Cut Crossing Works

(ii) Brookside Boulevard and Inkster Boulevard Tunnelling Works

(iii) The conceptual plans have not been formally approved by the City's Traffic Services Department and require a final review by their department.

(b) Conceptual traffic management plans for Works within the RM of Rosser and MTI jurisdiction (included in Appendix H) have been developed for use in planning traffic control for this Contract. The traffic management plans include control measures for the following works:

(i) Sturgeon Road Open Cut Crossing Works

(ii) Red Fife Road Open Cut Works

(iii) Temporary traffic control measures for the works listed above shall conform to the MTTC regardless of whether the works are taking place outside of the City's jurisdiction.

- Any temporary traffic control measures required at additional sites will be the responsibility of the Contractor and must follow the applicable requirements of the jurisdiction having authority.

- The MTI Work Zone Traffic Control Manual is available online at:
  - Work Zone Traffic Control | Transportation and Infrastructure | Province of Manitoba (gov.mb.ca)

(c) Any modifications to these plans should be submitted to the Contract Administrator for approval minimum 15 days prior to starting the Work.

(d) Additional traffic management plans may be required for other aspects of the project. The below traffic requirements must be adhered to within these traffic management plans.

(e) The Contractor shall minimize the duration of road closures as much as possible such that only areas with active construction are closed off.

(i) The Contractor shall be responsible for preparing and submitting a traffic management plan to the Contract Administrator and the City of Winnipeg's Traffic Management Department for any proposed lane closures.

(ii) The traffic management plan shall be submitted a minimum 15 working days prior to the date of the anticipated road closure.

E11.3 Further to Clause 3.7 of CW 1130 for Regional Streets:

E11.3.1 Intersecting local street, median opening and private approach access shall be maintained at all times. Temporary closures are to be staggered such that consecutive intersections are not closed at the same time. Traffic on intersecting regional/collector streets shall be maintained at all times.

E11.3.2 Should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, they shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.

E11.3.3 The Contractor shall not park company or private vehicles inside the barricaded work zone in a manner that will block sightlines for vehicles and pedestrians approaching and crossing or create any other safety concern.

E11.3.4 Emergency vehicle access must be maintained at all times.

E11.3.5 Winnipeg Transit service shall be maintained at all times.

(a) Should the Contractor be unable to maintain bus stops or routes it shall be reviewed with the Contract Administrator at least 3 business days in advance to see if modifications can be made.

E11.3.6 Flag persons may be necessary to maintain the flow of traffic during certain work operations.

E11.3.7 The Contractor shall provide at least ten (10) business days notification to the Contract Administrator prior to beginning a new phase of traffic control.

E11.3.8 Regional Streets impacted by the Work will include:

(a) CentrePort Canada Way (PTH 190 - MTI jurisdiction)

(i) No lane closures permitted.

(ii) Any work occurring within 10 m of a paved shoulder or open traffic lane requires the approval and installation of a 60 km/hr speed reduction zone and accompanying signage in conformance with Manitoba Infrastructure and Transportation's Work Zone Traffic Control Manual.

- This is anticipated be required from approximately Sta 5+925 to Sta 6+200 near Red Fife Road.
  - The Contractor shall provide temporary traffic control in accordance with TMP-915-9 for this area.

- Planning, coordinating and implement of all traffic control measures along PTH 190 will be the responsibility of the Contractor.

- The Contractor shall minimize the amount of work occurring within this 10 m zone. Any additional traffic control measures arising from the Contractor's means and methods within this zone shall be considered incidental to the Work.

(b) Sturgeon Access

(i) No lane closures permitted.

(c) Brookside Boulevard and Inkster Boulevard

(i) The traffic management plan included in Appendix G shall be adhered to when the Tunneling and associated shaft Work is being completed.

(ii) Traffic Control Measures for the Tunneling and shaft construction near the intersection of Brookside Blvd and Inkster Blvd is described in two phases:

- Phase 1: Closure of northbound Brookside Boulevard to eastbound Inkster Boulevard yield lane
  - A Designated Construction Zone will be required to reduce the speed of northbound thru traffic to 60 km/hr.
  - Northbound Brookside Boulevard to eastbound Inkster Boulevard traffic will be directed to complete a right turn in the curb lane.
  - Truck traffic will be restricted from making a right turn at this intersection.
- Phase 2: Closure of northbound Brookside Boulevard to eastbound Inkster Boulevard yield lane (maintain Phase 1) as well as the westbound Inkster Boulevard to northbound Brookside Boulevard yield lane
  - A Designated Construction Zone will be required to reduce the speed of northbound and westbound thru traffic to 60 km/hr.
  - Northbound Brookside Boulevard to eastbound Inkster Boulevard traffic will be directed to complete a right turn in the curb lane.
  - Westbound Inkster Boulevard to northbound Brookside Boulevard traffic will be directed to complete a right turn in the curb lane.
  - Truck traffic will be restricted from making a right turn at both closed yield lanes.
- The Contractor may elect to complete Phase 2 prior to Phase 1 if desired.

E11.4 Further to Clause 3.7 of CW 1130 for Local/Non-Regional Street:

E11.4.1 For all local or non-regional streets, 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) Maintain access for garbage/recycling trucks.

(c) Ambulance/ emergency vehicle access must be maintained at all times.

(d) Where possible maintain safe pedestrian routes around shaft locations and all other Work areas. Otherwise, a pedestrian detour shall be put in place.

(e) Where streets will be closed to through traffic and local access and/or bus traffic shall be maintained, the Contractor shall sign the street "Road Closed – No Exit" in accordance with the Manual of Temporary Traffic Control.

(f) Where streets will be closed to all traffic, the Contractor shall sign the street "Road Closed" in accordance with the Manual of Temporary Traffic Control.

(g) The Contractor shall not park company or private vehicles inside the barricaded work zone in a manner that will block sightlines for vehicles and pedestrians approaching and crossing or create any other safety concern.

E11.4.2 Local Streets impacted by the Work will include:

(a) Sturgeon Road

(i) Work for the open cut installation of Sturgeon Road at the intersection Selkirk Avenue/Four Mile Road shall be completed in a single phase.

- The traffic management plan included in Appendix G shall be adhered to when the open cut work is being completed.
  - Temporary traffic controls and signage will be required to conform to the City of Winnipeg's MTTC as shown.
- Custom advance info signage will be fabricated and installed by the City.

(ii) For all other locations along Sturgeon Road, maintain minimum one lane for vehicular access in either direction for the duration of the project.

(b) Red Fife Road (RM of Rosser jurisdiction)

(i) Work for the open cut force main installation beneath Red Fife Road shall be completed in multiple phases as shown in the RM of Rosser Construction Management Plan included in Appendix H.

- Red Fife Road may be closed to thru traffic along specific segments so long as uninterrupted vehicular access from one or both directions is maintained to all nearby businesses.

(ii) Alternative traffic control measures and phasing must be submitted to the Contract Administrator for review and are subject to RM of Rosser approval.

(iii) Pedestrian access, including the provision of temporary ramps, must be maintained along the existing sidewalk of Red Fife Road at all times.

E11.5 Measurement and Payment

E11.5.1 All Work associated with adhering to the Traffic Management requirements identified are incidental to Site Development and Restoration in E7.

E12. PROTECTION OF EXISTING TREES

E12.1 The Contractor shall take the following precautionary steps to avoid damage from construction activities to any existing trees within the limits of the construction area.

E12.1.1 Do not stockpile materials and soil or park vehicles and equipment within 2 metres of trees.

E12.1.2 Safety fencing shall be installed around the tree dripline.

E12.1.3 Excavations shall be carried out in a manner to minimize damage to existing root systems. Where roots must be cut to facilitate an excavation, they shall be neatly pruned at the face of the excavation and coated with an appropriate wound dressing to prevent infection.

E12.1.4 Work on Site shall be carried out in a manner to minimize damage to existing tree branches. Where damage to tree branches does occur, the branches shall be pruned by an approved arborist from the City of Winnipeg's Urban Forestry approved Contractors list.

E12.1.5 American elm trees shall not be pruned between April 1st and August 1st and Siberian elm trees between April 1st and July 1st of any year under provisions of The Dutch Elm Disease Act.

E12.2 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.

E12.3 Costs for protection of trees shall be considered incidental to Site Development and Restoration. No separate measurement or payment will be made.

E13. PROVISIONAL ITEMS

E13.1 The Provisional Items listed on Form B: Prices are part of the Contract.

E13.2 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.

E13.3 Notwithstanding C:7.5, 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.

E14. ALLOWANCE FOR MATERIAL SAMPLING AND TESTING

E14.1 Description

(a) Further to CW 2110, CW 2160, CW 3110 and CW 3410 this specification shall cover additional inspection and testing requirements for all materials used in the Work associated with this Tender.

(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 2160, CW 3110, CW 3410, other relevant City specifications, and the additional specifications within this Bid Opportunity. The Contractor shall engage an independent material inspection and testing agency for the purpose of conducting these material tests and obtaining associated documentation when directed by the Contract Administrator.

E14.2 Construction Methods

(a) The Contractor shall be responsible for scheduling field tests 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.

E14.3 Measurement and Payment

(a) The cost for material sampling and testing shall be paid for under the 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.

E15. CHANGE IN CONTRACT CONDITIONS

E15.1 Description

(a) This specification covers changes identified to the scope of Work including changes in geotechnical and geological conditions that may impact the Trenchless Work.

(b) The basis for the geotechnical and geologic conditions are described in the GBR and GDR as defined in D37.

(c) The method for reviewing, recording and accepting change to geotechnical and geologic conditions or obstructions is described in Section D40.

E15.2 Measurement and Payment

(a) Where a Contractor has made a claim in accordance with C7 or D40 which has been accepted by the Contract Administrator and City, the Contractor will be compensated in

accordance with D40 from the allowance under the Contact unit price “Change in Contract Conditions Allowance”

(b) Daily costs for all equipment, including but not limited to the Trenchless 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 Trenchless Work and Work belonging to the Contractor or their sub-contractors shall be paid for at the daily rate under the contract unit price for each of the following Trenchless installation methods:

(i) Daily Equipment Rate (Horizontal Direction Drilling)

(ii) Daily Equipment Rate (Tunnel Boring Machine)

(iii) Daily Equipment Rate (Auger Boring or Pipe Ramming)

(c) 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.

E16. EXTRA WORK ALLOWANCE

E16.1 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.

E16.2 A cash allowance has been included on Form B: Prices.

E16.3 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.

E16.4 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.

E16.5 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 Contractors schedule time to be on Site.

E16.6 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.

E16.7 Material Mark-Up Factors:

(a) Markups on additional Work shall be in accordance with allowable markups outlines in C7.4.2

UTILITY COORDINATION

E17. RAILWAY TRACK INSTRUMENTATION AND MONITORING

E17.1 Description

(a) The Work specified in this Section includes furnishing and installing geotechnical instrumentation to monitor the railway tracks. The work includes, but is not limited to, installing: Surface Monitoring Points and Subsurface Monitoring Points. Also included are furnishing monitoring equipment before excavation and Trenchless work. The locations of monitoring points should be clearly marked as to ensure that repeated surveys can be

accurately compared. Monitoring locations within the railway right-of-way must be in agreement with the Canadian Pacific Kansas City (CPKC) and Canadian National (CN) Local Track Supervisor. Flagging or other requirements set forth by CPKC and CN must be adhered to when undertaking installation and monitoring within the CPKC and CN right-of-way.

(b) The Contract Administrator is responsible for surveying the elevations and locations of the instruments. Baseline readings and elevations shall be determined before shaft or trenchless construction begins to establish a baseline, and during and after operations to monitor any movements related to the trenchless and shaft construction. The Contractor shall coordinate access and flagging requirements on behalf of the Contract Administrator to facilitate the survey monitoring within the CPKC and CN right-of-way.

(c) Minimum instrumentation requirements are shown on the drawings and specified herein.

E17.2 Materials

(a) Surface Monitoring Points: Surface Monitoring Points shall be established by driving a 700-mm length of steel rebar within the railway ballast surface and leaving a minimum of 100 mm stickup above the ballast. The Contractor Administrator will affix a survey target to the top of each Surface Monitoring Point. Each monitoring point shall have a tag or marking indicating the station and offset from centerline.

(b) Subsurface Monitoring Point: Install as indicated in the Drawings. The settlement rod shall be installed to 1 m above the obvert of the pipeline casing or as noted otherwise on the Drawings. The protective casing for the Sub-Surface Monitoring Point shall be installed with a minimum 0.3 m stickup above the ground surface. The Contract Administrator will affix a survey target to the top of each Sub-Surface Monitoring Point.

E17.3 Submittals

(a) Submittals shall be made in accordance with the requirements identified in E4 and as listed below.

(b) Submit the following, at least four (4) 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.

(c) Reports and Records:

(i) 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.

E17.4 Quality Control

(a) Install all monitoring points and instrumentation at locations shown in the drawings or as directed by the Contract Administrator.

(b) 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.

(c) 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 excavation.

(d) Installation of instrumentation shall, at all times, be performed in the presence of the Contract Administrator.

E17.5 Construction Methods

(a) Coordination with Railway

(i) Contractor shall comply with all standards, terms, conditions and safety requirements defined in E37.

(ii) The Contractor must review the frequency of monitoring and threshold of settlement with the CPKC and CN Local Track Supervisor before the commencement of Trenchless construction.

(iii) Contractor shall obtain written approval from CPKC and CN to proceed with instrumentation and monitoring of the railway within the required timelines, as required under the crossing agreement.

(b) 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. 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.

(c) Installation of Instruments

(i) Coordinate with CPKC and CN to obtain access to the tracks for instrument installations and daily monitoring. Obtain permits and provide flaggers, as required, and pay all fees associated with providing access to the Contract Administrator for establishing and performing settlement monitoring. Provide all required worker training to access CPKC and CN right-of-way and tracks.

(ii) Following completion of the work all instrumentation shall be removed or abandoned according to applicable codes and standards unless otherwise noted.

(d) 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 trenchless construction, unless permitted otherwise in writing by the Contract Administrator.

(e) Monitoring during Construction

(i) The Contractor shall provide access and assistance to the Contract Administrator for obtaining baseline and daily monitoring surveys, including coordinating track protection with CPKC and CN.

(ii) The Contractor shall install all surface and subsurface settlement monitoring devices and coordinate with the Contract Administrator to perform a baseline survey of all devices at least two (2) days prior to the commencement of shaft excavation.

(iii) Baseline survey monitoring shall occur twice per day for two (2) days prior to the start of trenchless construction.

(iv) For CPKC Crossing, once the HDD drill string is within the Zone of Potential Train Loading (ZPTL), survey monitoring shall occur at least twice daily. This process encompasses the pilot hole drilling, reaming, and HDPE casing pipe pullback.

(v) For CPKC Crossing, upon completion of the Trenchless construction, where the HDPE casing pipe is pulled back to its final location, survey monitoring shall occur once daily for seven (7) days.

(vi) For CN Crossing, once trenchless construction commences, and as long as the leading edge of the trenchless construction is within the Zone of Potential Train Loading (ZPTL), survey monitoring shall occur at least twice daily or after each train passage, whichever provides the greatest number of readings.

(vii) For CN Crossing, upon completion of the trenchless construction, where the pipe is in the final location, survey monitoring shall occur twice daily for three (3) days.

(f) Values

(i) Instrument Response Values for CPKC:

Feature	Threshold Value (Action Required)	Response Value	Shutdown Value
	mm	mm	mm
Surface Monitoring Point	8	16	>16
Surface/Sub-Surface Monitoring Point	8	16	>16

(ii) Instrument Response Values for CN:

Feature	Threshold Value (Action Required)	Response Value	Shutdown Value
	mm	mm	mm
Surface Monitoring Point	8	16	>16
Surface/Sub-Surface Monitoring Point	8	16	>16

(iii) When the instruments indicate movement equal to the Threshold Value, the Contractor shall meet with City to discuss his construction means and methods to determine what changes, if any, shall be made to better control ground movement. Instrument readings shall be required prior to commencing further work and will only proceed if the magnitude of movement has stabilized from the previous readings. If further movement is observed, work will be discontinued until movement is stopped at which point the pipe installation will be authorized to proceed.

(iv) When the instruments indicate movement equal to the Response Value, the Contractor shall meet with the City and CPKC or CN representatives to develop and activate a plan to actively control ground movements to prevent reaching the Shutdown Value. Instrument readings shall be required and work will only be authorized to proceed if there is no movement between at least two readings taken 12 hours apart. If further movement is recorded, survey monitoring will continue until movement has stopped and revised installation procedure has been submitted. If all cases, CPKC or CN will have the right to carry out maintenance of the track upon completion of the works to restore the track at the expense of the Contractor to the same or better condition as was established in the baseline survey.

(v) When the instruments indicate movement equal to the Shutdown Value, the Contractor shall stop all work immediately, and meet with the City and CPKC or CN representatives to develop a plan of action before work can be resumed.

(g) 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) Surface Monitoring Points shall remain in place unless directed by the Contract Administrator to remove and dispose of the points.

(ii) Properly abandon all subsurface and utility settlement monitoring point boreholes, by grouting drilled holes and casing with cement bentonite grout as directed by the Contract Administrator.

E17.6 Measurement and Payment

(a) Installation and Monitoring will be paid for each type at the contract unit prices described below:
   (i) Surface Monitoring Points
   (ii) Subsurface Monitoring Points

(b) The price shall include but not be limited to the installation and protection of the instruments, replacement of damaged utilities, scheduling and coordinating access to the CPKC or CN to facilitate instrument installation and survey monitoring throughout construction 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.

E18. UTILITY MONITORING POINTS

E18.1 Description

(a) The Work specified in this Section includes furnishing and installing geotechnical instrumentation to monitor surface features, utilities, and the ground around and above Tunnelling and Trenchless operations, and all excavations. The work includes installing Utility Monitoring Points.

(b) The Contract Administrator is responsible for surveying the elevations and locations of the instruments. Baseline readings and elevations shall be determined before shaft or Trenchless construction establishes a baseline, and during and after operations to monitor any movements related to the Trenchless and shaft construction. The Contractor shall coordinate with the utility provider for access requirements on behalf of the Contract Administrator to facilitate the survey monitoring.

E18.2 Materials

(a) Utility Monitoring Point:
   (i) Install as instructed by the Contract Administrator.
   (ii) Do not use drilling techniques.
   (iii) vacuum excavation of the hole is acceptable.
   (iv) Do not damage the existing utility.

E18.3 Submittals

(a) Submittals shall be made in accordance with the requirements identified in E4 and as listed below.

(b) Submit the following, at least four (4) weeks before the 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.

(c) Reports and Records:
   (i) 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.

E18.4 Quality Control

(a) Install all monitoring points and instrumentation at locations shown in the drawings or as directed by the Contract Administrator.

(b) 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.

(c) 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 excavation.

(d) Installation of instrumentation shall, at all times, be performed in the presence of the Contract Administrator.

E18.5 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. 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) Record and report depth of utilities found during Utility Monitoring Point installation.

(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 trenchless construction, unless permitted otherwise in writing by the Contract Administrator.

(d) Monitoring during Construction

(i) The Contractor shall provide access and assistance to the Contract Administrator for obtaining baseline and daily monitoring surveys.

(ii) The Contractor shall install all monitoring devices and coordinate with the Contract Administrator to perform a baseline survey of all devices at least two (2) days prior to the commencement of construction.

(iii) Baseline survey monitoring shall occur twice per day for two (2) days prior to the start of construction.

(iv) Upon completion of the construction, where the pipe is in the final location, survey monitoring shall occur twice daily for three (3) days.

(e) Utility Monitoring Response Values:

PURPOSE	Threshold Value	Response Value	Shutdown Value
	(mm)	(mm)	(mm)
UTILITY MONITORING	10	25	40

(i) When the instruments indicate movement equal to the Threshold Value, the Contractor shall meet with City to discuss his construction means and methods to determine what changes, if any, shall be made to better control ground movement. Instrument readings shall be required prior to commencing further work and will only proceed if the magnitude of movement has stabilized from the previous readings. If

further movement is observed, work will be discontinued until movement is stopped at which point the pipe installation will be authorized to proceed.

(ii) When the instruments indicate movement equal to the Response Value, the Contractor shall meet with the City and utility representatives to develop and activate a plan to actively control ground movements to prevent reaching the Shutdown Value. Instrument readings shall be required and work will only be authorized to proceed if there is no movement between at least two readings taken 12 hours apart. If further movement is recorded, survey monitoring will continue until movement has stopped and revised installation procedure has been submitted. If all cases, the utility provider will have the right to carry out maintenance of the utility upon completion of the works to restore the utility at the expense of the Contractor to the same or better condition as was established in the baseline survey.

(iii) When the instruments indicate movement equal to the Shutdown Value, the Contractor shall stop all work immediately, and meet with the City and the utility representatives to develop a plan of action before work can be resumed.

(iv) When the instruments indicate movement equal to the Shutdown Value, the Contractor shall stop all work immediately, and meet with the City to develop a plan of action before work can be resumed.

(f) Abandonment of Instruments

(i) Properly abandon all utility settlement monitoring point boreholes, by grouting drilled holes and casing with cement bentonite grout conforming to the requirements of Contact Grout in E32.

E18.6 Measurement and Payment

(a) Installation and Monitoring will be paid for each type at the contract unit prices described below:

(i) Utility Monitoring Point

(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.

E19. PRE-CONSTRUCTION EXPLORATION OF EXISTING UTILITIES

E19.1 General

(a) The Pre-Construction Exploration of Existing Utilities is being undertaken for the following purposes:

(i) To ensure positive slope in the force main pipe from Station 6+588 – STN 7+572.

(ii) To adjust design grades or relocate/support existing utilities along the force main to avoid conflicts between the force main and existing utilities.

(b) A utility locating program (soft digging and test pitting) was completed as part of the design phase of this project to confirm crossing clearances for gas mains and large diameter water mains however additional utility verification may be required prior to commencement of construction.

(c) This specification covers additional soft digging exploration of existing buried utilities (if required) and adjacent test pitting (if required) at key locations within the Site as directed by the Contract Administrator.

(d) Further to CW 1120, the Contractor shall perform exploratory excavations by soft dig methods and/or testing putting methods suitable to the Contract Administrator to verify and locate buried utilities within key locations including but not limited to sewers mains, water

mains, gas, power and telecommunications ducts and conduits, traffic signal conduits, street lighting and other communication cables.

(e) Test pitting may be required adjacent to these utilities to verify bedrock depths and determine if temporary supports are required to facilitate the removal of bedrock below the utility.

(f) All proposed soft dig and test pitting locations will be provided by the Contract Administrator upon the award of the project.

(g) **The utility exploration Work shall commence immediately upon the award of the project.**

E19.2 Execution

(a) The information obtained will determine if an alternate vertical or horizontal alignment of the proposed force main may be beneficial to minimize conflicts with the existing utilities or services.

(b) The Contractor may also use this information to identify the need for depressurization as specified in E25 and E26.

(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 Administer to arrange for lane closures as required.

(f) The Contractor shall use a hydro-excavator for all soft dig locations to expose the utility under investigation.

(g) The Contractor shall use an excavator with a bucket attachment to dig test pits to a depth up to 300mm below the invert of the pipe or two pipe diameters lower than the adjacent utility.

(h) The Contractor shall record the depth of the utility and provide this information to the Contract Administrator.

(i) The Contractor is responsible for backfill and restoration of soft dig and test pitting locations.

E19.3 Measurement and Payment

(a) Any exploration of existing utilities and services within the Work Site along the path of the force main, at shafts, service connections, 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 incidental to the cost of the sewer installations.

(b) Where the Contract Administrator has requested soft digging or test pitting associated with this specification the Contractor shall be paid at the per unit rate as listed below. The cost shall include all Works described herein for each utility exploration hole identified by the Contract Administrator.

(i) Utility Exploration Using Soft Digging

(ii) Utility Exploration Using Test Pitting

(c) Utility locates, safety watches, hydro-excavation, inspections, equipment, restoration, and traffic control for utility exploration will be incidental to the Work included in this Specification.

(d) Concrete and asphalt restoration, if required, will be paid for through Provisional Items.

E20. SUPPORT OR TEMPORARY RELOCATION OF EXISTING UTILITIES

E20.1 Description

(a) This specification covers the requirements of the Contractor to provide temporary support to infrastructure along the alignment of the proposed force main.

(b) The Contractor shall provide support or temporary relocation of existing services and utilities (including but not limited to water mains, sewer mains, gas mains, and electrical or telecommunication conduit/ducts), when excavation shafts require support of these services. Support of the services shall be undertaken to the requirements of the utility provider. Services and utilities may only be interrupted with the permission of the Contract Administrator and the utility provider.

(c) Utilities shall not be temporarily cut and capped unless permission is given by the Contract Administrator and the Jurisdiction having control over the utility.

E20.2 Construction Methods

(a) Support of large diameter gas mains:

(a) Each crossing of the large diameter gas mains requires the following measures to be taken:

(i) Contractor to coordinate with Manitoba Hydro for safety watch.

(ii) Hydro-vac to confirm the location and depth of the gas main before commencement.

(iii) Excavate to within 450 mm of the gas main via mechanical excavation using a smooth edge bucket.

(iv) Shore the excavation as per E23.

(v) Support the gas main as shown on Drawing 13491.

(vi) Where the pipe is installed Trenchless the Contract shall provide Manitoba Hydro with an observation hole using hydro-vac methods, the dimensions of the observation hole as described in the link provided below:

- 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

(b) Support of sewer and water mains larger than 200mm:

(a) Each crossing of sewer and water mains larger than 200mm will require the following measures to be taken:

(i) Contractor to coordinate with utility provider before commencement.

(ii) Hydro-vac to confirm the location and depth of the water main prior to crossing

(iii) If crossing under the water main, excavate to within 450 mm of the water main via mechanical excavation using a smooth edge bucket.

(iv) Shore the excavation as per E23.

(v) Support the water main as shown on Drawing 13491.

(vi) Proceed with the open-cut installation of the force main piping after approval by the utility provider to do so.

(c) Backfill

(i) Excavations below-supported utilities shall be backfilled with cement-stabilized fill in the following manner:

(i) For open-cut pipe installations, the Contractor shall backfill with cement-stabilized fill from the bottom of the excavation to the bottom of the existing utility.

(ii) For Trenchless pipe installations, the Contractor shall excavate down to the spring line of the newly installed pipe and backfill with cement-stabilized fill from the spring line up to the bottom of the existing utilities extending at a 45-degree angle.

E20.3 Measurement and Payment

(a) The following key infrastructure elements have been identified on the Drawings as pay items as presented on Form B those items shall be paid for on each basis:

(i) Support of 200mm Gas Main
(ii) Support of 400mm Gas Main
(iii) Support of 250 mm Force Main
(iv) Support of 300 mm Water Main
(v) Support of 350 mm Water Main
(vi) Support of 525mm Water Main

(b) Support or temporary relocation of all other existing utilities required to facilitate the force main installation and/or associated excavations not identified on Form B or on the Drawings will be considered incidental to the cost of the force main installation.

E21. RELOCATION OF TELUS DUCT LINE

E21.1 Description

(a) A telecommunication duct line (owned by Telus) consisting of a 38 mm orange HDPE SDR 11 line pass runs parallel to the force main alignment on the west side of the Sturgeon Road for approximately 2.0 km. The entire length of cable is to be relocated to facilitate the construction of the force main.

(b) **KGS Group has initiated this relocation request with Telus. Cable relocation is estimated to be completed during the Fall of 2024.**

E21.2 Construction

(a) The Contractor shall prepare their schedule in such a manner to accommodate Telus' proposed relocation schedule.

(b) The Contractor shall coordinate with Telus and the Contract Administrator to ensure cable relocation does not cause delays to the overall project.

E21.3 Measurement and Payment

(a) Coordination and scheduling around the Telus duct line relocation shall be considered incidental to the Works of this Contract and no measurement or payment will be made for this item.

E22. FEEDER MAIN PROTECTION AND OPERATING CONSTRAINTS

E22.1 General

(a) The Work involves construction activity in close proximity to the active 600 mm diameter Inkster Boulevard Feeder Main.

(i) Close proximity shall be deemed to be any construction activity within a 5 m horizontal offset from the centreline of a feeder main.

(b) The Inkster Boulevard Feeder Main is a critical component of the City of Winnipeg water supply system, and work in close proximity to the pipeline shall be undertaken with an abundance of caution. Large diameter pressure pipe generally has limited ability to withstand increased earth and live loading.

(c) PCCP typically fails in a non-ductile mode and has the potential to cause extensive consequential damage to infrastructure if failure should occur. Therefore, every precaution must be undertaken to ensure that applied loading during all phases of construction is within accepted loading parameters.

(d) Work around the feeder main shall be planned and implemented to minimize the time period that Work is carried out in close proximity to the pipe and to ensure that the pipeline is not subjected to excessive construction related loads, including excessive vibrations and/or concentrated or asymmetrical lateral loads during backfill placement.

E22.2 Submittals

(a) Submit proposed construction equipment specifications to the Contract Administrator for review a minimum of ten (10) Business Days prior to construction. The equipment submission shall include:

(i) equipment operating and payload weights;

(ii) equipment dimensions, including wheel or track base, track length or axle spacing, track widths or wheel configurations; and

(iii) load distributions in the intended operating configuration.

(b) Submit a construction method statement to the Contract Administrator a minimum of ten (10) business days prior to construction. The construction method statement shall contain the following minimum information:

(i) proposed construction plan including excavation locations, haul routes, excavation equipment locations, and loading positions;

(ii) excavation plans, including shoring designs, for excavations occurring in close proximity to feeder mains where the excavation/shoring system is to be extended below the top of the feeder mains embedment zone (150 mm above the pipe); and,

(iii) Any other pertinent information required to accurately describe the construction activities in close proximity to the feeder main and permit the Contract Administrator to review the proposed construction plans. No work shall commence in close proximity to feeder mains, chambers, and other critical infrastructure until the equipment specifications and construction method statement have been submitted and accepted, and feeder main locations have been clearly delineated in the field. Work over feeder mains shall only be carried out with equipment that has been reviewed and quantified in terms of its loading implications on the pipe.

E22.3 Pre-Work, Planning and General Execution

(a) The Drawings provide the location of the feeder mains, chambers, and critical pipelines through the construction site. Pipe locations noted on the Drawings are based on the original record drawings. Locate critical infrastructure and confirm their position horizontally and vertically (if required) prior to undertaking work in close proximity to said infrastructure. Visually delineate all critical infrastructure identified herein on Site by use of paint, staking/flagging, construction fencing, snow fencing, or other suitable methods.

(b) Only utilize construction practices and procedures that do not impart excessive vibratory loads on feeder mains and chambers or that would cause settlement of the subgrade below feeder mains and critical pipelines.

(c) Only equipment and construction practices stipulated in the accepted construction method statement and the supplemental requirements noted herein may be utilized in close proximity to feeder mains, chambers, and other critical infrastructure identified herein.

(d) Construction operations should be staged in such a manner as to limit multiple construction loads at one time, (e.g., offset crossings sufficiently from each other, rollers should remain a sufficient distance behind spreaders to limit loads. A reasonable offset distance is 3 m between loads).

(e) Granular material, construction material, soil, and/or other material shall not be stockpiled on the pipelines or within 5 m of any critical infrastructure identified herein.

(f) Use only smooth edged excavation buckets, soft excavation or hand excavation techniques where there is less than 1.5 m of cover over the pipe. Where there is less than 1.0 m of cover, provide full time supervision and complete the excavation utilizing hand excavation or soft excavation methods.

(g) Equipment should not be allowed to operate while positioned directly over a feeder main except where permitted herein, outlined in the reviewed and accepted construction method statement.

(h) Excavation within 3 m of the outside edge of a feeder main and which extend below the feeder main obvert shall utilize shoring methods that prevent the movement of native in-situ soils (i.e. a tight shoring system).

(i) The Contractor shall ensure that all crew members understand and observe the requirements of working near feeder mains, valve chambers, and critical infrastructure. Prior to commencement of on-Site work, the Contractor shall jointly conduct an orientation meeting with the Contract Administer, all superintendents, foreman, and heavy equipment operators to make all workers on the Site fully cognizant of the limitations of altered loading on, the ramifications of inadvertent damage to, and the constraints associated with work in close proximity to feeder mains and critical pipelines. New personnel introduced after commencement of the Project need to be formally orientated as outlined herein. It is recommended that restrictions associated with the crossing, consistent with the Contractor's submitted method statement be posted on Site and near the crossing.

(j) Work should be planned such that equipment crossings of the existing FM are minimized. Crossings to be limited to a designated crossing location.

E22.4 Measurement and Payment

(a) No separate measurement or payment will be made for feeder main protection. It will be considered incidental to the Works of the project.

OPEN CUT SEWER CONSTRUCTION

E23. SUPPLY AND INSTALLATION OF TEMPORARY SHORING

E23.1 Description

(a) This Specification supplements CW 2030 and covers shoring requirements for the Works.

E23.2 Construction Methods

(a) Excavation

(i) 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.

(b) Excavation Security Fence

(i) Further to Clause 3.1 of CW 1130, completely cover the excavation and provide a security fence to completely surround the excavation when unattended generally in accordance with the following:

- Security fence shall be chain link fence as per CW 3550 or approved equal in accordance with B8, 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.
- Attach fencing securely to posts.
- Secure the gate or end of the fencing to a post with chain and a padlock.

(c) Shoring

(i) The type, strength, and amount of shoring and bracing shall be provided consistent with the nature of the ground surface and subsurface conditions, taking into account property lines, existing slopes, utilities and roadways.

(ii) Shoring and bracing shall be so spaced and dimensioned as to prevent caving, loss of ground, surface settlement, or squeezing of the soil beyond the neat lines of excavation. It shall be free from defects that might impair its strength or suitability for the Work. Sheeting/shoring and bracing shall conform to the latest revisions of the "Construction Safety Act" of the Department of Labour of the Government of Manitoba and in accordance with Province of Manitoba "W210 The Workplace Safety and Health Act" and "Guidelines for Excavation Work".

(iii) Submit supporting design calculations as required to facilitate review of the submission for conformance with the Contract Documents.

(iv) 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.

(v) Shoring and bracing shall be installed such that the structure size and wall thickness shown on the shop drawings can be effectively installed and or constructed subsequent to installation of the shoring system.

(vi) 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.

(vii) Shoring and bracing shall remain in place until it is no longer required to complete the Work.

(d) Monitoring Movement of Shoring

(i) The Contractor shall submit to the Contract Administrator a plan for monitoring the movement of shoring during construction a minimum of two (2) Working Days prior to the installation of 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.

E23.3 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.

E24. EXCAVATION, BEDDING AND BACKFILL

E24.1 General

(a) This Specification supplements requirements for excavation, bedding and backfill identified in CW 2030.

E24.2 Related Specifications

(a) Environmental Protection Plan - Section E5

(b) Force Mains – Section E25

(c) Tunneling Sewer Construction – Section E30

E24.3 Submittals

(a) Submit shoring designs to Contract Administrator, in accordance with E4 and E23.

E24.4 Existing Utilities

(a) Arrange and pay for any required safety watches around existing utilities as per CW 1120.

(b) 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.

E24.5 Excavation

E24.5.1 The following clauses amend CW 2030:

(a) For the purpose this Specification, with regards to open cut installation only, boulders are defined as boulders, rock, concrete rubble and foundations greater than 1.0 cubic metre in volume, measured as a discrete unit, that are to be removed from the excavation to support the installation of the pipe.

(b) Solid rock and concrete excavation is defined as bedrock and buried concrete pavements that require blasting, drilling, splitting or breaking with additional equipment before being removed from excavations using normal mechanical excavation equipment.

(c) Excavation and disposal of tree roots and stumps shall be incidental to trench excavation for pipe installation. Tree roots and stumps are to be disposed of as per Item E24.6.

(d) Boulders larger than 300 mm in diameter shall be considered unsuitable for backfill and shall be disposed of as described in E24.6.

E24.6 Disposal of Unsuitable or Surplus Excavated Material

E24.6.1 The Contractor is responsible for arranging for a disposal site for all excavated material, and associated Works including transportation and payment of tipping fees.

(a) Disposal of organic materials such as tree roots, stumps, soils contaminated with noxious weeds shall be the responsibility of the Contractor.

(b) Disposal of boulders larger than 300 mm shall be the responsibility of the Contractor.

(c) If the Brady Landfill or the Summit Road Landfill are used by the Contractor for disposing any unsuitable or surplus material under this Contract, the Contractor will be responsible to pay all tipping fees.

(i) Alternatively, the Contractor may locate a legal disposal site of their choosing in accordance with CW 3170 Item 9.4.

E24.7 Foundation and Bedding and Initial Backfill

E24.7.1 Foundation and Bedding to be Class B bedding sand for trenches and shafts with pipe, in accordance with City of Winnipeg Standard Detail SD-001.

E24.8 Backfill

E24.8.1 Backfill for excavations under or within one (1) metre of paved areas on 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.

(a) Within the RM of Rosser, Class 2 backfill must be used for excavations under or within two (2) metres of a road shoulder.

(i) Trench backfill for the open cut installation beneath Red Fife Road shall be completed as shown on Drawing 13499.

(b) Sturgeon Road and the Toowoomba parking lot open cut force main crossings shall utilize Class 1 backfill as shown on the Drawings.

E24.8.2 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.

E24.8.3 Backfill over-excavations resulting from bedrock or boulder removal with Type 1 material as directed by the Contract Administrator.

E24.8.4 Backfill above the bedrock zone extending vertically 1.0 m shall be either common backfill if approved by the Contract Administrator or imported clay as approved by the Contract Administrator. The 1.0 m clay cap above the bedrock zone is to ensure a seal between the bedrock and the overburden at the discretion of the Contract Administrator.

E24.8.5 The Contractor shall have personnel available for immediate repairs of settlement at shaft locations from the start of construction until final restoration is complete.

E24.8.6 Trench backfill for the East Colony Creek crossing shall be completed as per Section E28.

E24.9 Measurement and Payment

E24.9.1 All costs associated with Excavation, Bedding and Backfill as described herein are incidental to the installation of the force main piping covered in CW 2110 and 2130 except the supplemental items listed below:

(a) Boulder Removal

(i) Excavation and disposal of boulders will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre of “Boulder Excavation”. Volume to be paid for will be the total number of cubic metres of boulders that are excavated and disposed of in accordance with this specification, accepted and measured by the Contract Administrator.

(ii) Individual boulder volumes will be calculated from the average diameter of each boulder that is excavated, as measured by the Contract Administrator.

(iii) No delay claims will be entertained relating to boulder removal. Payment for boulder removal shall include any delays, additional equipment or other costs incurred by the Contractor associated with boulder removal.

(b) Solid Rock and Concrete Excavation

(i) Excavation and disposal of Solid Rock and Concrete Excavation will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre of “Solid Rock and Concrete Excavation”. Volume to be paid for will be the total number of cubic metres of Solid Rock and Concrete Excavation that is excavated and disposed of in accordance with this specification, accepted and measured by the Contract Administrator.

(ii) For payment of solid rock and concrete excavation to be considered, the Contractor must notify the Contract Administrator as soon as the material is encountered.

(iii) Solid rock and concrete excavation will be considered for payment by the Contract Administrator only if the Contract Administrator witnesses that little to no progress is made by the Contractor attempting to excavate through the material with normal excavation equipment.

(iv) No delay claims will be entertained relating to solid rock and concrete excavation. Payment for solid rock and concrete excavation shall include any delays, additional equipment or other costs incurred by the Contractor associated with solid rock and concrete excavation.

(c) Surplus Material

(i) There shall be no measurement of surplus soil material or tree root and stump material disposed of at any disposal site. No additional payment will be made for disposal of surplus or waste soil materials. It shall be considered incidental to the cost of the Work.

(ii) There shall be no separate measurement for boulder disposal. No additional payment will be made for disposal of boulders that are unsuitable for backfill. It shall be considered incidental to the cost of the boulder removal.

E25. PUMP TEST AND DEPRESSURIZATION PLAN

E25.1 Description

(a) Elevated groundwater elevations exist across portions of the project Site that will require groundwater depressurization to facilitate the pipe installation. In these areas where excavations extend through the confining overburden layer, groundwater pressures from within the till and bedrock zones may result in elevated water levels within open trench excavations for the force main. A groundwater Depressurization Plan will be required to facilitate the force main installation within these areas

(b) The Depressurization Plan shall be prepared by a Professional Engineer or Professional

(c) Geoscientist experienced in hydrogeology and registered to practice in the Province of Manitoba. The plan shall address the specific pumping needs that support the Contractors means and methods for their open trench installations and any shafts to support trenchless installations.

(d) Pump testing shall be completed at three test locations specified herein to support the development of the Depressurization Plan.

(e) This specification addresses the requirements for pump testing and the preparation of the Contractor's Depressurization Plan.

(f) The Contractor shall be responsible for all testing and permitting, and approvals necessary to perform the Work. The Contractor shall engage the services of a Professional Engineer or Professional Geoscientist experienced in hydrogeology and registered to practice in the Province of Manitoba.

(g) The excavation and depressurization system discharge water quality parameters shall be sampled, analysed, and compared to applicable regulatory guidelines. With required permits and approvals in place, discharge of excavation seepage and aquifer depressurization waters may be directed to surface ditching, or other conveyances, while considering that the discharged water is not recirculating back into the local groundwater system or active excavation areas, creating a recharge loop. If water quality or other considerations are not acceptable for surface discharge, an alternative design for collection and proper disposal shall be required.

(h) E26 addresses the implementation of the Contractor Depressurization Plan.

E25.2 Methods

E25.2.1 Pump Testing

(a) The Contractor shall conduct three pump testing programs along the force main alignment between Stations 2+950 and 3+050 (Drawing 13473), Stations 4+800 and 4+900 (Drawing 13480), and Station 5+050 and 5+150 (Drawing 13481). These locations are anticipated to require depressurization during construction based on observations within the GDR. Alternate locations may be proposed by the Contractor based on their assessment of the geotechnical data.

(b) The Contractor shall install one new 125 mm Pump Testing Well within each of the three locations identified above. Pump Testing Wells shall extend a minimum of 6 m into bedrock.

(c) The contractor shall install 2 new 25 mm Observation Wells per Pump Testing Well location. Observation Wells shall extend a minimum of 3 m into bedrock.

(d) Pump Testing in the 125 mm diameter wells shall be to 100 USgpm for one (1) hour to monitor Pump Testing Well and Observation Well drawdowns throughout pump testing and recovery and to determine well capacity and aquifer hydrogeological parameters (e.g., transmissivity).

(i) Where 100 USgpm is deemed too high for the aquifer and a smaller pump is required for the Depressurization Plan design, smaller pumps may be utilized.

(ii) Where the 100 USgpm flow rate is not adequate to draw down the groundwater, the Contractor shall increase the diameter of the Pump Testing Wells to 200 mm and conduct pump testing up to 350 USgpm for one (1) hour.

E25.3 Submittals

E25.3.1 Pump Testing

(a) The Contractor shall arrange for all required permitting for the exploratory pump testing and associated discharge.

E25.3.2 Depressurization Plan

(a) Prior to Construction of any excavations within the Project Site, the Contractor shall submit and a Depressurization Plan designed and sealed by a Professional Engineer

or Professional Geoscientist experienced in hydrogeology and registered to practice in the Province of Manitoba for review and approval by the Contract Administrator.

(b) The plan shall define the depressurization or dewatering requirements for the effective installation of the force main Work.

(c) Depressurization of the groundwater shall be undertaken using groundwater wells and dewatering shall be undertaken with the use of sumps.

(i) Sumps are anticipated where the force main invert is on the bedrock, or below the bedrock surface. In these cases, the Contractor's Depressurization Plan shall consider the installation of 600 mm diameter sumps cased through the overburden and excavated to a minimum of 2 m below the bedrock surface or the force main invert, whichever is greater. The Contractor may propose an equivalent sump design for approval by the Contract Administrator. The cased sumps shall be pumped to maintain bedrock aquifer pressures below the invert of the trench excavation.

(d) The Depressurization Plan submittal shall include the following at a minimum:

(i) An evaluation of static groundwater conditions and required drawdown elevations for successful installation of the force main Work.

(ii) Permissible groundwater levels (pressures) at various stages of excavation.

(iii) Backfill staging requirements to prevent uplift of pipe/soil layers and to prevent any other disturbance to the in-situ foundation soils due to any excess groundwater pressures.

(iv) Confirmation of the elevation to which the excavation may proceed before the well system (or dewatering sump) commences operation.

(v) Confirmation of the extent to which excavation, force main installation, and backfill must be completed before the well system can cease operation.

(vi) Number of wells and or sumps, including location, size, pumps, additional equipment, and installation details for pumping and discharge to approved surface location for each working section of the force main alignment where force main work is actively occurring.

(vii) It is anticipated that the Contractor's Depressurization Plan will involve relocating the dewatering pumps from well to well along the force main alignment as required to support active pipe installation Work. To that point, the Contractor's Depressurization Plan shall be limited to areas where Work is actively occurring. Pumping of groundwater outside of the area where active work is occurring will not be covered by the Contract.

(viii) Pump Capacities: The Contractors Depressurization plan shall assume the following anticipated well diameters and associated maximum pumping rates for the Depressurization Pumping Wells and sumps. The Contractor may adjust the pumping rates based on the results of the Contractor's pump testing field program.

- 125 mm diameter well – maximum 100 US gpm;
- 200 mm diameter well – maximum 350 US gpm
- 600 mm diameter sump – maximum 500 US gpm

(ix) Observation Wells: The Depressurization Plan shall include 25 mm observation wells installed within any segment of the force main alignment that requires depressurization to ensure that groundwater levels have been lowered to the required elevations prior to excavation. The location of the observation well with respect to the pumping wells of any given segment shall be determined by the Contractor.

(x) Schedule of monitoring, maintenance, labour estimates, and interpreting of ground water levels throughout the duration of the Project.

(xi) A well and sump decommissioning plan.

E25.4 Measurement and Payment

E25.4.1 Pump Testing and Depressurization Plan

(a) Pump testing and the submission of the Contractor's Depressurization Plan shall be measured on a lump sum basis and paid for at the Contract Unit Price for "Pump Testing and Depressurization Plan".

(b) The price shall be payment in full for performing all operations described and all Work incidental to this Specification. This includes but is not limited to mobilization of drill rigs and other equipment, drilling of wells, installation of casing, caps and seals, installation of pumps, generators, discharge and discharge hoses, erosion control, permitting, operations/staffing, and preparation of the Depressurization Plan.

(c) The price shall include all Work described herein with the exception of the costs for the development of a higher capacity well (if required). The costs for redrilling the three 125mm pump wells to 200 mm and rerunning the pump test to up to 350 USgpm will be paid out under a separate Contract Unit Price.

(d) Pump Testing and Depressurization Plan shall be paid out in accordance with the following payment schedule:

(i) 50% upon completion of the Pump Testing

(ii) 50% upon approval of the Depressurization Plan

E25.4.2 Pumping Well Development (200 mm)

(a) The cost to redrill a 125 mm Pump Test Well to 200 mm and rerunning the pump test for up to 350 USgpm will be paid for at the Contract Unit Price of "Pumping Well Development (200 mm)" The cost will be measured on a unit basis for each well that requires further development to support the pump testing program.

(b) The cost shall include the remobilization of the drill rig, removal of the existing well casing, installation of new casing, caps and seals, and the completion of the pump tests including all pump, generators, hoses, operations, discharge, and permitting costs.

E26. DEPRESSURIZATION FOR CONSTRUCTION OF FORCE MAIN

E26.1 Description

(a) Construction of the force main will require the depressurization of the bedrock aquifer, and seepage control within excavations along portions of the Site, as designed by the Contractor. There are areas along the force main alignment where control of confined bedrock groundwater pressures is necessary to protect against excavation basal heave/blowout and to ensure a dry working environment for the installation of the force main Work. Groundwater control shall be necessary on a continuous basis in these areas to ensure the excavations are protected against basal heave/blowout and seepage.

(b) This specification addresses the installation of pump wells and sumps, pumps and the auxiliary equipment, materials and labour required to support depressurization and dewatering of excavations for the force main Work. The number of pumping wells and/or sumps, and the number of active pumps for any segment of Work will be at the discretion of the Contractor based on the Depressurization Plan submittal discussed in E25.

(c) This specification provides a mechanism for payment of the depressurization plan that will be implemented during construction.

(d) **The depressurization must be limited to areas where active pipe installation Work is occurring. Depressurization of the groundwater outside of active Work areas will not be covered by the Contract.**

(e) The Contractor shall be responsible for all permitting, and approvals necessary to perform the Work.

(f) The excavation and depressurization system discharge water quality parameters shall be sampled, analysed, and compared to applicable regulatory guidelines. With required permits and approvals in place, discharge of excavation seepage and aquifer depressurization waters may be directed to surface ditching, or other conveyances, while

considering that the discharged water is not recirculating back into the local groundwater system or active excavation areas, creating a recharge loop. If water quality or other considerations are not acceptable for surface discharge, an alternative design for collection and proper disposal shall be required.

(g) Notwithstanding C:7.5, the City reserves the right to diminish all or any portion of the items of work listed in the Depressurization for Construction of Force Main Items and no claim shall be made for damages on the grounds of loss of anticipated profit or for any other reason.

E26.2 Methods

E26.2.1 Depressurization Program

(a) The Contractor shall construct 125 mm (or 200 mm) diameter Depressurization Pumping Wells to drawdown groundwater levels (pressures) below each section of the open trench construction along the portions of the force main alignment that require depressurization in accordance with their approved excavation Depressurization Plan.

(b) The Contractor shall construct 600 mm diameter sumps cased through the overburden to dewater the excavations in accordance with their approved excavation Depressurization Plan.

(c) The contractor shall construct 25 mm diameter Observation Wells as required to confirm the groundwater levels (pressures) have been lowered prior to excavation below critical elevations in accordance with their approved excavation Depressurization Plan.

(d) The number, locations, and layout of Depressurization Pumping Wells, sumps, and Observation Wells to be installed will be dependent on the design requirements for active segment length of open excavation to keep groundwater levels (pressures) below required safe excavation levels, and as necessary for the Contractor to facilitate and stage their Work.

(e) The Contractor is responsible for all permitting for depressurization program and discharge.

(f) The Contractor shall install and activate the pumps within the appropriate pumping well to support the active zone of force main Work. The maximum pumping rates for the Depressurization Pumping Wells and sumps are as listed below. The Contractor may adjust the pumping rates based on the results of the Contractor's pump testing field program and subsequent Depressurization Plan.

(i) 125 mm diameter well – maximum 100 USgpm;

(ii) 200 mm diameter well – maximum 350 USgpm

(iii) 600 mm diameter sump – maximum 500 USgpm

(g) Depressurization shall be run 24 hours a day, 7 days a week, until approved backfilling and compaction levels are completed.

(i) The Contractor shall commence depressurization for excavations extending below elevations identified within their Depressurization Plan (in areas where depressurization is required to undertake the Work)

(ii) The Contractor shall place backfill to elevations identified within their Depressurization Plan to ensure no adverse impacts to the pipe or excavation upon stopping depressurization within any segment of the Work where depressurization is required.

(iii) The Contractor shall ensure that they have sufficient generators, staffing and fuel to maintain pumping for 24 hours per day over evenings between the time Work has ceased for one day and commenced on the following day.

(iv) Pumping during work stoppages will not be covered by the contract. The Contractor shall develop their Work Schedule so that excavations along the open cut portions of the Work are backfilled before weekends or any other

extended shutdowns. Pumping for shafts for trenchless Work (if required) will be paid for over weekends if work extends through the weekend, but will not be covered during extended shutdowns (shutdowns outside of weekends).

(h) The Contractor shall decommission pump wells, sumps and observation wells following commissioning of the force main.

(i) The Contractor shall provide adequate power/generators and fuel to support the pumping needs.

(j) The contractor shall provide the required discharge hosing to support the depressurization and dewatering needs.

E26.3 Submittals

E26.3.1 Drilling

(a) The Contractor shall provide a drill log identifying the depth of installation of each well within each subsurface layer identifying overburden and bedrock elevations, soil logging, groundwater elevations, elevation extents of the well screen, and any other information to support measurement and payment.

E26.3.2 Pumps

(a) The Contractor shall provide daily records of the number of pumps required to support active Work areas.

(b) The pump records shall specify the following:

(i) Which areas from the Contractor's Depressurization Plan were being supported by each pump.

(ii) Pump Capacity (of pumps in use).

(iii) The start date of each pump within each active segment of force main Work.

(iv) The end date of each pump within each active segment of force main Work.

E26.4 Measurement and Payment

E26.4.1 Well and Sump Construction

(a) Overburden Drilling

(i) The well and sump construction in overburden (above the bedrock) shall be paid for at the Contract Unit Price for "Overburden Drilling" for each Item of Work listed below.

Items of Work:

- 25 mm Observation Well
- 125 mm Pump Well
- 200 mm Pump Well
- 600 mm Sump

(ii) The well and sump construction in overburden shall be measured on a vertical meter basis from the surface to the end of the well or sump installed within the overburden zone in accordance with the approved excavation Depressurization Plan.

(iii) Costs include all items described herein and incidental to the completion of the work including drilling, the supply and installation of PVC casing, Casagrande tips, well cap, grouting, and related works.

(iv) Overburden refers to all subsurface layers above the bedrock including organics, clay, silt, sand, gravel, cobbles, boulders, inclusions and till.

(b) Bedrock Drilling

(i) The well and sump construction in bedrock shall be paid for at the Contract Unit Price for “Bedrock Drilling” for each Item of Work listed below.

Items of Work:

- 25 mm Observation Well
- 125 mm Pump Well
- 200 mm Pump Well
- 600 mm Sump

(ii) The well and sump construction in bedrock shall be measured on a vertical meter basis from the top of the bedrock surface to the end of the well or sump installed within the bedrock zone in accordance with the approved excavation Depressurization Plan.

(iii) Costs include all items described herein and incidental to the completion of the work including drilling, well development, the supply and installation of PVC casing, Casagrande tips, well cap, well seal, grouting, and related works.

E26.4.2 Pump Installation and Operation

(a) The installation and operation of the submersible pumps within the pump wells or sumps shall be paid at the Contract Unit Rate for “Pump Installation and Operation” for each item listed below:

(i) Items of Work:

- Max 100 USgpm in 125 mm well
- Max 350 USgpm in 200 mm well
- Max 500 USgpm in 600 mm sump

(b) The installation and operation of the pumps shall be measured on a daily basis for each pump that is actively installed within a well or sump and is running to support active force main installation Work.

(c) The daily rate assumes 24 hours of operation

(d) The cost includes all necessary electrical connections, components, drop piping, well head fittings and adapters, well caps, seals, piping, discharge hoses, header system, fuel, operations/staffing and all other items incidental to the Work.

(e) The supply and operation of electrical generation plants sufficient to operate submersible pumps is considered incidental to the Work and no separate measurement or payment will be made.

(f) Depressurization well header piping installed in accordance with this Specification is considered incidental to the Work and no separate measurement or payment will be made.

(g) The supply and installation of scour and erosion protection measures such as heavy-duty erosion control mats and silt fence is considered incidental to the Work and no separate measurement or payment will be made.

(h) The pump capacity required for depressurization within a given well diameter, as selected by the Contractor within their Depressurization Plan, may be less than the maximum pumping rates listed within this specification. Where lower capacity pumps are installed within a given well or sump, the unit rate will be discounted by the difference in the daily supply cost for the maximum capacity listed above in Items of Work, and the daily supply cost for the actual pump installed.

(i) Where lower capacity pumps are used within a well, the Contractor shall provide quotes from their pump supplier for the daily cost of the Max pumping capacity and the capacity of the pump selected for use.

E26.4.3 Well/Sump Decommissioning

(a) Decommissioning of each well or sump shall be paid for at the Contract Unit Price for "Well/Sump Decommissioning" for each item listed below:

Items of Work:

- 25 mm Observation Well
- 125 mm Pump Well
- 200 mm Pump Well
- 600 mm Sump

(b) The amount to be paid for shall be the total number of wells or sumps decommissioned in accordance with the approved excavation Depressurization Plan

E26.4.4 Depressurization Allowance

(a) Additional Depressurization Work may be necessitated due to unforeseen circumstances that may arise during the course of the project due to:

(i) Additions to the scope of Work by the Contract Administrator, beyond that defined herein.

(b) A cash allowance has been included on Form B: Prices.

(c) 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.

(d) 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.

(e) Additional services and/or Work will not be initiated for:

(i) Reasons of lack of performance or errors in execution.

(ii) Scheduling changes initiated by the City, where at least 24 hours notice is given prior to the Contractors schedule time to be on Site.

(f) 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.

(g) Material Mark-Up Factors:

(i) Markups on additional Work shall be in accordance with allowable markups outlines in C7.4.2

E27. FORCE MAINS

E27.1 Description

(a) This Specification describes the supply and installation of force mains and shall supplement the requirements of CW 2110.

(b) For the purposes of this Specification, the term "force main" shall be considered equivalent to the term "water main".

E27.2 General

E27.2.1 **Force main pipe installation is intended to be by open-cut methods except for the following Trenchless locations:**

(a) **CPKC Railway Mile 6.46 Carberry Subdivision Crossing – Drawing 13479**

(b) **CN Railway Mile 8.53 Rivers Subdivision Crossing – Drawing 13481**

(c) Bergen Cutoff Road Crossing – Drawing 13486

(d) **Oak Point Highway Crossing – Drawing 13488**

(e) **Inkster Boulevard and Brookside Boulevard Crossing – Drawing 13490**

E27.2.2 **Deviations from this methodology must be submitted to the Contract Administrator for approval prior to commencement of Construction.**

E27.2.3 **Payment for the roadway reconstruction on Sturgeon Road (Drawing 13472), Red Fife Road (Drawings 13486, 13487), the Toowoomba Land Company parking lot (Drawings 13489, 13490) and the Brookside and Inkster Blvd intersection (Drawing 13490) will be made in accordance with Section E52. Any other road reconstruction required as a result of the Works will be considered incidental to E9 Site Development and Restoration.**

E27.2.4 Submittals

(a) Laying Schedule

(i) Submit laying schedule for review by the Contract Administrator. Laying schedule shall show general pipe layout, location of fittings and specials, proposed direction of lay and connection points.

(ii) Minor adjustments to pipe design plans to suit standard pipe lengths may be permitted by the Contract Administrator.

(b) Fittings

(i) Submit details of all fabricated fittings and specials, including details of proposed connections to existing pipes.

(c) Affidavit of Compliance

(i) An affidavit of compliance signed by an officer of the pipe manufacturer shall be provided stating that the pipe and fittings comply with this Specification, in accordance with Section 6.3 of AWWA C900.

E27.3 Materials

E27.3.1 PVC Pipe

(a) All force main piping and fittings except for the Trenchless CPKC Railway Crossing to be Poly Vinyl Chloride (PVC) AWWA C900 pipe conforming to City Approved Water Product Standard CoW-WM-01 and CoW-WM-02.

(i) Dimension Ratio (DR) to be 25.

(ii) Approved products: Ipex Centurion, Westlake AquaSpring C900 or approved equal in accordance with B8.

(iii) Pipe under existing and future pavement crossings to be designed for a minimum HS20 loading factor.

(b) Mechanical Thrust Restraints:

(i) Mechanical restraints are to be installed at all PVC joints on and in between vertical bends and within the ROW of East Colony Creek as described in E28.

- Acceptable product is PVC Stargrip Series 4400 or approved equivalent in accordance with B8. Contractor shall submit product information and/or shop drawings for mechanical restraints to be used for review and approval.

(c) Restrained Joint PVC Pipe

(i) All force main piping being installed Trenchless including the CN Railway Crossings, Bergen Cutoff Rd Crossing and Oak Point Hwy Crossing within a casing pipe shall be Restrained Joint PVC pipe.

- Dimension Ratio (DR) to be 18

- Approved products: IPEX TerraBrute, Westlake Certa-Lok RJIB, Westlake Certa-Lok RJ, or approved equal in accordance with B8

E27.3.2 HDPE Pipe

(a) All force main piping and fittings for the Trenchless CPKC Railway Crossing is to be HDPE as shown in Drawing 13495.

(i) Dimension Ratio (DR) to be 9

(ii) NPS 24/DN 600 IPS High Density Polyethylene

(iii) Conform to AWWA C906

(iv) PE 4710 Resin

(v) Joint Type: Butt Fused (ASTM F2620)

E27.3.3 Steel Casing for CN Railway Crossing, Oak Point Hwy Crossing, Bergen Cutoff Rd Crossing as per Section E39.

E27.3.4 Tracer Wire System as per Section E28.

E27.3.5 PVC flange adapters for connecting to chamber piping shall conform to the following:

(a) Made of ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible with supplied chamber piping flanges.

(b) Consist of a plurality of actuated gripping wedges to maximize restraint capability. Torque limiting actuated screws shall be used to ensure proper initial set of gripping wedges.

(c) All internal surfaces of the gasket ring (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the requirements of ANSI/AWWA C213.

(d) Exterior surfaces of the gasket ring shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116.

(e) Restraint Ring shall be coated with MEGA-BOND.

(f) Minimum pressure rating of 1000 kPa.

(g) Approved product: EBAA Series 2100 MEGAFLANGE or approved equal in accordance with B8.

E27.4 Construction Methods

(a) Excavation Bedding and Backfill shall be completed in accordance with CW 2030 and E24.

(b) Installation of force mains shall be in accordance with CW 2110.

(c) Frost Conditions

(i) No pipe shall be laid upon a foundation into which frost has penetrated, nor at any time when the Contract Administrator shall deem that there is danger of the formation of ice or the penetration of frost at the bottom of the excavation. Every precaution must be taken to prevent frost from penetrating the ground to depths below the foundations during construction. Any pipe which, in the opinion of the Contract Administrator has been injured through neglect of this provision of the Specifications, shall be removed and made good by the Contractor and at the Contractor's expense.

(ii) Heating of the pipe, sand and gaskets shall commence when the ambient temperature falls below -10 C. The pipe shall be heated throughout with a low heat immediately prior to installation (warm to the touch).

(d) Thrust Blocks

(i) Thrust blocks shall be installed at all tees, wyes, elbows, bends, plugs, reducers and crosses and at locations of horizontal and vertical bends as shown on the Drawings. Thrust blocks shall consist of concrete as specified in Specification CW 2160 and shall be installed as shown on SD-004 and SD-005. The thrust block shall bear against undisturbed soil and the soil shall be cut smooth and at the proper angle to the pipe. No horizontal struts or braces required for trench bracing shall remain in

the concrete thrust block. A bond breaker consisting of 0.20 millimetre (8 mil) polyethylene sheeting shall be installed between fittings, valves, or plugs and the concrete of the thrust block to allow future removal of the thrust block without disturbing the fitting, valve or plug. Before any concrete is placed, all thrust block formwork shall be inspected and approved by the Contract Administrator.

(ii) Thrust blocks for piping shall be sized as per CW SD-004 and SD-005.

(e) Thrust Restraints

(i) Mechanical thrust restraints shall be installed in accordance with manufacturer's recommendations.

(f) Tracer Wire System

(i) Install tracer wire and access ports in accordance with Section E28.

E27.5 Measurement and Payment

(a) Measurement and payment for Force Mains shall be in accordance with CW 2110 for the diameter, class, bedding and backfill requirements listed on the Form B: Prices with the supplemental items listed below:

(i) Excavation, Bedding and Backfill, as described in E24, are incidental to Force Mains.

(ii) Tracer Wire System, as described in E28, is incidental to Force Mains.

(iii) Surface Restorations will be paid as described in E7.

(iv) Cost of shaft construction and associated shoring required for the installation of the works described herein, is incidental to Force Mains.

(v) Correction of alignment and grade exceeding the allowable variance will be at the Contractor's own expense.

(vi) "Supply of Fittings" as listed in Form B: Prices is intended to cover the supply cost of additional large diameter fittings that may be required during the course of construction. This is to minimize any delays or down time for ordering additional fittings. All fittings listed under "Supply of Fittings" shall be supplied and delivered to Site. If the fittings are required during construction, the cost to install the fittings, including thrust blocks, valve boxes for tracer wire etc. shall be paid under the Provisional Item "Installation of Fittings". If some or all of the fittings listed under "Supply of Fittings" are not required, the City will still pay the supply cost of all remaining fittings and take the fittings into their inventory.

E28. EAST COLONY CREEK CROSSING

E28.1 Description

E28.1.1 This Specification shall cover the supply and installation of the new 450 mm diameter force main within the East Colony Creek Crossing ROW as shown on the Drawings. This Specification shall amend, and supplement Standard Specifications CW 2110 as follows:

(a) The term "force main" shall be considered equivalent to the term "watermain".

(b) Disinfection of the force main pipe will not be required.

E28.1.2 To eliminate the need for any coffer dams, rerouting or by-pass pumping, the creek crossing Works are to be completed during the winter months between December 15, 2024 and March 1, 2025.

E28.2 Materials

E28.2.1 Force Main Pipe

(a) The force main shall be constructed using AWWA-C900 PVC DR 25 pipe. Contractor shall submit product information and/or shop drawings for pipe and bends for review and approval.

(b) Mechanical restraints are to be installed at all PVC joints within the East Colony Creek Crossing ROW as specified on the Drawings. Acceptable mechanical restraint product is PVC Stargrip Series 4100P PVCG4024 (Star Pipe Products) or approved equivalent in accordance with B8. Contractor shall submit product information and/or shop drawings for mechanical restraints to be used for review and approval.

(c) 100 mm thick rigid polystyrene insulation to be installed along the pipe within the East Colony Creek Crossing extents as identified on the Drawings (Reference East Colony Creek Backfill Detail).

E28.2.2 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. The Contractor shall keep all equipment in good Working order, and have sufficient standby equipment available at all times, as required.

E28.3 Construction Methods

E28.3.1 Trench Shoring and Excavation

(a) Work must be completed in accordance with CW 2030, unless otherwise indicated by the Contract Administrator.

(b) The Contractor shall take precautionary steps to prevent damage from construction activities to surrounding property and adjacent existing infrastructure. Any damage caused by the Contractor's activities shall be repaired to, equal or better condition than prior to construction, as approved by the Contract Administrator. No separate measurement or payment will be made for the protection of adjacent property and/or infrastructure.

(c) The force main piping within the East Colony Creek Crossing extents shall be installed with cement stabilized flowable fill bedding and initial backfill up to a minimum of 300mm above top of pipe (as identified on the Drawings), with modified Class 2 backfill, modified to have 0.6m of compacted clay fill as opposed to the detailed 0.3 m of compacted excavated material. Clay used shall consist of a high plasticity clay material, with a liquid limit in excess of 50%. They clay shall be free of any deleterious materials, such as roots, organic materials, ice, snow, or other unsuitable materials. Frozen material will not be accepted. The clay shall be suitable for compaction to achieve density requirements as specified in CW2030 (95% of Standard Proctor Density).

(d) Further to (c), the Contractor shall compact backfill material to 95% Standard Proctor Density in accordance with CW 2030. Frozen backfill material will not be accepted. The Contractor shall submit a detailed Backfilling Procedure Plan to the Contract Administrator a minimum of five (5) days prior to Construction. The Backfilling Procedure Plan submitted shall at a minimum include:

(i) Description of Contractor's Means and Methods for heating, hoarding, tamping, and compacting backfill material to achieve the specified densities and ensure no frozen material is placed.

(ii) The plan shall also consider how backfill material will be stored, delivered, and maintained on site to protect the material from freezing prior to placement.

(e) Thrust blocks shall be constructed for each PVC bend in accordance with City of Winnipeg Specifications and/or as specified on the Drawings.

E28.4 Method of Measurement and Payment

E28.4.1 Supply and Installation of 450 mm diameter force main within the East Colony Creek Crossing ROW extents will be measured on a length basis for the type of bedding and backfill specified and paid for at the Contract Unit Price per metre for "450 mm PVC C900 DR 25 c/w Tracer Wire". Length to be paid for will be the total number of linear metres

supplied and installed in accordance with this Specification, accepted and measured by the Contract Administrator.

(a) Measurement for length of force main installed in a trench will be made horizontally at grade above the centreline of pipe through fittings.

(b) Correction of alignment and grade exceeding the allowable variance will be at the Contractor's own expense.

(c) Mechanical Restraints shall be considered incidental to Supply and Installation of 450 mm diameter force main within the East Colony Creek Crossing ROW extents. No separate measurement or payment will be made.

(d) Thrust blocks shall be considered incidental to Supply of Fittings and Supply and Installation of 450 mm diameter force main within the East Colony Creek Crossing ROW extents. No separate measurement or payment will be made.

(e) Rigid insulation shall be considered incidental to Supply and Installation of 450 mm diameter force main within the East Colony Creek Crossing ROW extents. No separate measurement or payment will be made.

E29. TRACER WIRE SYSTEM

E29.1 Description

(a) This Specification describes the supply and installation of tracer wire and access ports for the force main piping.

E29.2 Materials

(a) Tracer Wire:
  (i) #14 AWG solid copper conductor in accordance with UL 83.
  (ii) HMWPE insulation in accordance with UL 83, coloured green to indicate wastewater.

(b) Access Port:
  (i) Standard CoW two-piece valve box. Cast iron upper casing to be marked "S" for sewer.

(c) Grounding
  (i) 1.5-lb drive-in magnesium grounding rod.

E29.3 Construction Methods:

(a) Tracer Wire:
  (i) Installation of tracer wire shall always be on the same side of the pipe. Tracer wire to be installed on the east or south side of the force main.
  (ii) Tape tracer wire to pipe minimum every 3.0 m.
  (iii) Ensure placement of bedding does not damage or strain tracer wire.
  (iv) Install tracer wire as a single continuous wire. Splicing of wire, if necessary, shall be done in such a way to produce an electrically and mechanically sound joint. No bare tracer wire shall be exposed above or below ground.
  (v) Tracer wire must be grounded at all dead ends. Grounding shall be achieved using a 1.5 pound, drive-in magnesium rod.

(b) Access Ports:
  (i) Access ports shall be installed above every horizontal bend on the force main pipe, as directed by the Contract Administrator.
  (ii) For straight aways, access ports shall be installed every 500m, as directed by the Contract Administrator
  (iii) Install access ports flush with existing ground.

(iv) Backfill access ports with sand once tracer wire is installed as shown on the Drawings. Do not over fill access port, ensure valve cover is able to fully close.

E29.4 Testing:

(a) Once fully installed, the Contractor shall test the tracer wire system with typical locating equipment, ensuring proper function of the system.

(b) The Contractor shall be responsible for locating and repairing any breaks in the tracer wire and any other defects in the locating system.

(c) Continuity testing of the tracer wire system in lieu of using locating equipment will not be accepted.

E29.5 Measurement and Payment

(a) Measurement and payment for Tracer Wire System shall be as per the following:

(i) Tracer Wire: No separate measurement or payment shall be made for installation of tracer wire and associated works. Tracer wire installation shall be considered incidental to force main installation described in Section E25.

(ii) Access Ports shall be measured on an each basis and paid for at the Contract Unit price for “Tracer Wire Access Ports”.

TUNNELING SEWER CONSTRUCTION

E30. TUNNELLING SEWER CONSTRUCTION

E30.1 Description

(a) This Specification supplements and amends City of Winnipeg Standard Construction Specification CW 2130 Gravity Sewers, and shall cover the installation of 1200 mm Gravity Sewers.

(b) Further to Clause 3.4.1 of CW 2130, sewers shall be installed by Tunneling as per D6.

E30.2 Materials

(a) Pipe Classes indicated on Drawings or within the Bid documents represent long term design conditions and loading based on depth of bury. The Contractor shall verify that the pipe class, strength, reinforcing and joint design of the pipes being installed are suitable for their proposed installation methods and procedures. Design of any pipe to suit installation methods is the responsibility of the Contractor.

E30.3 Construction Methods

(a) Sewers shall be installed in accordance with CW 2130.

(b) Selection of excavation equipment for installation of sewers by Tunnelling methods shall be the responsibility of the Contractor and shall be made based on expected soil conditions inferred from the Geotechnical Reports in Appendix A and Appendix B.

E30.4 Submittals

(a) **Shaft Construction** - No shaft construction may proceed without approved shop drawings in accordance with E4 sealed by an Engineer licensed in the Province of Manitoba.

(i) Shaft Shop Drawings shall demonstrate at minimum:

- Shoring design meets all Province of Manitoba regulations.
- Shoring is satisfactory to support soil, active and construction loading.
- Excavation space permits the effective installation of the planned Trenchless works and other design elements shown on the Drawings.

(ii) **Thrust Support** - Where shafts are used for Tunnelling, the shop drawings shall identify the anticipated thrust and shall consider the interaction of the thrust with respect to shoring, existing soil conditions, utilities, or other site-specific items.

(b) **Jacking Pipe** – Pipe is being installed by Pipe Jacking, the Contractor shall submit shop drawings sealed by an Engineer in the Province of Manitoba demonstrating that the pipe can support the selected installation method in accordance with this specification.

(i) The Jacking Pipe shall be HDPE lined reinforced concrete pipe as per E31.

(ii) The submission shall include the design calculations for the specific drive lengths, depth, soil conditions and materials selected.

(iii) Lubrication/grout ports shall be provided at a minimum as frequently every 7 meters. 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.

(iv) Upon completion of the Tunneling drives, grout shall be injected into the annular space through all ports in accordance with E32. Once grouting has been completed, each port shall be sealed as per the manufacturer's recommendations.

(c) **Grade Control** - The Contractor shall provide a submission demonstrating the method of grade control used on their tunnelling equipment. Contractor shall demonstrate that their grade control can be used effectively for their proposed drive lengths.

(d) **Quality Control Survey** – Where Tunnelling methods are being used the Contractor shall provide a submission demonstrating their Quality Control plan for measuring the grade and alignment of the new pipe with respect to the design. The submission shall explain the method to be used to survey the pipe (separate from the Grade Control). The frequency of quality control shall at minimum be as follows:

(i) Every 10 m

(e) Contractor to submit QC data to the Contract Administrator daily or as soon as practicable.

(f) Frequency shall increase at the discretion of the Contract Administrator if the Contractors QC survey deviates from allowable tolerances in the Specifications.

(g) Contractor to allow the Contract Administrator access to complete Quality Assurance surveys of completed Work as required.

E30.5 Measurement and Payment

(a) Measurement and payment for Tunneling Sewer Construction shall be in accordance with CW 2130 for the diameter, class, bedding and backfill requirements listed on the Form B with the supplemental items listed below:

(i) Excavation, Bedding and Backfill, as described in E24, are incidental to Tunneling Sewer Construction.

(ii) Surface Restorations, as described in E7, are incidental to Tunneling Sewer Construction.

(iii) Payment for the temporary or permanent relocation of existing utilities that are not listed on the Form B, and or temporary support of existing utilities required for the placement of shafts shall be incidental to Tunneling Sewer Construction as specified in E20.

(iv) Cost of shaft construction and associated shoring required for the installation of the works described herein, is incidental to Tunneling Sewer Construction.

(v) Methods for dealing with and paying for Tunnelling excavation obstructions are shown in E15.

(b) Tunneling Sewer Construction shall be measured on a lineal meter basis and paid for at the Contract Unit Price for "Tunneling Sewer Construction". 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.

(c) The unit price for this item shall include all costs to supply and install the reinforced concrete jacking pipe, 2mm thick HDPE liner, cap strings, welding and QAQC, lubrication, contact grouting, and tunnelling plan development. Costs shall include the supply and use

of tunnel boring machines, lubrication and grouting systems, and ancillary equipment needed to install the sewer on line and grade as outlined in the Drawings and Specifications herein.

(d) Tunneling Sewer Construction listed on Form B: Prices will be paid out in accordance with the following payment schedule:

(i) 60% paid upon completion of pipe installation

(ii) 20% paid upon completion of Contact Grouting

(iii) 10% paid upon completion of joint welding

(iv) 10% paid upon approval of QA/QC documentation

E31. REINFORCED CONCRETE JACKING PIPE

E31.1 Description

(a) This section includes the minimum requirements for Jacking Pipe also referred to as the reinforced concrete jacking pipe (RCJP) lined with HDPE (minimum 2mm thick liner) for the Tunnelling 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.

E31.2 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 Tunneling 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 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 of 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 of 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 E34 and as identified on the Drawings.

E31.3 Submittals

(a) Provide sufficient detail to allow the Contract Administrator to review whether the proposed equipment, materials, and procedures meet the requirements of the Specifications. Review of the Contractor's submittals by the Contract Administrator 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 2mm 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 Contract Administrator.

(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.

E31.4 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 Contract Administrator prior to manufacturing.

(b) All work shall be performed under the review of quality control personnel or as approved by the Contract Administrator.

(c) The Contractor shall immediately notify the Contract Administrator, 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 Contract Administrator 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 unrepairable 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.

E31.5 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.

E31.6 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 E34 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) The Contract Administrator shall review all submittals required including manufacturing design data and direct design calculations.

E31.7 Measurement and Payment

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

E32. CONTACT GROUTING

E32.1 Description

(a) This section outlines the minimum requirements for Contact Grouting following Tunnelling drive completion. The Contractor shall furnish all materials and equipment necessary for Contact Grouting the annular space and any voids created or encountered during tunnelling and any voids created or encountered during shaft construction.

E32.2 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 Contract Administrator.

(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 Contract Administrator. 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.

E32.3 Submittals

(a) Provide sufficient detail to allow the Contract Administrator to review whether the proposed equipment, materials, and procedures meet the requirements of the Specifications. Review of the Contractor's submittals by the Contract Administrator 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.

E32.4 Quality Assurance

(a) The Contractor shall allow access to the Contract Administrator and shall provide necessary assistance and cooperation to aid the Contract Administrator 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 Contract Administrator, 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.

E32.5 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.

E32.6 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 Contract Administrator. Admixtures may be used to improve the pump-ability, control set time, hold sand in suspension, and to prevent segregation and bleeding.

E32.7 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.

E32.8 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 exacavation 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.

E32.9 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 water

E32.10 Measurement and Payment

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

E33. LARGE DIAMETER MANHOLE

E33.1 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.

E33.2 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.

E33.3 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 E34 and as identified on the Drawings.

E33.4 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.

E33.5 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) Manholes:

(i) Large Diameter Manholes

- MH-01(2400mm diameter c/w HDPE lining)
- MH-02 (2700mm diameter c/w HDPE lining)

(ii) New Manhole on Existing Sewer:

(i) Large Diameter Manholes

- MH-03 (3000X2400mm diameter pre-cast box manhole c/w HDPE lining)

(b) Prices include connections of the proposed piping as described in E30 to the manholes detailed on the Drawings as required for the select installation methodology.

E34. CONCRETE PROTECTIVE LINERS AND COATINGS

E34.1 Description

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

E34.2 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

E34.3 Submittals

(a) Submittals to be in accordance with E4.

(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.

E34.4 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.

E34.5 Delivery, Storage and Handling

(a) Deliver, store and handle Materials in accordance 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.

E34.6 Materials

(a) Concrete Protective Liner (CPL) shall be smooth HDPE liner with a minimum nominal thickness of 2.0mm (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 2.0 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**		
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.

E34.7 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.

E34.8 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.

E34.9 Construction/Execution

E34.9.1 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.

E34.9.2 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.

E34.9.3 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.

E34.9.4 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.

E34.9.5 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.

E34.9.6 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.

E34.10 Measurement and Payment

(a) All costs associated with concrete protective liners and coatings as described herein are incidental to E30 and E33. No separate measurement or payment will be made.

E35. MAINTAINING FLOW IN EXISTING 1350 INTERCEPTOR SEWER MAIN

E35.1 Description

E35.1.1 The specification covers the requirement of the Contractor to maintain sewer flow in the existing 1350 mm interceptor sewer that is impacted by the installation of MH-03.

E35.1.2 Maintaining Flow in the existing sewer shall be in accordance with City Specification CW 2130 and as listed herein.

E35.1.3 The Contractor may identify their method for controlling the flows, this includes construction of a flume within the excavation or a by-pass pumping arrangement.

E35.1.4 **Further to E35.1.3, should the Contractor select a by-pass pumping arrangement rather than a flume within their excavation, the by-pass pumping/flow control setup shall not obstruct and/or cross over traffic lanes. Traffic along Inkster Boulevard and Brookside Boulevard are to be maintained throughout construction.**

E35.1.5 **Controlling flows in the 1350 mm interceptor sewer will only be permitted during dry weather flow. All work associated with the installation of MH3 requiring flow control (by-pass pumping or flume as described herein) shall be completed during dry weather flow periods.**

E35.1.6 Where by-pass pumping is selected to control dry weather flow of 8.0 L/s, the Contractor must provide redundant pumps and a back-up power supply to ensure that the sewer flows are controlled to the existing peak dry weather flow of the pipe network; and so the sewer system is not at risk to elevated levels causing basement flooding.

E35.1.7 Expected flows for dry weather flows and specific rain events flows are provided in the table below:

Parameter	DWF
Peak Flow (m3/s)	0.008
Peak Velocity (m/s)	0.005589

E35.2 Submittals

E35.2.1 Submittals shall be made in accordance with the requirements identified in E4 and as listed below.

E35.2.2 Submit a description of the proposed bypass method which shall include the following, as applicable:

(a) Diversion
  (i) Size and location of pipe, bends and connections.
  (ii) Pipe materials.
  (iii) Procedures to monitor upstream mains for backup impacts.
  (iv) Procedures for setup and breakdown of diversion.
  (v) Emergency plan detailing procedures to be followed in event of sewer overflows, service backups, and sewage spillage.

(b) Pumping
  (i) Size and location of manhole or access points for suction and discharge hose or piping.
  (ii) Sections showing suction and discharge pipe depth, embedment, select fill and special backfill, if buried.
  (iii) Temporary pipe supports and anchoring required.
  (iv) Thrust and restraint block sizes and locations.
  (v) Sewer plugging method and type of plugs.

(vi) Bypass pump sizes, capacity, number of each size to be on site and power requirements.

(vii) Backup pump, power and piping equipment.

(viii) Calculations for upstream backwater effect to ensure properties upstream are not adversely affected by pumping.

(ix) Calculations of static lift, friction losses, and flow velocity. Pump curves showing pump operating range.

(x) Design plans and computation for access to bypass pumping locations indicated on drawings.

(xi) Calculations for selection of bypass pumping pipe size.

(xii) Method of noise control for each pump and/or generator.

(xiii) Method of protecting discharge manholes or structures from erosion and damage.

(xiv) Schedule for installation and maintenance of bypass pumping lines.

(xv) Procedures to monitor upstream mains for backup impacts.

(xvi) Procedures for setup and breakdown of pumping operations.

(xvii) Emergency plan detailing procedures to be followed in event of pump failures, sewer overflows, service backups, and sewage spillage.

E35.2.3 Methods

(a) Schedule and perform work in manner that does not cause or contribute to incidence of basement flooding, overflows, releases or spills of sewage from sanitary sewer system or bypass operation.

(b) Setup and perform work in a manner that does not impact traffic flows. Traffic along Inkster Boulevard and Brookside Boulevard to be maintained throughout construction.

(c) The Contractor shall acquire any permits required from the City for redirecting of flows

(d) During bypass pumping or diversion operation, protect sewer lines from damage inflicted by equipment.

(e) Upon completion of bypass pumping or diversion operations, and after the receipt of written permission from the Contract Administrator, the Contractor shall remove or abandon temporary piping installed as part of this specification.

E35.2.4 Measurement and Payment

(a) The costs for Maintaining Flow in the Existing 1350mm Interceptor Sewer will be measured and paid for at the Contract Lump Sum Price for “Maintaining Flow in Existing 1350mm Interceptor Sewer”, 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) There shall be no separate claims made by the Contractor for additional costs or time due to increased standby pumping operations from high dry weather flows.

E36. HIGH FLOW THROUGH CONSTRUCTION SITE CLEAN UP

E36.1 Description

(a) This specification covers work required to clean and restore the Site in order to resume work following a high flow event that surpasses the specified diversion/flume or bypass flow control and floods the excavation.

(b) The occurrence of a high flow event that requires clean-up to resume work shall be determined by the Contract Administrator.

E36.2 Measurement and Payment

(a) High Flow Through Construction Site Clean Up shall be measured on a unit price basis and paid for at the Contract Unit price for “High Flow Through Construction Site Clean Up” for each occurrence.

CPKC RAILWAY CROSSING

E37. CPKC RAILWAY RIGHT OF WAY CROSSING REQUIREMENTS

E37.1 Description

E37.1.1 This Specification covers the potential costs borne by the Contractor imposed by CPKC Railway in order to comply with the Crossing agreement. The crossing agreement must be adhered to for all Work shown on the Drawings within the CPKC right-of-way.

E37.1.2 Installation through the CPKC right-of-way is subject to the additional requirements of the railway. The following documents shall apply:

(a) Minimum Safety Requirements for Contractors Working on CPKC Property in Canada (CPKC)

(b) CPKC Geotechnical Protocol for Pipeline and Utility Crossing(s) under Railway Tracks (CPKC)

(c) CP – SP-TS-2.39 – Pipeline and Cable Installations within Railway Right of Way (CPKC)

(d) Standards Respecting Pipeline Crossings Under Railways – TC E-10 (Transport Canada)

E37.1.3 Crossing Agreement

(a) The installation of the pipeline through the CPKC right-of-way is dependent on the execution of a crossing agreement between the City of Winnipeg and CPKC. KGS Group submitted the crossing agreement on behalf of the City on July 2, 2024 consisting of Drawings 13495, 13497 and a geotechnical assessment report. The complete submittal package is included in Appendix D. These appendix documents are for information only and do not form part of the Contract. CPKC has not yet formally approved the crossing application nor has the crossing agreement been executed. It is anticipated that the agreement will be fully executed in advance of commencement of the Trenchless Work.

(b) Railway Track Monitoring Plan

(i) Details of the monitoring plan as identified in E17.

E37.2 Submittals

E37.2.1 The Contractor shall submit an Emergency Response Plan outlining the steps to be followed if the event of excessive soil loss or settlement. The Emergency Response Plan shall include the location and contact information for the nearest cement or grout plant to address voids/sinkholes. The Contractor shall also determine with the CPKC Roadmaster the nearest source of ballast material should tamping/resurfacing of the railway track be required.

E37.3 Methods

E37.3.1 The Contractor is responsible for all coordination with CPKC and any fees required to meet the CPKC requirements before and during the Work.

E37.3.2 Flagging and Signals

(a) All charges for flagging and signals protection incurred to complete the work listed herein, in the geotechnical report, and shown on Drawings shall be paid by the Contractor.

(b) Prior to the start of construction, a minimum notice of fourteen working days must be given to CPKC to arrange flagging protection and to schedule a pre-construction coordination meeting between the Contractor, Contract Administrator, and CPKC.

E37.3.3 Settlement and Construction Monitoring

(a) Refer to Section E17 and the Drawings for monitoring requirements for railway monitoring.

E37.3.4 Railway Safety

(a) Comply with CPKC Minimum Safety Requirements for Contractors working on Railway Property, including training, protective equipment and procedures.

E37.3.5 Emergency Response Plan

(a) If an urgent or near urgent defect is detected during monitoring, an on-site meeting shall be conducted to determine the cause of the defect and remedial action.

(b) The Contractor will be required to carry-out remedial action as directed by the Contract Administrator and agreed upon by CPKC.

E37.4 Measurement and Payment

(a) Costs incurred by the Contractor from CPKC associated with the Work shown on the Drawings and described within the Specifications within the CPKC right-of-way, will be paid from the allowance under the Contract Unit Price “CPKC Right-of-Way Crossing Requirements”.

(b) The costs paid shall be the actual invoiced costs and any allowable mark-ups as stated within the General Conditions.

E38. TRENCHLESS CPKC RAILWAY CROSSING - HORIZONTAL DIRECTIONAL DRILLING

Part 1 General

E38.1 General Description

(a) Horizontal directional drilling (HDD) is the installation of a pipeline by drilling a pilot bore from an entry pit to a predetermined exit location. The drilling head is then replaced with a reamer and the borehole is enlarged to a predetermined size. Once completed the product pipeline is pulled into place.

(b) This Specification outlines the minimum requirements for the installation of HDD crossings for pipeline systems. Ensure that the HDD requirements set out in this Specification are complied with by the Contractor to the extent they are applicable in the circumstance. Except as otherwise expressly provided herein; the Contractor is responsible for implementing this Specification. The Contractor shall be solely responsible for ensuring that the Work is performed in strict compliance with all Environmental, Health, and Safety Laws.

(c) The work shall include the complete installation by directional drill of one NPS 24/DN 600 DR9 high density polyethylene (HDPE) force main and the pulling of an aramid (Kevlar) flexible fiber reinforced pipe (FFRP) supplied by Primus Liner.

E38.2 Reference Standards

(a) ANSI/AWWA (Latest Edition)

(b) AWWA C901, Polyethylene (PE) Pressure Pipe and Tubing, ¾ in. (19 mm) through 3 in. (76 mm), for Water Service

(c) AWWA C906, Polyethylene (PE) Pressure Pipe and Tubing, 4 in. through 65 in. (100 mm through 1,650 mm) for Waterworks

(d) American Petroleum Institute (Latest Edition)

(e) API Recommended Practice 13B-1, Field Testing Water-based Drilling Fluids

(f) ASTM International (Latest Edition)

(g) ASTM F2620, Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings

(h) ASTM F3183, Standard Practice for Guided Side Bend Evaluation of Polyethylene Pipe Butt Fusion Joint

(i) ASTM F3190, Standard Practice for Heat Fusion Equipment (HFE) Operator Qualification on Polyethylene (PE) and Polyamide (PA) Pipe and Fittings

E38.3 Submittals for Review

E38.3.1 HDD Execution Plan

(a) The Contractor shall submit a detailed work plan outlining the Contractor's planned directional drilling construction methodology at least twenty-five (25) working days prior to the scheduled mobilization for the CPKC crossing. Any operational deviation from the HDD Execution Plan shall be presented to the Contract Administrator in written form; this may include a change in any process, borehole condition, equipment, or pipe installation technique. The Contract Administrator shall review and approve any deviations to the HDD Execution Plan prior to implementation by the Contractor. The HDD Execution Plan shall include:

(i) Detailed description of the steps required to complete all aspects of the project including surface conductor casing installation (method, equipment, casing product information including specification, size, wall thickness, and welding procedures), pilot hole drilling (steering/tracking procedures and downhole equipment/tooling), reaming (number of passes, orientation, sizes, and types), cleaning passes (number of passes, orientation, reamer size and type), and pullback operation (configuration of pull assembly and product pipe support).

(ii) Complete description of all equipment to be supplied on both the entry and exit sides to complete the work including, but not limited to, drill rigs (models, pullback/thrust capacities, and rotary torque capacities), drill pipes (types, lengths, and sizes), downhole tools and survey instruments (types, sizes, accuracy, etc.) and bits (sizes and types), reaming equipment (sizes and types), anchoring systems, drilling fluid mixing and recycling systems (tanks, shakers, de-silters, de-sanders, pumps, etc.), and noise mitigation systems (if required).

(iii) Detailed description of the steering/locating systems, equipment (downhole and surface), and procedures.

(iv) Detailed description of pullback force monitoring instruments/methods or procedures to ensure the pullback force does not exceed the allowable tensile stress of the product pipe.

(v) Description of all auxiliary equipment including, but not limited to, light plants, auxiliary pumps, generators, rig mats, and all other equipment to complete the work.

(vi) Drawing of the entry and exit work sites, including locations and footprints of equipment, sumps/pits, and accesses. For each installation, indicate product pipe fusing and staging areas for pullback, and identify any potential conflicts with traffic.

(vii) Drawings of the intended drill path in plan and profile, including depths of cover, entry and exit angles, drill path radii, and length and size of surface casings for both entry and exit.

(viii) Description of drill pipe maintenance procedures including inspection as required, and how the Contractor will minimize stresses in the drill pipe during operations.

(ix) Description of water sources, estimates of volume required per day, and onsite storage requirements.

(x) Sample of daily drilling reports including tower sheets, drilling fluid test results, steering/locating reports, annular pressure reports, and surface monitoring reports.

(xi) Description of all safety and medical equipment to meet the regulatory requirements for the work.

(xii) Emergency procedures for inadvertent utility strikes.

(xiii) Standard procedures that address the processes typically undertaken on an HDD project. At a minimum, these procedures shall be a quality control document identifying the Contractor's standard procedures for casing installation, pilot hole drilling, reaming, cleaning passes, and pullback.

(xiv) Contingency plans in the event of partial loss of circulation (including plugging/bridging procedures), excessive annular pressures, fluid volume loss, and high rotary torque.

(xv) Drilling Fluid Management Plan:

- Drilling fluid mix design specific to the anticipated formation for each installation including all proposed additives, rheological properties (unit weight, viscosity, and gel strength), planned testing, and treatment guidelines for anticipated drilling concerns including, but not limited to, loss of circulation, borehole collapse, and inadvertent returns to surface (hydrofracture).
- Product data sheets and safety data sheets (SDS) for all proposed drilling fluid additives.
- Detailed description of downhole annular pressure monitoring instruments and frequency of monitoring.
- Procedures to balance drilling fluid losses into the formation.
- Detailed description of the steps required to manage the drilling fluid for the project including, but not limited to, fluid containment, recycling, transport, and disposal.
- Designated drilling waste disposal site.
- Calculations of the appropriate rate of penetration for each drilling process (pilot bore and all pre-reams) based on the anticipated ground conditions, drilling fluid design, and proposed drilling equipment.

(xvi) Environmental Monitoring and Response Plan

- Description of surface monitoring procedures along and offset to the drill path alignment, including frequency of "frac walks".
- Roles and responsibilities of site personnel in the event of a drilling fluid loss event.
- Response procedures in the event fluid loss is detected.

(xvii) Product Pipe Jointing Details:

- Complete description of all heat fusion equipment and product support equipment.
- Heat fusion equipment operator qualifications to ASTM F3190.
- Product pipe data including manufacturer's instructions, printed product literature, and data sheets.

(xviii) Product Support and Pullback Plan:

- Step-by-step outline of the proposed method and timeline/schedule to successfully complete the product pipe string installation.
- Proposed equipment and/or structures to support the pipe string during pullback operations.
- Pipe section lengths and their pull order.

(xix) Schedule of work for each installation including, but not limited to, preparation works (work pad, layout, access, etc.), mobilization, survey (if required), casing

installation, pilot hole drilling, all reaming passes, all cleaning passes, product pipe support and pullback, demobilization, and clean up/restoration works.

E38.3.2 Primus Liner Installation Plan

(a) The Contractor shall be responsible for the installation of the liner in accordance with the manufacturer's recommendations and standards. A plan shall be submitted noting the following:

(i) Installation equipment, direction and staging of the site.

(ii) Description of the process, stages, and method of confirmation of the installation of the liner.

(iii) Maximum allowable pull force and equipment capable of monitoring and recording the force used during the installation.

(iv) Use of lubricants if planned and its SDS information.

(v) Certification of the installation sub-contractor as provided by the liner supplier.

E38.4 Regulatory Requirements

(a) All Horizontally Directionally Drilled (HDD) Crossings shall be performed in accordance with the following codes, regulations, and requirements as applicable:

(i) Crossing / Proximity agreements of foreign pipelines.

(ii) Access routes to the right-of-way (ROW), work sites, staging areas, or to associated areas.

(iii) Landowner/Shareholder agreements.

(iv) Water withdrawal permits.

(v) Environmental Construction Operation Plan (ECO Plan).

(b) If there is a conflict between Acts, Regulations, Laws, Codes and Standards, the most stringent requirement shall be met by the Contractor at the sole cost to the Contractor.

(c) Conform to applicable code and regulations applicable requirements.

(d) Obtain all necessary permits or authorizations to execute construction activities near or across buried pipelines and conduit.

E38.5 Contractor's Terms of Responsibility

(a) The Contractor shall:

(i) Review the Contract Documents and drawings to ensure workspace, ROW, drill design, layout areas, and all other items pertaining to the HDD scope are acceptable for their equipment and set-up procedures.

(ii) Confirm at the time of Tender that the geotechnical information provided is suitable for the work. Any additional geotechnical information that may be required by the Contractor to minimize their own risk shall be obtained by the Contractor at their cost following the issuance of the Notice of Award.

(iii) Be responsible for the directional drilling methodology and equipment selection. Proposed drill rigs, mud mixing systems, tooling, and personnel must meet the project requirements and be sufficient to successfully complete the installation considering the installation length, product type and diameter, and formation and groundwater conditions that can be reasonably foreseen.

(iv) The Contractor shall be responsible to determine the size and method of installation for entry and exit casings (where specified on the drawings or determined to be required based on the Contractor's method).

(v) Be responsible for two attempts at completing an installation prior to consideration of claim or suggesting changed conditions. As HDD is susceptible to difficulties caused by subsurface ground conditions, if the first attempt at installing a crossing is unsuccessful, an additional attempt will be made along an alternative alignment to complete the installation. If the second attempt is not successful, the Owner will consider payment for additional cost to

undertake additional attempts to complete the installation. An installation would be considered unsuccessful, when the Contractor is employing good drilling practices, and one of the following occur:

- Unable to complete the pilot bore due to unexpected ground conditions, while employing suitable downhole tooling, based on the geotechnical information available;
- Loss of circulation due to inadvertent returns, which prevent proper flushing of the borehole and impede the installation, after appropriate measures are taken to restore circulation are unsuccessful, which occur at a pressure lower than the predicted annular pressure model;
- Collapse of the borehole during reaming, while using a properly formulated drilling fluid, and reaming at a rate suitable for the formation and rig fluid pumping rate;
- Loss or failure of new tooling within the borehole during the reaming process, that would prevent the safe pullback of the product pipe, after reasonable attempts to recover the tooling have been unsuccessful; or,
- Product pipe becomes stuck due to collapsed borehole, while employing a properly formulated drilling fluid, in a suitably sized reamed borehole, when the borehole had been suitably swabbed and conditioned prior to pullback.

Part 2 Products

E38.6 Equipment

(a) The Contractor shall be responsible for the directional drilling method and equipment. The Contractor shall provide drill rig(s) and drilling fluid mixing and recycling systems with sufficient capacity to successfully complete the installation taking into consideration the installation length, product type and diameter, and ground and groundwater conditions that can reasonably be foreseen.

(b) The Contractor shall supply the following (at a minimum).

(i) HDD equipment including a drilling rig with a minimum of 160,000 lbs. of push-pull force with suitable rotatory torque to open boreholes to diameters specified.

(ii) All drill pipe, crossover subs, monel collars, a swivel, pull head, and all downhole tooling.

(iii) A down-hole annular pressure monitoring tool.

(iv) An approved anchoring system for the drill rig, such that the installation can proceed in a safe and effective manner throughout the work without failure.

(v) Barricades, warning signs, trench breakers, and all materials for fluid containment on the worksite.

(vi) Excavators and other lifting/excavation equipment with operators to support the HDD process on entry and exit throughout the work. Rollers will be required to support the pipe during pipe pull to keep the pipe from dragging on the ground surface.

(vii) An Electronic Drilling Recorder (EDR); provide EDR data and conversion factors to convert instrument read-outs of all EDR, Annular Pressure (AP), rotary motors, pressure, and torque units to the manufacturer's specifications.

(viii) Adequate lighting systems to perform the work.

(ix) Rig mats for entry and exit sites. Use of rig mats for the pipe preparation area will be at the discretion of the Contractor.

E38.7 Materials

(a) High density polyethylene (HDPE) HDD product pipe and conduit:

(i) 19 mm through 76 mm conduit to AWWA C901, DR as noted on the drawings.

(ii) 100 mm through 1,650 mm pipe to AWWA C906, DR as noted on the drawings.

(iii) Heat fusion joints: thermal butt fusion to ASTM F2620.

(b) Primus Liner MD – 500mm as noted on the design drawings.

(i) End connectors to be Class 150 ANSI flanges.

(ii) Flange bolt patterns shall match those needed for the HDPE backup flange and restrained coupler.

Part 3 Execution

E38.8 Pre-Commencement

(a) All subsurface utilities within 25 m of the proposed alignment must be identified and location marked on the surface. Owners of subsurface utilities within 25 m of the proposed alignment must be notified of the impending work through Click Before You Dig Manitoba or directly if not a member of the service.

(b) Prepare all construction sites including removal of vegetation and topsoil to a base level grade, containment berms for temporary storage area excavation of entry/exit pits, and installation of conductor barrels.

(c) Prior to commencement of the pilot bore, the proposed borepath shall be “swept” for interference by the Locator. Based on the results of the “sweep” (for electromagnetic interference that may affect the locating system) the Contractor will indicate to the Contract Administrator any concerns regarding the ability to accurately locate and track the drill head. Alternative tracking methods or realignment of the borepath may be required if tracking along the proposed borepath is deemed impractical.

(d) Location must be identified for product pipe layout, as well as suitable space for pipe fusion or coupling depending on product pipe material. This area may require delineation depending on level of pedestrian and vehicular traffic at the discretion of the Contract Administrator.

(e) Drill sites shall be constructed to prevent fluids from leaving the Site.

(f) All utility crossings shall be exposed using hydro-excavation, hand excavation, or another approved method to confirm depth. Acquire appropriate permits to cross, expose, and backfill existing utilities.

(g) The proposed drill path shall be surveyed and documented, including its horizontal and vertical alignments and the location of buried utilities and subsurface structures along the path.

(h) Exit and entry areas should be delineated using traffic cones, barricades, construction taping, flagging, fencing/hoarding or by some combination of these as specified on the drawings. If necessary, warning signs should be placed to indicate open excavation.

(i) Exit area should be suitable size to accommodate activities related to reamer and product pipe connection.

E38.9 Casing Installation

(a) The Contractor shall install entry and exit conductor casing to stabilize near surface formations from collapse and drilling fluid loss where specified on the drawings.

(b) The sizing of conductor casing is the responsibility of the Contractor.

(c) A leak down test shall be completed to ensure that the casing can contain the hydrostatic pressure of the drilling fluid prior to the start of the pilot hole.

(d) The Contractor shall supply and install centralizer pipe throughout the project and replace/rotate as required to ensure wear on the casing is minimized.

(e) Conductor casing shall be removed after pipe pullback or prior to demobilization, unless otherwise specified to be abandoned in place on the drawings.

E38.10 Pilot Hole

(a) Pilot hole drilling shall not begin until all required submittals have been completed and reviewed by the Contract Administrator.

(b) Unless specifically waived by the Contract Administrator, the Contractor will drill the pilot hole to within 2 m radial distance of the design drill path shown on the drawings. The Contractor may suggest an alternate drill path plan at the time of Tender subject to the Contract Administrator for approval.

(c) The Contractor shall identify the expected drill path along the ground surface for quick reference in the event of a potential inadvertent release to surface. If feasible, a line of site shall be cleared by the Contractor to a minimum width of 1 m along the entire drill path.

(d) The Contractor shall record the X, Y, and Z position of the pilot bore at every joint. Inherent errors in azimuth due to tools or equipment shall be considered but it shall be required that the HDD Contractor evaluate the data and state the location of the pilot hole (x, y, and z position) and show how the pilot hole meets the pilot hole tolerance specifications:

(i) The Contractor shall inform the Contract Administrator of any deviation from the design drill path that does not adhere to the tolerance and present a plan for mitigation, or re-drill for Contractor Administrator acceptance.

(ii) The Contractor is responsible for correcting any deficiencies in the pilot hole installation at their own cost.

(iii) The Contractor shall provide the Contract Administrator a copy of the steering report upon request.

E38.11 Reaming

(a) The Contractor will complete all reaming passes to open the borehole to a final diameter that will allow for the safe installation of the product pipeline according to these minimum specifications:

(i) Product size < 200 mm (8 inches) then the final ream hole diameter shall be a minimum of the product outside diameter plus 100 mm (4 inches).

(ii) Product size 200 - 600 mm (8 - 24 inches) then the final ream hole diameter shall be a minimum of 1.5 times the product outside diameter.

(iii) Product size > 600 mm (24 inches) then the final ream hole diameter shall be a minimum of the product outside diameter plus 300 mm (12 inches).

(b) The Contractor shall determine the sizes and number of reaming passes as required for product installation based on the geotechnical conditions.

(c) Any tools or other metal object lost or lodged down hole shall be reported to the Contract Administrator. Metal objects shall be fully recovered prior to pipe pullback operation unless specifically approved otherwise by Contract Administrator. Failure to recover metal objects lost or lodged down hole within a reasonable time period constitutes just cause for rejection of the drill borehole.

(d) Pipe pull shall not occur at the same time as hole enlargement.

E38.12 Cleaning Passes

(a) The Contractor shall complete a cleaning pass to prepare the borehole for product pipe installation. The Contractor shall complete a minimum of one cleaning pass prior to pullback. A second pass may be required if forces on the reamers remain high. In all cases, the Contractor shall ensure the borehole is clean and free of obstructions prior to pullback.

(b) The Contractor shall monitor and record pull force and rotary torque every joint during the cleaning pass and provide this information to the Contract Administrator prior to pipe pullback.

E38.13 Product Pipe Preparation

(a) HDPE product pipe fusing shall be done in accordance with ASTM F2620. All joint fusions shall be recorded on an electronic data logger and the fusion logs shall be provided to the Contract Administrator prior to pipe pullback for review.

(b) Pipe fusion shall be completed by qualified HFE operators with valid certification completed within the last two years.

(c) The Contractor shall complete quality control testing to ASTM F2620 for product with wall thickness less than 25 mm and ASTM F3183 for product with wall thickness greater than or equal to 25 mm; samples shall be prepared from the first joint fused each day fusion is to occur per fusing machine and operator. All test results shall be provided to the Contract Administrator prior to pipe pullback for review.

E38.14 Pullback

(a) The Contractor shall control the pipe installation process to ensure a safe and quality installation.

(b) The Contractor shall provide the Contract Administrator with sufficient notice prior to the start of pullback to ensure support operations from the Owner are in place and shall begin the installation of the product pipe in daylight hours.

(c) The Contractor shall monitor the pipe section and record the pull force vs. time and joint. A conversion chart should be provided where necessary to account for rig specific capabilities.

(d) The Contractor shall have sufficient equipment and storage on-site to manage excess fluid displaced by the pullback section.

(e) The Contractor shall provide support equipment during pullback operations to safely install the product pipe without overstress. The Contractor shall be responsible for coordinating and managing all aspects of the pullback section.

(f) The Contractor shall pull the product pipe at least 2 m into the entry pit to inspect the pipe. If the pipe is damaged, the Contractor will pull additional lengths of pipe until the damage is either reduced or eliminated and is acceptable to the Contract Administrator. If the damage is unacceptable to the Contract Administrator, the Contractor will remove the section, replace if damaged, re-ream the borehole, and re-install the product section.

(g) The Contractor shall avoid excessive reaming and pullback rates and shall match reaming and pullback rates with their downhole tooling and the borehole cleaning ability of their equipment.

(h) Pipes are to be capped until such time that tie-ins are made to connect the open cut sections of pipe.

E38.15 Drilling Fluid Management

(a) The Contractor shall be responsible for the drilling fluid design to complete the installation and shall plan for the recycling, managing, and disposal accordingly.

(b) Excess drilling fluid and waste storage on site shall be limited to hydrovac trucks, tanks, or other types of above ground systems. No temporary excavations, except for the designated entry and exit pits, shall contain drilling fluid or waste at any time during the project.

(c) Excess drilling fluid and waste shall be disposed of off site. Disposal of excess drilling fluid and waste shall be conducted in compliance with all relevant environmental regulations, landowner agreements, workspace agreements, and permit requirements.

(d) Transferring drilling waste off site for disposal shall be completed during daylight hours.

(e) The Contractor shall be proactive about the management of the drilling fluid and will specifically (at a minimum):

(i) Complete rheological testing every four hours and compare results to the Drilling Fluid Management Plan and adjust as required.

(ii) Measure and document the volume of fluid employed in the drilling process, and any quantities of make-up fluid. If volume loss is identified, the Vendor will investigate the drill path alignment for indication of surface release.

(iii) Measure annular pressures and control pressures according to an approved model.

(f) Rheological testing completed shall include the following (at a minimum):

(i) Drilling fluid density (mud weight) by conventional ambient pressure mud balance procedure described in API RP 13B-1.

(ii) Funnel viscosity using a Marsh Funnel as described in API RP 13B-1.

(iii) Drilling fluid viscosity and gel strength using a direct-reading viscometer as described in API RP 13B-1.

E38.16 Environmental Response

(a) The Contractor will monitor the surface of the drill path during all phases of the installation. Monitoring shall be completed along and up to 100 m on either side of the drill path at a minimum interval of every four hours with daily reporting of the monitoring results.

(b) The Contractor will designate a representative on-site responsible for coordinating the environmental response and supplying the appropriate information to the owner.

(c) If fluid loss is detected, the Contractor will:

(i) Halt all operations immediately.

(ii) Inform the Contract Administrator as soon as possible so appropriate regulatory agencies can be notified.

(iii) Isolate the migration site and recover fluids (on land).

(iv) Contain the drilling fluid and prevent further migration downstream (if in the watercourse or floodplain).

(v) If fluid migration does not appear on the surface or in the watercourse, the Contractor shall increase the frequency of surface monitoring to ensure drilling fluid has not migrated to surface.

(vi) Attempt to restore circulation by extracting the drill pipe and cleaning the hole, plugging, re-drill the pilot hole, or continue with loss of circulation while ensuring no effect to the environment (this must be approved by the Contract Administrator prior to implementing).

(vii) Fracture plugging/bridging agents employed shall be set per the manufacturer's recommendations. If positive circulation is restored drilling can continue. If positive circulation is not established, pumps will be halted, and a reapplication shall be made. This process may be repeated until plugging occurs. All plugging agents will be specifically designed for the formations being drilled and supplied on site. If plugging cannot be achieved the following continuance options may be utilized, upon approval by the Owner and all applicable regulatory bodies:

- Installation of casing or extension of existing casing where possible to eliminate the point of fracture.
- Partial recovery of circulation where fracture to the surface can be managed by pumping fluid back to either the entry or exit point and may be allowed. This may be sufficient if a diligent monitoring program is undertaken to ensure fluid is not being released to the environment.
- Pilot hole re-drill along a different drill path designed to avoid the area where loss circulation occurred.

(d) The following equipment and supplies are recommended (at a minimum) for emergency environmental response:

(i) 0.5 m3 - Absorbent material for hydrocarbon product spills.

(ii) 1 pallet of sand bags.

(iii) 2 - 4" trash pumps with 200 m of hose and associated fittings.

(iv) 20 - T-posts;

(v) Light towers suitable for personnel working on entry and exit sides safely.

(vi) 2 rolls - Silt fence.

(vii) 1 - Post pounders.

(viii) 50 m - Geo-textile/ plastic sheeting.

(ix) 100 m - Plastic snow fence.

E38.17 Clean-Up

(a) Upon the successful completion of the HDD and subsequent tie-ins, all equipment and materials will be removed from the site and the area will be cleaned up. Clean-up includes (at a minimum):

(i) Reclamation of all drilling fluid/cuttings storage areas.

(ii) Removal of all equipment, materials, and waste from the sites.

(iii) Clean-up and restoration of accesses, entry/exit work areas, ROW, layout areas, and water body accesses (except for seeding/fertilizing) to original condition.

(b) All areas affected by Contractor's use shall be restored, and free of contaminants, to the original state prior to construction.

E38.18 Primus Liner Installation

(a) The HDPE pipe shall be debeaded prior to the installation of the liner.

(b) Contractor shall confirm the needed conditions within the HDPE pipe have been met prior to the liner installation based on the manufacturer's recommendations and requirements.

(c) Installation of the liner shall not occur until the review of all shop drawings have been completed and approved by the Contract Administrator.

E38.19 Record of Construction / Acceptance

(a) Pipeline product shall be installed within the pre-specified alignment and grade tolerance as shown on the drawings and provided in the project specifications.

(b) If abandoning a drilled hole beneath an artificial surface, fill hole with moist bentonite or cementitious grout to prevent future subsidence.

(c) Daily Reports:

(i) Tower Sheets showing equipment, manpower, and activities on an hourly basis.

(ii) Drilling fluid volume (fluid loss/gain) and parameter (weight, viscosity, and sand content) reports.

(iii) Steering survey data.

(iv) Surface monitoring reports.

(v) Water use.

(vi) Safety tailgate meetings and investigations as required.

(d) Submissions within seven (7) days of completion:

(i) As-built information including pipe centerline in plain view and tabulation of coordinates referenced to the drill entry point and to the global survey systems.

(ii) Pipe Pullback Report showing pull force per joint vs. time.

(iii) Drilling Fluid Disposal Report (location, permits, volumes, approvals, testing).

E38.20 Measurement and Payment

(a) Supply and Install of 600mm HDPE DR9 c/w Tracer Wire

(i) This lump sum price shall include, but not limited to, all costs for all requirements to install the HDPE pipe by HDD methods as specified and as shown on the drawings, all costs for additional drill and installation length due to alignment deviation by contractor, all costs for special procedures to drill and install pipe through unforeseen conditions, fusing and pipe support required to ensure the product pipes are not damaged while being moved or stored onsite. 'As-Built' tracking and recording, surface monitoring along alignment, temporary onsite storage and permanent disposal site preparation, disposal of cuttings and drilling fluid, emergency clean-up, equipment and all required testing as specified.

(ii) Be responsible for two attempts at completing an installation prior to consideration of claim or suggesting changed conditions. As HDD is susceptible to difficulties caused

by subsurface ground conditions, if the first attempt at installing a crossing is unsuccessful, an additional attempt will be made along an alternative alignment to complete the installation. If the second attempt is not successful, the Owner will consider payment for additional cost to undertake additional attempts to complete the installation.

(iii) The lump sum price shall include the installation of tracer wire and associated works. Tracer wire shall be installed as per E29.

(iv) The lump sum price shall include all costs for the supply of the pipe to site as specified including pipe bends, hauling, unloading, handling, inspection and testing upon arrival, securing onsite, and transport around site as required.

(v) Item to be paid under this lump sum item is for the design length of HDPE pipe to be installed as detailed on the Drawings. The lump sum shall include all costs for supply of any additional pipe the contractor determines to be required to account for any excessive contractor deviations from the design alignment and ensure the HDPE pipe is installed to the extent as shown on the drawings and as specified.

(vi) The lump sum price shall include all aspects of the preparation, management, and disposal of the drilling fluids, additives, water, mixing and preparation, recycling, temporary storage, and, drilling fluid and resulting cuttings. Drilling fluid waste shall be disposed at an accepting disposal facility. Disposal of waste on private land is not permitted.

(vii) The lump sum price shall also include preparation of the drilling entry and exit pads, use of rig mats, line of site preparation, access road construction and maintenance, entry and exit pad restoration including product pipe end caps and burial after installation, and site security fencing.

(viii) Lump sum price to include pipe fusing, crossing markers, clean-up, restoration of entry and exit pits to pre-construction condition or better and all other work.

(ix) Lump sum price to include supply, fusion, pre-pullback testing, and installation of pipe.

(x) Price to include supply and installation of all bends, tees, reduces, all fittings, blind flanges, including thrust blocks and restraints, cathodic protection, and all other works associated with this installation.

(xi) Price to include supply of imported pipe zone material for all entry and exit pits. Pipe zone material to be placed and compacted as per E24.

(xii) Price to include all water, drilling fluid, polymers, and admixtures required for drilling. There will be no separate payment for disposal of all drilling fluid. Include costs in related sections.

(xiii) Price to include all hydro-excavation or hand excavation to expose existing underground pipelines and franchise utilities are incidental to the directional drilling.

(xiv) Horizontal Direction Drilling listed on Form B: Prices for Supply and Install of 600mm HDPE DR9 c/w Tracer Wire will be paid out in accordance with the following payment schedule:

- 10% paid when the Product Pipe has arrived on site as described herein.
- 30% paid upon completion of Pilot Hole as described herein.
- 30% paid upon completion of Reaming Passes as described herein.
- 30% upon completion of Product Pipe Installation and Pipe pigging and Hydrostatic Pressure Testing as described herein and in E49.

E38.20.1 Conductor Casing listed on Form B: Prices for Supply and Install HDD Conductor Casing will be paid out in accordance with the following payment schedule:

(a) This item shall be paid on a linear meter basis for the installation and removal of entry casing based on actual length installed and removed at the Contract Unit Price of Supply and Install HDD Conductor Casing as described herein.

E38.20.2 The supply and installation of the Primus Liner will not be measured and will be paid for at the Contract Lump Sum Price for "Supply and Install of Primus Liner", which price shall be paid in full for supplying all materials and for performing all operations herein described.

(a) Primus Liner listed on Form B: Prices for Supply and Install of Primus Liner will be paid out in accordance with the following payment schedule:

(i) 50% paid when the Primus Liner and equipment has arrived on site and the installation of the Primus Liner is completed.

(ii) 50% upon completion of Pipe Pigging and Hydrostatic Pressure Testing as described herein and in E49.

PIPE RAMMING OR AUGER BORING TRENCHLESS WORKS

E39. PIPE RAMMING OR AUGER BORING TRENCHLESS CROSSINGS

E39.1 Description

E39.1.1 This Specification supplements and amends CW 2110 and shall cover the trenchless installation of the force main pipe using pipe ramming or auger boring as shown on the Drawings.

E39.2 Materials

E39.2.1 Steel Casing Pipe

(a) Seamless or welded steel pipe: to ASTM A252/A252M. Grade: 2 or better (as indicated in the Contract Documents).

(b) Wall thickness: as shown on the Drawings. Contractor is responsible to independently assess the need to increase the wall thickness based on their estimated installation loads.

(c) End finish: beveled to an angle of 30 +5°, -0°.

(d) Pipe joints: to be complete joint penetration (CJP) groove weld butt joints to CSA W59.

(i) Joints welded from one side without backing are not prequalified CJP groove welds under CSA W59 and require qualification in accordance with CSA W47.1.

E39.2.2 Carrier Pipe

(a) 450 mm PVC AWWA C900 in accordance with E25.

(b) All pipe joints within the steel casing pipe shall be installed with mechanical restraints in accordance with Section E25.

(c) Restrained joints may include welded joints, fused joints, integrally restrained joints, and external mechanically restrained joints.

(d) The Contractor is responsible to ensure that external mechanical restraints will fit properly within the casing pipe and are compatible with the casing spacers.

E39.2.3 Casing Spacers:

(a) Shell/band: 14-gauge steel, 304 stainless or carbon with shop coat.

(b) Risers: 10-gauge steel, 304 stainless or carbon with shop coat, MIG welded to shell/band when runner height extension is required.

(c) Runners: glass reinforced polymer plastic.

(d) Fasteners: 304 stainless steel.

(e) Configuration:

(i) Centered if no backfill grout is specified on the Drawings.

(ii) Centered and restrained if backfill grout is specified on the Drawings.

(iii) The Contractor may elect to use self-restraining casing spacers where applicable.

(iv) The Contractor is responsible to ensure that casing spacers will fit properly within the casing pipe prior to ordering.

E39.2.4 End Seals:

(a) Manufactured end seals: synthetic rubber with 304 stainless steel banding straps.

E39.3 Construction Methods

E39.3.1 Installation of steel casing pipe shall be by auger boring or pipe ramming in accordance with E40 and E41.

E39.4 Measurement and Payment

(a) Trenchless CN Railway Crossing

(i) Trenchless CN Railway Crossing shall be measured on a linear metre basis and paid at the contract unit price for "Trenchless CN Railway Crossing" for either of the approved methods described in E40 and E41. The price shall include all work described herein and includes but shall not be limited to the boring/tunnelling, casing and carrier pipe, end seals, pipe restraints, construction of shafts, bedrock and boulder excavation, supply and installation of excavation support, bedding, backfilling, surface reinstatement and all appurtenances and miscellaneous materials.

(b) Trenchless Bergen Cuttoff Rd Crossing

(i) Trenchless Bergen Cuttoff Rd Crossing shall be measured on a linear metre basis and paid at the contract unit price for "Trenchless Bergen Cuttoff Rd Crossing" for either of the approved methods described in E40 and E41. The price shall include all work described herein and includes but shall not be limited to the boring/tunnelling, casing and carrier pipe, end seals, pipe restraints, construction of shafts, bedrock and boulder excavation, supply and installation of excavation support, bedding, backfilling, surface reinstatement and all appurtenances and miscellaneous materials.

(c) Trenchless Oak Point Hwy Crossing

(i) Trenchless Oak Point Hwy Crossing shall be measured on a linear metre basis and paid at the contract unit price for "Trenchless Oak Point Hwy Crossing" for either of the approved methods described in E40 and E41. The price shall include all work described herein and includes but shall not be limited to the boring/tunnelling, casing and carrier pipe, end seals, pipe restraints, construction of shafts, bedrock and boulder excavation, supply and installation of excavation support, bedding, backfilling, surface reinstatement and all appurtenances and miscellaneous materials.

(d) Measurement for length of pipe will be made horizontally at grade above the centreline of pipe through shafts from drive face of drive shaft to receiving face at receiving shaft.

(e) Repair of damage to underground and surface structures due to surface subsidence and soil heaving caused by the installation will be at the Contractor's own expense.

(f) Bedding and backfill described in E24 will be incidental to the Trenchless Crossings.

(g) Shoring described in E23 will be incidental to the Trenchless Crossings.

E40. AUGER BORING INSTALLATION

General

E40.1 Reference Standards

(a) ASTM International (Latest Edition):

(i) ASTM A252/A252M, Standard Specification for Welded and Seamless Steel Pipe Piles.

(b) CSA Group (Latest Edition):

(i) CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

(ii) CSA A3000, Cementitious Materials Compendium.

(iii) CSA W47.1, Certification of Companies for Fusion Welding of Steel.

(iv) CSA W59, Welded Steel Construction.

(v) CSA Z662, Oil and Gas Pipeline Systems.

E40.2 Action and Informational Submittals

(a) Submit in accordance with E4.

(b) Auger bore work plan:

(i) Submit a detailed description of the auger boring casing installation procedure at least twenty (20) working days prior to the scheduled mobilization for the crossing. The equipment selected by the Contractor shall be compatible with the geologic conditions described within the Geotechnical Reports. The Contractor is solely responsible for evaluating the ground conditions and ensuring the appropriate equipment and installations procedures are employed during the work. The work plan shall include:

(i) Detailed description of the auger boring installation methodology (method statement).

(ii) Auger boring installation equipment specifications and capabilities.

(iii) Description of alignment control and steering systems, including manufacturer's literature.

(iv) Description of thrusting systems and estimate of jacking forces to complete the crossing.

(v) Description of the excavation system including: cutterhead details; tooling; location of the cutterhead relative to the leading edge of the casing; casing banding, shoe, and/or leading-edge reinforcement details; soil plug length (if required, or otherwise specified on the Drawings); and radial overcut dimensions.

(vi) Lubrication system details (if used) including water source, lubricant mix design and proposed additives, rheological properties and planned testing, additive safety data sheets (SDSs), injection system details, and injection pressures.

(vii) Site layout plan including locations and dimensions of all trenchless shafts.

(viii) Shaft excavation Shop Drawings detailing support structures or alternative methods for stabilizing the walls. Support structure Shop Drawings and specifications are required to be authenticated by a Professional Engineer registered to practice in the Province of Manitoba, as required by Manitoba OH&S Legislation.

(ix) Groundwater management plan for shaft excavations and the casing.

(x) Casing pipe jointing procedure, including welding procedure data sheets (WPDSs) and/or welding procedure specifications (WPS) to CSA W47.1.

(xi) Welder qualifications.

(xii) Carrier pipe insertion plan, including carrier pipe jointing procedures and mitigation strategies to limit carrier pipe joint damage and over-insertion/over-belling (where applicable).

(xiii) Contact grout mix design and grouting plan including injection port (locations, type, frequency/spacing, and closure details), and injection pressures.

(xiv) Settlement monitoring plan.

(xv) Contingency procedures to address the following:

- Inadvertent utility strikes, including power, natural gas, water, sewer, or telecommunication lines.
- Obstruction, inability to advance, or damaged tooling/equipment.
- Unexpected ground conditions.
- Deviation from the design line and grade exceeding the specified tolerances.
- Ground movement exceeding the specified tolerances.
- Schedule of the work including sequence of shaft excavations, casing pipe installation, carrier pipe insertion, and shaft backfill.

(c) Product Data:

(i) Submit mill test certificates/mill test reports for the casing pipe steel.

(ii) Submit manufacturer's instructions, printed product literature and data sheets for carrier pipes, casing spacers, casing end seals, joint restraint systems, and shaft backfill materials.

E40.3 Closeout Submittals

(a) Redline Drawings:

(i) Submit final surveyed information noting the casing end locations with northing, easting, and invert elevations.

(ii) Contractor shall indicate any horizontal or vertical deviations between the design line and grade and the actual installation in red colored ink.

(b) Field Notes:

(i) A daily logbook must be kept for all installations and submitted upon crossing completion. The daily logbook shall include, at a minimum:

(i) The position of the casing pipe in relation to the design line and grade.

(ii) The date, starting time, and finish time for each casing pipe segment installed.

(iii) Advance rates.

(iv) Jacking forces.

(v) Quantity and type of lubrication, if used.

(vi) Quantity of spoil excavated.

(vii) Quantity of contact grout, if used, per port, and locations of ports.

(viii) Settlement monitoring survey results.

E40.4 Delivery, Storage and Handling

(a) Deliver, store and handle Materials in accordance 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.

Execution

E40.4.1 Pre-Commencement

(a) All subsurface utilities within 25 m of the proposed alignment must be identified and location marked on the surface. Owners of subsurface utilities within 25 m of the proposed alignment must be notified of the impending work through Click Before You Dig Manitoba or directly if not a member of the service.

(b) Contractor to daylight and protect utility crossings in accordance with the relevant crossing agreements.

E40.4.2 Shaft Excavation

(a) Do excavation Work in accordance with CW 2030 and all relevant Manitoba OH&S Legislation.

(b) Shaft dimensions and means of wall stabilization/support shall be determined by the Contractor based on the site conditions and constraints, anticipated ground and groundwater conditions, and the proposed trenchless installation equipment.

(c) Shaft dimensions shall conform to constraints specified on the Drawings.

(d) Support structures shall be designed and authenticated by a Professional Engineer registered to practice in the Province of Manitoba, as required by Manitoba OH&S Legislation.

(e) The Contractor shall manage the inflow of groundwater and surface water as required to keep working pits free of water during the performance of the work.

E40.4.3 Auger Boring Casing Installation

(a) The Contract Administrator must be notified 48 hours in advance of starting work. Trenchless crossings shall not begin until the Contract Administrator is present at the job site and agrees that proper preparations for the operation have been made. The Contractor's approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract.

(b) The Contractor is responsible to establish and use benchmarks to furnish and maintain all reference lines and grades for any guidance systems used and is fully responsible for the accuracy of the work and any corrections. Guidance systems shall be mounted independently from the thrust block and jacking frame.

(c) Install casing pipe as required to satisfy the line and grade of the carrier pipe as shown on the Drawings, the tolerance for line shall be ± 100 mm horizontal deviation and the tolerance for grade shall be ± 100 mm vertical deviation.

(d) If the casing pipe installation does not meet the specified tolerances for line and grade, the Contractor shall correct the installation including any necessary redesign of the pipeline or structures and acquisition of necessary easements. Corrective work shall be completed at no additional cost to the Owner and is subject to approval by the Contract Administrator.

(e) Trenchless installations shall be executed such that settlement and/or heave is minimized, the in-place steel casing shall have full bearing against earth, and no voids are left in any portion of the Work.

(f) A soil plug at the leading edge of the casing shall be maintained when specified (and applicable for the installation methodology). The soil plug length shall be a minimum of one times the casing diameter unless a greater length is otherwise specified.

(g) The Contractor shall monitor spoil material, quantity, and consistency, and make suitable changes to the trenchless installation method to control ground movements and minimize over excavation as required.

(h) Spoil material from the trenchless operations shall be disposed of off-site by the Contractor at an appropriate facility.

(i) Spoil material demonstrating unexpected ground conditions must be stored on site for review by the Contract Administrator.

(j) The Contractor shall monitor jacking and ensure that installation forces remain below the axial capacity of the casing pipe and welded pipe joints.

(k) Lubrication to reduce skin friction may be used at the Contractor's discretion. If lubrication is used, pressures must be kept below the confining pressure of the overlying ground, which shall be estimated as the vertical earth pressure to the casing

crown (total stress model) unless otherwise estimated by the Contractor using an industry recognized model (e.g., Delft Equation, Queen's Method, etc.).

(l) The Contractor is responsible for the inspection of all welds. Support the pipe segments in the shaft and tack weld as required to ensure a straight joint before full circumferential welding. Complete welding in accordance with the submitted WPS and/or WPDSs.

(m) If it is necessary to abandon a crossing, the casing and any overcut shall be filled with grout. Equipment that is not internally retrievable in locations where surface intervention/rescue is not permitted will be abandoned in place.

E40.4.4 Carrier Pipe Inspection

(a) Handle and join carrier pipes in accordance with CW 2110.

(b) Use approved blocking method to guide carrier pipe into casing in true alignment.

(c) Place casing spacers within 0.3 m of carrier pipe joints.

(d) Spacers for the remaining pipe barrel shall not exceed a separation of 1.8 m, or less, as based on manufacturer's recommendations for carrier pipe support.

(e) Place casing spacers within 0.3 m of each end of the casing.

(f) Clearance between casing spacer risers and the casing pipe shall be a maximum of 25 mm when carrier pipe is in position in a centered and restrained spacer configuration.

(g) Join carrier pipes one length at a time outside of the casing. Push or pull the carrier pipe into position.

(i) Prevent over-insertion/over-belling of the carrier pipe joints if the pipe is pushed into position.

(ii) Prevent separation of the carrier pipe joints if the pipe is pulled into position.

(h) Place end seals on each end of the casing.

(i) Manufacturer's recommendations for installation shall be followed where applicable.

E40.4.5 Shaft Backfill

(a) Backfill shafts with flowable cement-stabilized fill.

(b) The Contractor shall implement measures to avoid flotation of the carrier pipe within the shaft; measures may include placement of unshrinkable fill in small lifts, ballasting/weighting of the carrier pipe, and/or anchoring/blocking of carrier pipe.

Measurement and Payment

E40.4.6 Auger Boring

(a) There shall be no separate measurement or payment for the work associated with Auger Boring Installation. Payment for Auger Boring Installation and all associated works shall be included in the price for either Trenchless CN Railway Crossing, Trenchless Bergen Cutoff RD Crossing, or Trenchless Oak Point Hwy Crossing.

E41. PIPE RAMMING INSTALLATION

General

E41.1 Reference Standards

(a) ASTM International (Latest Edition):

(i) ASTM A252/A252M, Standard Specification for Welded and Seamless Steel Pipe Piles.

(b) CSA Group (Latest Edition):

(i) CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

(ii) CSA A3000, Cementitious Materials Compendium.

(iii) CSA W47.1, Certification of Companies for Fusion Welding of Steel.

(iv) CSA W59, Welded Steel Construction.

(v) CSA Z662, Oil and Gas Pipeline Systems.

E41.2 Action and Informational Submittals

(a) Submit in accordance with E4.

(b) Pipe ramming work plan:

- Submit a detailed description of the pipe ramming casing installation procedure at least twenty (20) working days prior to the scheduled mobilization for the crossing. The equipment selected by the Contractor shall be compatible with the geologic conditions described within the geotechnical investigation. The Contractor is solely responsible for evaluating the ground conditions and ensuring the appropriate equipment and installations procedures are employed during the work. The work plan shall include:
- Detailed description of the pipe ramming installation methodology (method statement).
- Pipe ramming installation equipment specifications and capabilities.
- Description of alignment control and steering systems, including manufacturer's literature.
- Description of ramming systems and estimate of ramming forces to complete the crossing.
- Casing leading -edge reinforcement details.
- Description of the timing and method of spoil removal.
- Lubrication system details (if used) including water source, lubricant mix design and proposed additives, rheological properties and planned testing, additive safety data sheets (SDSs), injection system details, and injection pressures.
- Site layout plan including locations and dimensions of all trenchless working pits.
- Working pit excavation Shop Drawings detailing support structures or alternative methods for stabilizing the walls. Support structure Shop Drawings and specifications are required to be authenticated by a professional engineer registered to practice in the Province of Manitoba, as required by Manitoba OH&S Legislation.
- Groundwater management plan for working pit excavations and the casing.
- Casing pipe jointing procedure, including welding procedure data sheets (WPDSs) and/or welding procedure specifications (WPS) to
- CSA W47.1.
- Welder qualifications.
- Carrier pipe insertion plan, including carrier pipe jointing procedures and mitigation strategies to limit carrier pipe joint damage and over-insertion/over-belling (where applicable).
- Contact grout mix design and grouting plan including injection port (locations, type, frequency/spacing, and closure details), and injection pressures.
- Settlement monitoring plan.
- Contingency procedures to address the following:
- Inadvertent utility strikes, including power, natural gas, water, sewer, or telecommunication lines.

- Obstruction, inability to advance, or damaged tooling/equipment.
- Unexpected ground conditions.
- Deviation from the design line and grade exceeding the specified tolerances.
- Ground movement exceeding the specified tolerances.
- Schedule of the work including sequence of working pit excavations, casing pipe installation, carrier pipe insertion, contact grouting (where applicable), backfill grouting (if specified), and working pit backfill.

(c) Product Data:

(i) Submit mill test certificates/mill test reports for the casing pipe steel.

(ii) Submit manufacturer's instructions, printed product literature and data sheets for carrier pipes, casing spacers, casing end seals, joint restraint systems, and working pit backfill materials.

E41.3 Closeout Submittals

(a) Redline Drawings:

(i) Submit final surveyed information noting the casing end locations with northing, easting, and invert elevations.

(ii) Contractor shall indicate any horizontal or vertical deviations between the design line and grade and the actual installation in red colored ink.

(b) Field Notes:

(i) A daily logbook must be kept for all installations and submitted upon crossing completion. The daily logbook shall include, at a minimum:

- The position of the casing pipe in relation to the design line and grade.
- The date, starting time, and finish time for each casing pipe segment installed.
- Advance rates.
- Hammer strokes per minute.
- Quantity and type of lubrication, if used.
- Quantity of spoil excavated.
- Quantity of contact grout, if used, per port, and locations of ports.
- Settlement monitoring survey results.

E41.4 Delivery, Storage, and Handling

(a) Deliver, store and handle Materials in accordance with Section 01 10 00 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.

Execution

E41.5 Pre-Commencement

(a) All subsurface utilities within 25 m of the proposed alignment must be identified and location marked on the surface. Owners of subsurface utilities within 25 m of the

proposed alignment must be notified of the impending work through Click Before You Dig Manitoba or directly if not a member of the service.

(b) Contractor to daylight and protect utility crossings in accordance with the relevant crossing agreements.

E41.6 Working Pit Excavations

(a) Do excavation Work in accordance with CW 2030 and all relevant Manitoba OH&S Legislation.

(b) Working pit dimensions and means of wall stabilization/support shall be determined by the Contractor based on the site conditions and constraints, anticipated ground and groundwater conditions, and the proposed trenchless installation equipment.

(c) Working pit dimensions shall conform to constraints specified on the Drawings.

(d) Support structures shall be designed and authenticated by a professional engineer registered to practice in the Province of Manitoba, as required by Manitoba OH&S Legislation.

(e) The Contractor shall manage the inflow of groundwater and surface water as required to keep working pits free of water during the performance of the work.

E41.7 Pipe Ramming Casing Installation

(a) The Engineer must be notified 48 hours in advance of starting work. Trenchless crossings shall not begin until the Engineer is present at the job site and agrees that proper preparations for the operation have been made. The Engineer's approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract.

(b) The Contractor is responsible to establish and use benchmarks to furnish and maintain all reference lines and grades for any guidance systems used and is fully responsible for the accuracy of the work and any corrections. Guidance systems shall be mounted independently from the track and hammer.

(c) Install casing pipe as required to satisfy the line and grade of the carrier pipe as shown on the Drawings, the tolerance for line shall be ± 100 mm horizontal deviation and the tolerance for grade shall be ± 100 mm vertical deviation.

(d) If the casing pipe installation does not meet the specified tolerances for line and grade, the Contractor shall correct the installation including any necessary redesign of the pipeline or structures and acquisition of necessary easements. Corrective work shall be completed at no additional cost to the Owner and is subject to approval by the Engineer.

(e) Trenchless installations shall be executed such that settlement and/or heave is minimized, the in-place steel casing shall have full bearing against earth, and no voids are left in any portion of the Work.

(f) The Contractor shall monitor spoil material, quantity, and consistency, and make suitable changes to the trenchless installation method to control ground movements and minimize over excavation as required.

(g) Spoil material from the trenchless operations shall be disposed of off-site by the Contractor at an appropriate facility.

(h) Spoil material demonstrating unexpected ground conditions must be stored on site for review by the Engineer.

(i) The Contractor shall monitor ramming forces and ensure that installation forces remain below the axial capacity of the casing pipe and welded pipe joints.

(j) Lubrication to reduce skin friction may be used at the Contractor's discretion. If lubrication is used, pressures must be kept below the confining pressure of the overlying ground, which shall be estimated as the vertical earth pressure to the casing

crown (total stress model) unless otherwise estimated by the Contractor using an industry recognized model (e.g., Delft Equation, Queen's Method, etc.).

(k) The Contractor is responsible for the inspection of all welds. Support the pipe segments in the working pit and tack weld as required to ensure a straight joint before full circumferential welding. Complete welding in accordance with the submitted WPS and/or WPDSs.

(l) On completion of trenchless crossings, contact grout the annular space between the casing pipe and the ground and any voids outside the casing pipe.

(m) If it is necessary to abandon a crossing, the casing and any overcut shall be filled with grout. Equipment that is not internally retrievable in locations where surface intervention/rescue is not permitted will be abandoned in place.

E41.8 Carrier Pipe Insertion

(a) Handle and join carrier pipes in accordance with CW 2110.

(b) Use approved blocking method to guide carrier pipe into casing in true alignment.

(c) Place casing spacers within 0.3 m of carrier pipe joints or immediately outside of external mechanical joint restraints (if used).

(d) Spacers for the remaining pipe barrel shall not exceed a separation of 1.8 m, or less, as based on manufacturer's recommendations for carrier pipe support.

(e) Place casing spacers within 0.3 m of each end of the casing.

(f) Clearance between casing spacer risers and the casing pipe shall be a maximum of

(g) 25 mm when carrier pipe is in position in a centered and restrained spacer configuration.

(h) Join carrier pipes one length at a time outside of the casing. Push or pull the carrier pipe into position.

(i) Prevent over-insertion/over-belling of the carrier pipe joints if the pipe is pushed into position.

(j) Prevent separation of the carrier pipe joints if the pipe is pulled into position.

(k) Place end seals on each end of the casing.

(l) Manufacturer's recommendations for installation shall be followed where applicable.

E41.9 Working Pit Backfill

(a) Backfill working pits with flowable cement-stabilized fill.

(b) The Contractor shall implement measures to avoid flotation of the carrier pipe within the working pit; measures may include placement of unshrinkable fill in small lifts, ballasting/weighting of the carrier pipe, and/or anchoring/blocking of carrier pipe.

Measurement and Payment

E41.10 Pipe Ramming

(a) There shall be no separate measurement or payment for the work associated with Pipe Ramming Installation. Payment for Pipe Ramming Installation and all associated works shall be included in the price for either Trenchless CN Railway Crossing, Trenchless Bergen Cutoff RD Crossing, or Trenchless Oak Point Hwy Crossing.

E42. CN RAILWAY RIGHT OF WAY CROSSING REQUIREMENTS

E42.1 Description

E42.1.1 This Specification covers the potential costs borne by the Contractor imposed by CN Railway in order to comply with the Crossing agreement. The crossing agreement must be adhered to for all Work shown on the Drawings within the CN right-of-way.

E42.1.2 Installation through the CN right-of-way is subject to the additional requirements of the railway. The following documents shall apply:

(a) Safety Guidelines for Contractors Working – Annex D – July 2012 (CN)

(b) Geotechnical Requirements GEO-Form 2 (CN)

(c) A Guide to Water / Sewer Pipeline Applications (CN)

(d) Pipeline Crossing / Encroachment Application Form (Water/Sewer) (CN)

(e) Standards Respecting Pipeline Crossings Under Railways – TC E-10 (Transport Canada)

E42.1.3 Crossing Agreement

(a) The installation of the pipeline through the CN right-of-way is dependent on the execution of a crossing agreement between the City of Winnipeg and CN. KGS Group will submit the crossing agreement on behalf of the City consisting of Drawings 13496, 13498 and a geotechnical assessment report. The complete submittal package is included in Appendix E. These appendix documents are for information only and do not form part of the Contract. CN has not yet formally approved the crossing application nor has the crossing agreement been executed. It is anticipated that the agreement will be fully executed in advance of commencement of the Trenchless Work.

(b) Railway Track Monitoring Plan

(i) Details of the monitoring plan as identified in Section E17.

E42.2 Submittals

E42.2.1 The Contractor shall submit an Emergency Response Plan outlining the steps to be followed if the event of excessive soil loss or settlement. The Emergency Response Plan shall include the location and contact information for the nearest cement or grout plant to address voids/sinkholes. The Contractor shall also determine with the CN Roadmaster the nearest source of ballast material should tamping/resurfacing of the railway track be required.

E42.3 Methods

E42.3.1 The Contractor is responsible for all coordination with CN and any fees required to meet the CN requirements before and during the Work.

E42.3.2 Flagging and Signals

(a) All charges for flagging and signals protection incurred to complete the work listed herein, in the geotechnical report, and shown on Drawings shall be paid by the Contractor.

(b) Prior to the start of construction, a minimum notice of fourteen working days must be given to CN to arrange flagging protection.

E42.3.3 Settlement and Construction Monitoring

(a) Refer to Section E17 and the Drawings for monitoring requirements for railway monitoring.

E42.3.4 Railway Safety

(a) Comply with CN Safety Guidelines for Contractors (Annex D, July 2012), including training, protective equipment and procedures.

E42.3.5 Emergency Response Plan

(a) If an urgent or near urgent defect is detected during monitoring, an on-site meeting shall be conducted to determine the cause of the defect and remedial action.

(b) The Contractor will be required to carry-out remedial action as directed by the Contract Administrator and agreed upon by CN.

E42.4 Measurement and Payment

(a) Costs incurred by the Contractor from CN associated with the Work shown on the Drawings and described within the Specifications within the CN right-of-way, will be paid from the allowance under the Contract Unit Price “CN Right-of-Way Crossing Requirements”.

(b) The costs paid shall be the actual invoiced costs and any allowable mark-ups as stated within the General Conditions.

CHAMBERS AND APPURTENANCES

E43. PRE-CAST CONCRETE CHAMBERS

E43.1 Description

E43.1.1 This Specification applies to the following chambers as shown on the Drawings:

(a) Combination Air Valve Chambers 1 – 6

(b) MH-01

(c) MH-02

(d) MH-03

E43.1.2 All valves shall close clockwise with black operating nuts.

E43.2 Submittals

E43.2.1 Submit shop drawings for each chamber listed on the Drawings in accordance with E4.

E43.3 Materials

(a) Pre-cast concrete structures as per CW 2130 and the Drawings.

(i) Combination Air Valve Chambers 1, 4, 5, 6, MH-02 and MH-03 to be 750 mm frame and solid cover as per CW 2130.

- Combination Air Valve Chambers 1, 4, 5, 6 and MH-03 to also include manhole lid carbon filter. Approved product SweetStreet Manhole Odour Control Module or approved equivalent in accordance with B8.

(ii) Combination Air Valve Chambers 2 and 3, and MH-01 to be 750 mm frame and sealed water tight cover.

- Approved product Titan Foundry TF-153 frame and water tight cover or approved equivalent in accordance with B8.

(b) Internal piping and fittings as per Section E43.5(b).

(c) Valves as per Section E45.

(d) Insulation shall be polyurethane spray foam, minimum 50 mm thick.

E43.4 Construction Methods

(a) Chamber installation as per CW 2130 and as shown on the Drawings.

(b) Chamber piping and fitting installation as per E43.5(b).

(c) Valve installation as per E45.

(d) Spray applied polyurethane insulation may be factory or field applied, in accordance with manufacturer's recommendations.

E43.5 Measurement and Payment

(a) Supply and installation of Pre-Cast Concrete Chambers will not be measured and will be paid for at the Lump Sum Price for each type of “Pre-Cast Concrete Chambers” installed which shall be payment in full for all excavation, backfill, mounding of soils around chamber, supply and installation of pre-cast concrete chambers, insulation, threaded

valves, piping, spool pieces, fittings, vent stacks, appurtenances, miscellaneous metals and performing all operations herein described and as shown on the Drawings, and all other items incidental to the Work.

(b) Further to (a), chamber piping and fittings shall be considered incidental to the cost of "Pre-Cast Concrete Chambers" up to and including the transition flange outside the chamber wall, as well as PVC flange adapters and any other fittings or appurtenances required to connect PVC piping to the chamber piping.

(c) Further to (a), supply and installation of pre-cast large diameter manhole structures (MH-01, MH-02, and MH-03) as described herein and as shown on the Drawings will be measured and paid in accordance with E33 (Large Diameter Manhole).

E44. PIPING, FITTINGS AND MISCELLANEOUS METAL FABRICATIONS

E44.1 Description

(a) General

(i) This Specification shall cover the supply, fabrication, transportation, handling, delivery and placement of piping, fittings and metal fabrications for all pre-cast concrete chambers.

(ii) All piping and fittings shall be designed for an operating pressure of 700 kilopascals and a test pressure of 1,000 kilopascals.

E44.2 Submittals

(a) Submit the qualifications of the fabricator and welders to the Contractor Administrator for acceptance.

(b) Submit shop drawings in accordance with E4.

E44.3 Materials

E44.3.1 All materials shall be of a type acceptable to the Contract Administrator and shall be subject to inspection and testing by the Contractor Administrator.

E44.3.2 Material intended for use in the various assemblies shall be new, straight, clean, with sharply defined profiles.

E44.3.3 Chamber Piping:

(a) Chamber piping:

(i) Ductile iron piping conforming to AWWA C151.

(ii) Carbon steel ASTM A53, ERW, Black, XS wall thickness except pipe lengths passing through concrete wall shall be schedule 40.

(b) Manhole Venting: Passive Vent DN150 SCH. 40S 304 SS Pipe complete with Vent Stack Odour Control

- Approved Product for Odour Control – Sweetvent Vent Stack Odour Control

(c) Fittings:

(i) Carbon steel, butt-weld, ASTM A234-WPB, XS wall thickness.

(ii) Grooved: Cast fittings ductile iron conforming to ASTM A536, Grade 65-45-12. Segmentally welded fittings or pipe conforming to ASTM A53 grade B, XS wall thickness.

(d) Flanges: Carbon steel, ASTM A105, B16.5, slip-on, 150#, flat-face.

(e) Flange gaskets: full face, neoprene, 3 mm thick.

(f) Flange bolting: ASTM A193-B8M Class 2 Type 316 stainless steel bolts, ASTM A194 8M Type 316 stainless steel heavy hex nuts coated with anti-galling compound.

(g) On mechanically coupled pipe ends, grooved ends shall be formed by roll forming that does not reduce the pipe wall thickness at the groove. Cut grooves shall not be permitted.

(h) Couplings: flexible coupling, ductile iron, ASTM A536 Gr. 65-45-12, epoxy coated, EPDM flush-type gasket, zinc plated carbon steel bolts and heavy hex nuts.

(i) Acceptable products:

(i) Couplings (Rigid): Victaulic styles W07, 107V

(ii) Couplings (Flex): Victaulic style W77

(iii) Couplings (Fittings): Victaulic AGS

(iv) or approved equal in accordance with B8.

E44.3.4 Finishes

(a) All valve chamber piping and fittings shall be epoxy coated on the interior and exterior. Coatings shall be liquid epoxy or as an alternative, fusion bonded epoxy.

(b) Field applied coatings and touch-up for valve chamber piping shall be a liquid epoxy.

(c) Liquid Epoxy Coatings

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

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

(iii) Interior pipe linings shall be 100% solids liquid epoxy product. Approved products:

- International Enviroline 230,
- International Bar-Rust 234P,
- Specialty Polymer Coatings SP-7888,
- Or approved equal in accordance with B8.

(d) Exterior pipe linings for all exposed steel piping, valves, and actuators shall be Polyamide Epoxy. Approved products:

(i) International Enviroline 230,

(ii) International Bar-Rust 234P,

(iii) Specialty Polymer Coatings SP-7888,

(iv) Tnemec Series N140F Pota-Pox Plus,

(v) PPG Amerlock 2,

(vi) Or approved equal in accordance with B8.

(e) Fusion Bonded Epoxy Coatings

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

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

E44.3.5 Threaded Valves

(a) Small diameter threaded ball valves (75 mm diameter and smaller) shall be two-piece brass / bronze, full port, 600 psi (4000 kPa) cold working pressure. Direction of opening shall be counter-clockwise and shall be indicated on the handle.

(b) Acceptable manufacturer; Crane, Jenkins, Kennedy, Mueller, or approved equal in accordance with B8.

E44.3.6 Threaded Piping, Fittings and Flanges

(a) Small diameter brass threaded piping, fittings and flanges (75mm diameter and less) shall be cast red brass conforming to ASTM B43 or cast bronze conforming to ASTM

B62. Flange dimension and drilling shall be in accordance with ANSI B16.24 – Class 150.

(b) Small Diameter steel threaded fittings and flanges (75mm diameter and less) shall accordance with ANSI B16.5 - Class 150.

(c) Small diameter steel pipe nipples shall be Schedule 80 steel.

E44.3.7 Galvanic Anodes

(a) Galvanic anodes for cathodic protection of buried ferrous pipes and fittings shall be 10.9 kg pre-packaged zinc anodes to meet CW 2110.

E44.3.8 Chamber Wall Thrust Restraints

(a) Thrust restraints shall be installed within all combination air valve manhole chamber walls as shown on the Drawings.

E44.4 Construction Methods

(a) Fabrication

(a) Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured. Assemble work in such a way that no disfigurements will show in the finished work or impair the strength.

(b) Confirm measurements for all fabrications before fabricating.

(c) Pieces shall be of the sizes indicated on the Drawings and shall not be built up from scrap pieces. Confirm sizes with field measurements.

(d) Where possible, fit work and shop assemble, ready for erection.

(e) Remove and grind smooth burrs, filings, sharp protrusions, and projections from metal fabrications to prevent possible injury. Correct any dangerous or potentially harmful installations as directed by Contract Administrator.

(f) All steel welding shall conform to CSA Standard W59. Fabricator shall be fully approved by the Canadian Welding Bureau, in conformance with CSA Standard W.47.1. Welding shall be done by currently licensed welders only.

(g) Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

(h) Seal exterior steel fabrications to provide corrosion protection in accordance with CAN3-S16.1.

(i) Use self-tapping shake-proof flat-headed screws on items requiring assembly by screws.

(b) Erection

(a) Do steel welding work in accordance with CSA W59 and aluminum welding work in accordance with CSA W59.2

(b) Erect metalwork in accordance with reviewed shop drawings, square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

(c) Provide suitable means of anchorage acceptable to Contract Administrator such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles where not specifically indicated on the Drawings.

(d) Provide components for building in accordance with shop drawings and schedule.

(e) Make field connections with bolts to CAN/CSA-S16, or weld.

(f) Touch-up rivets, bolts and burnt or scratched surfaces that are to receive paint finish, with zinc primer after completion of erection.

(g) Install electrochemical isolation gaskets and sleeves to electrically isolate dissimilar metals in accordance with

E44.4.1 Flange Isolation Kits

(a) Flange isolation kits shall be used where noted, where dissimilar metal piping or fittings are joined.

(b) Flange isolation kits shall be to City of Winnipeg Specification except as modified below.

(c) Each kit shall be a double flange isolation kit with insulating sleeves and washers for each flange of the bolted connection.

(d) Bolt sleeves shall be comprised of G10 or G11 epoxy glass.

E44.4.2 Installation of Lead Wires, Continuity Bonding and Galvanic Anodes

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

(b) Thermite Welding Procedure:

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

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

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

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

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

E44.4.3 Install chamber wall thrust restraints as shown on the Drawings and as recommended by the manufacturer.

(a) Restraint devices shall be coated with Mega-Bond as per manufacturer's recommendations.

E44.5 Measurement and Payment

(a) There shall be no separate measurement or payment for the work associated with the supply, fabrication, transportation, handling, delivery and placement of all chamber piping, fittings, miscellaneous metals and appurtenances. Payment for Piping, Fittings and Miscellaneous Metal Fabrications shall be included in the Contract Lump Sum price for "Pre-Cast Concrete Chambers" and "Large Diameter Manhole".

E45. MISCELLANEOUS VALVES AND APPURTENANCES

E45.1 Description

E45.1.1 This Specification applies to valves within the following chambers as shown on the Drawings:

(a) Combination Air Valve Chambers 1 - 6

E45.1.2 All valves shall be designed for a minimum working pressure of 1000 kPa.

E45.2 Submittals

E45.2.1 Submit shop drawings for each valve shown on the Drawings in accordance with E4.

E45.3 Materials

E45.3.1 Combination Air Valves

(a) Combination air valves shall have the following certifications:
  (i) AWWA C512

(b) Combination air valves:
  (i) 50 mm threaded inlet with an orifice size of 4.76 mm and a minimum operating pressure of 1000 kPa.
  (ii) Materials:
    - Body/Neck/Cover/Float: 316 stainless steel
    - Elastomers: EPDM
  (iii) Approved product: 50 mm threaded Bermad C50-N without surge protection or approved equal in accordance with B8.

E45.4 Construction Methods

(a) Valve installation as per CW 2110 and manufacturer's recommendations.

E45.5 Measurement and Payment

(a) There shall be no separate measurement or payment for the work associated with the supply, fabrication, transportation, handling, delivery and placement of combination air valves, fittings, and appurtenances. Payment for Miscellaneous Valves and Appurtenances shall be included in the Contract Lump Sum price for "Pre-Cast Valve Chambers" and "Large Diameter Manhole".

CONNECTIONS AND COMMISSIONING

E46. SEWER MAIN CONNECTION TO MH-04

E46.1 As noted on the Drawings and Form B, this Work is included as a Provisional Item. It is anticipated that MH-04 (By Other – Interceptor) and Air Gap Manhole (By Other – Feeder Main) will be installed by the time the force main piping crosses the location between MH-04 (By Other – Interceptor) and the Air Gap Manhole (By Others – Feeder Main).

E46.2 If the connection to MH-04 hasn't been completed the Contractor shall install the 375 SDR35 PVC WWS as follows:

(a) Remove the 375 mm PVC SDR35 WWS end cap/temporary plug at the end of the existing 375 mm PVC SDR35 WWS, just outside the Air Gap Manhole.

(b) Connect to existing 375 mm PVC SDR35 WWS and install 16m of 375mm PVC SDR35 from the Air Gap Manhole to MH-04.

(c) Install Provisional – MH-04 Connection Detail as shown on Drawing 13494.
  (i) Supply and install heavy duty flap gate with round opening. Approved product: HydroGate Model 50C or approved equal in accordance with B8. Provide suitable PVC flange adapter.
  (ii) Supply and install drop piping inside MH-04 as shown on the Drawings and as per the manufacturer's recommendations.

E46.3 The Contractor shall not proceed with the Provisional Work items listed above unless directed by the Contract Administrator.

E46.4 Measurement and Payment

(a) Sewer Main Connection to MH-04 will not be measured and will be paid for at the Lump Sum Price for "Sewer Main Connection to MH-04" which shall be payment in full for all excavation, temporary shoring, backfill, piping, fittings, appurtenances and performing all operations herein described, and all other items incidental to the Work.

E47. COMMISSIONING PLAN

E47.1 Refer to Appendix F for a sample commissioning plan, including minimum requirements and expectations. The Contractor may submit an alternate commissioning procedures to the Contractor Administrator as described below.

E47.2 The Contractor shall submit their proposed Commissioning Plan to the Contract Administrator for approval at least twenty (20) Working Days prior to the proposed commissioning date. At a minimum, the Commissioning Plan shall take into account all activities described in the sample commissioning plan provided in Appendix F. The Commissioning Plan shall include timelines and step-by-step procedures for the following tasks:

(a) Force main pigging,

(b) Force main hydrostatic leakage testing;

(c) Proposed locations of bleeder lines and dewatering operations.

(d) Proposed locations and methods for dechlorinating (if required) and disposal of chlorinated water.

(e) Proposed methods for metering the volume of water used for commissioning.

E47.3 Commissioning of each of the items listed above shall paid as described in E49.

E48. WATER SUPPLY FOR COMMISSIONING WORK

E48.1 Further to Specifications CW 1120, Section 3.1 and CW 2125, water supply for the Work may be taken from City of Winnipeg hydrants or from the standpipe near Feeder Main Offtake Structure 3 (OS 3) in accordance with the following:

(a) Water for filling, pigging and commissioning the force main may be obtained from the standpipe near OS 3 by opening the 750 mm butterfly valve in OS 2, as described in Appendix F.

(i) Water used for commissioning in this manner shall be metered at the standpipe near OS 3 or via an alternative measurement method approved by the Contract Administrator.

(b) Alternatively, water may be obtained from fire hydrants for all commissioning or general construction activities in accordance with the following:

(i) Only hydrants approved by Water Services Division (WSD) shall be used for water supply.

(ii) The Contractor shall supply and use a Backflow Protection Arrangement as shown on Standard Drawing SD-019 when taking water from City hydrants. Alternatively, the Contractor may rent the Backflow Protection Arrangement from the WSD if available. WSD will supply a meter and locks for the Backflow Protection Arrangement.

(iii) The Contractor is permitted to turn approved hydrants on and off provided the Contractor has received training from the Water Services Division and the turn-ons and turn-offs are done in the presence of the Contract Administrator.

(iv) Hydrants approved for use shall be considered to be "in the Contractor's control" from the time the City has turned the hydrant on until the Contractor has notified the City the hydrant is no longer being used and the meter box has been removed.

(v) Between November 1 and April 30 of any year, the Contractor shall take all necessary precautions to prevent freezing of hydrants and related appurtenances for hydrants in their control and shall be responsible to pump out hydrants turned off by Emergency Services. Heating and hoarding of hydrants will be required by the

Contractor when the ambient air temperature reaches below 0°C at any time during the period of time under which the hydrant is in the Contractor's Control.

(vi) If a hydrant or appurtenance is damaged due to freezing or improper turn-on or turn-off procedures while in the Contractor's control, WSD will assess the damage and determine if WSD will repair the damage or if the Contractor will be responsible to repair the damage. Costs for repairs completed by WSD will be deducted from payments owing the Contractor. Repairs completed by the Contractor will be at the Contractor's expense.

(vii) Erect and maintain signage (bump signs) warning oncoming traffic of hose crossings to the satisfaction of the Contract Administrator and the Manual of Temporary Traffic Control.

(viii) Direct hook-up of pipeline flushing equipment to a hydrant is not permitted unless approved by the Contract Administrator.

(ix) WSD may instruct the Contractor to make other arrangements for hydrant turn-ons and turn-offs. The Water Services Division of the City's Water and Waste Department will provide and install metering equipment once a permit has been obtained.

E48.2 All water used from City sources must be metered and paid for by the Contractor. Water used will be billed to the Contractor at the most current Water Rate published on the City's website.

(a) Should the Contractor dispose of water used for commissioning into the City's sewer system, then the most current Sewer Rate published on the City website will also be billed to the Contractor at the metered volume of water usage.

E48.3 Measurements and Payment

(a) There will be no separate measurement or payment for permits or equipment, water usage and water disposal and it will be considered incidental to the Work being done.

E49. PIGGING AND HYDROSTATIC LEAKAGE TESTING OF FORCE MAIN

E49.1 Description:

(a) Pipe pigging and hydrostatic pressure testing shall be completed for all force main piping.

E49.2 General:

(a) Complete all Works in accordance with CW 2125 except as amended below.

(b) Pigging and hydrostatic leakage testing must be witnessed by the Contract Administrator.

(c) Piping may only be tested after complete backfilling of the trench.

(d) The Contractor shall be responsible for all installing all bleeder lines and dewatering operations required to complete the works.

(e) Submit Commissioning Plan in accordance with Section E47.

E49.3 Pipe Pigging

(a) Pigs shall be medium density urethane bullet type and shall have a diameter of at least 50 mm larger than the largest nominal pipe diameter.

(i) Force mains shall be pigged with a minimum four pigs. Two wire brush scrubbing pigs and two foam swabs shall be used.

(ii) Pigs shall be able to traverse standard piping configurations such as 45-degree elbows and tees.

(b) Insert pigs, ensuring that the pipe in front of the pig is at least 25% full of water while pigging.

(i) As part of the Commissioning Plan, the Contractor submit their proposed method for inserting and retrieving pigs from the force main.

(ii) Ensure the water fill rate behind the pigs is at a constant rate, providing a minimum velocity of 0.3 m/s.

(c) Ensure no air is introduced into the pipe after pigging and before leakage testing.

E49.4 Hydrostatic Leaking Testing for PVC Pipe

(a) After pigging is completed, the Contractor shall complete hydrostatic leakage testing in accordance with CW 2125 and AWWA C605.

(i) Apparent leakage for 450 mm PVC force mains shall meet the requirements of Table CW 2125.2.

(b) Testing shall be completed in the shortest segments possible (between valves) unless otherwise approved by the Contract Administrator.

E49.5 Hydrostatic Leaking Testing for HDPE Pipe

(a) Hydrostatic leakage testing of HDPE piping must be completed separately from hydrostatic leakage testing of PVC piping and the Primus Liner.

(b) Complete testing in accordance with AWWA M55 – PE Pipe – Design and Installation and ASTM F2164 – Standard Practice for Field Leak Testing of Polyethylene (PE) and Crosslinked Polyethylene (PEX) Pressure Piping Systems Using Hydrostatic Pressure.

(c) Provide labour, equipment, and materials to perform the hydrostatic test hereinafter described.

(d) Notify the Contract Administrator at least 48 hours in advance of all proposed tests. Contractor to confirm that test sections will maintain pressure prior to the Contract Administrator being on site. Perform all subsequent tests in the presence of the Contract Administrator.

(e) Pipe will be tested only after complete backfilling of trench.

(f) No testing is allowed during freezing weather, unless approved by the Contract Administrator. In such case, the Contractor shall protect valves, joints and fittings, ditch, road surface and including the test are free from ice.

(g) Strut and brace caps, bends, tees, and valves, to prevent movement when the test pressure is applied.

(h) Expel air from the pipe by slowly filling the pipe with potable water. Install corporation stops at any high points in the pipe where no air-vacuum release valves are installed. Remove stops after satisfactory completion of test and seal holes with plugs.

(i) Fill and pressurize the pipe before the test to allow for initial pipe expansion before initiating the hydrostatic test.

(j) During the expansion phase, when the test section is filled and purged of air, gradually increase pressure in the test section to the required test pressure of 1.5 times the design working pressure based on the elevation of the lowest point in the main and corrected to the elevation of the test gauge.

(k) If the test pressure cannot be attained, or if it takes an unreasonably long time to reach the test pressure, there may be faults such as excessive leakage or entrapped air, etc. If faults exist, discontinue pressuring, and correct them before continuing.

(l) Add make-up water as necessary to maintain the maximum test pressure for four hours.

(m) During the test phase, reduce the test pressure by 69 kPa (10 psi) and monitor the pressure for one hour. Do not increase the pressure or add make-up water.

(n) If no visual leakage is observed, and the pressure during the test phase remains steady (within 5% of the test pressure) for the one-hour test phase period, a passing test is indicated.

(o) If the test including the time required to pressurize, stabilize, hold test pressure, and depressurize is not completed due to leakage or any other reason within eight hours, the test section should be permitted to relax for at least eight hours before repeating the test.

(p) Locate and remove any pipe, fittings, and appurtenances found defective and replace with new sound material and make watertight.

(q) Repeat hydrostatic testing until all defects have been corrected. The Contractor is responsible for all costs on repeat tests.

E49.6 Hydrostatic Leaking Testing for Primus Liner

(a) Notify the Contract Administrator at least 48 hours in advance of all proposed tests. The Contractor is to confirm that test sections will maintain pressure prior to the Contract Administrator being on site. Perform all subsequent tests in the presence of the Contract Administrator.

(b) Hydrostatic leakage testing of the Primus Liner must be completed separately from hydrostatic leakage testing of PVC piping or HDPE piping.

(c) The Primus Liner shall be subjected to a hydrostatic pressure test at 1.5 the known working pressure or at working pressure plus 50 psi, whichever is less.

(d) Hold this pressure for a period of two to three hours to allow for stabilization of the Primus Liner. After this period, the pressure test will begin for a minimum of one hour. The main pressure test is considered successful if the pressure loss does not exceed a maximum of 20.6 kPa (3 psi) per hour. There is no leakage allowance allowed for any section of the Primus Liner.

(e) Repeat hydrostatic testing until all defects have been corrected. The Contractor is responsible for all costs on repeat tests.

E49.7 Dechlorination

(a) The Contractor is advised that no sanitary sewer or land drainage sewer infrastructure is present for flushed water to be disposed into, except at the downstream end of the force main. The Contractor shall submit the proposed method of water disposal and dechlorination as part of the Commissioning Plan.

(i) Discharging of chlorinated water directly into the environment is not permitted. The Contractor shall employ a means of dechlorinating all chlorinated water before discharging into ditches or land drainage sewer systems;

(i) Chlorine concentrations must be less than 0.01 mg/L when discharging to the environment. Contractor must test discharged water on site and provide evidence of chlorine concentrations meeting this requirement prior to discharging.

(b) The Contractor may discharge chlorinated water directly into the existing 1350 mm interceptor sewer along Inkster Boulevard through a permit application with the City of Winnipeg Water and Waste Department.

(i) The Contractor shall be responsible for all coordination and fees associated with the permit application.

E49.8 Measurement and Payment

(a) Pigging and hydrostatic leakage testing will not be measured and will be paid for at the Contract Lump Sum Price for “Testing and Commissioning”. 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. Payment for Testing and Commissioning shall be in accordance with the following:

(i) Fifty (50%) percent of the Contract Lump Sum Price following successful pigging of all force main pipe.

(ii) Remaining fifty (50%) percent of the Contract Lump Sump Price following successful pressure testing of all force main pipe.

SURFACE WORKS

E50. CORRUGATED STEEL PIPE CULVERTS

E50.1 General

(a) This Specification covers the supply and installation of culvert pipe, couplers and fittings for connections.

E50.2 Materials

(a) Corrugated steel pipe, couplers and bolts shall conform to CSA G401.

(b) Corrugated steel pipe shall be galvanized.

(c) Pipe less than 600 mm diameter shall have a minimum wall thickness of 1.6 mm.

(d) Helical corrugated pipe shall have end sections corrugated to annular corrugations over a length of 300 mm at the ends of each pipe.

(e) Provide culvert end markers for all culverts installed.

E50.3 Execution

(a) Install corrugated steel pipe culverts in accordance with CW 3610.

E50.4 Measurement and Payment

(a) Measurement and payment for corrugated steel pipe culverts shall be in accordance with CW 3610.

E51. TOPSOIL STRIPPING, STOCKPILING, PLACEMENT AND SEEDING

E51.1 General

(a) This Specification supplements and amends the City of Winnipeg Standard Construction Specification sections CW 3520 and CW 3540.

(b) All grassed areas within the Project Site are to be revegetated with naturalized seeding. This includes the following areas:

(i) Sturgeon Access ditches and berm

(ii) Sturgeon Road ditches

(iii) CentrePort Canada Way (PTH 190) ditches

(iv) Red Fife Road ditches

(c) The Contractor will be responsible for stripping of the topsoil, temporary stockpiling of the topsoil, replacement of the topsoil following backfilling of the Work, fine grading and seeding.

E51.2 Materials

(a) Topsoil placement for naturalized areas shall utilize suitable native topsoil that has been stripped and stockpiled prior to construction.

(b) Seed placed within City of Winnipeg limits shall be conform to the following:

(i) The seed supplied shall be free of disease and mixed by percentage (%) of PLS weight to meet the following:

(i) 18% Canadian Wild Rye

(ii) 18% Awned Wheatgrass

(iii) 18% Big Bluestem

(iv) 18% June Grass

(v) 18% Slough Grass

(vi) 10% Purple Prairie Clover

(c) The proposed seed blend shall be submitted to the Contract Administrator prior to placing. If the Contractor wishes to use an alternative seed blend, the mix shall be submitted to the Contract Administrator for review. Thorough mixing of the seed blend is mandatory and seed mixtures found to be not thoroughly mixed shall be rejected.

E51.3 Construction Methods

(a) The Contractor shall complete topsoil excavation to a minimum depth of 100 mm as defined in CW 3170 Clause 9.2 (a) for all grassed areas identified in E51.1 prior to pipe installation.

(b) Excavated topsoil shall be temporarily stockpiled for re-use at approved locations only.

(c) Following pipe installation and backfill but prior to replacing topsoil, all sub-grade areas shall be scarified to a minimum depth of 150 mm.

(d) Complete fine grading and native topsoil re-placement in accordance with CW 3540.

(i) The topsoil is to be prepared for seeding by removing weeds through mechanical or chemical controls. The Contractor is to provide a schedule of work detailing the timing and duration of soil preparation.

(e) Seeding:

(i) Seed shall be sown at rates suitable to the plant species and mix design. Seeding rates are to be included in seed mix design provided by Contractor.

(ii) Unless otherwise permitted by the Contract Administrator, placement of seed shall be performed during the following time periods:

(i) Spring start-up to May 15

(ii) October 15 to freeze-up

(iii) Notwithstanding the above Specifications, complete seeding in accordance with CW 3520.

(f) Commencement of Maintenance Period

(i) Within City of Winnipeg limits:

(i) As per CW 3520 Item 9.7

(ii) Within RM of Rosser and MTI jurisdiction:

(i) N/A

(g) Maintenance of Seeded Areas

(i) Within City of Winnipeg limits:

(i) As per CW 3520 Item 9.8

(ii) Within RM of Rosser and MTI jurisdiction:

(i) Maintenance is at the Contractor’s discretion to achieve the standard of acceptance described in Item (h)(ii) below.

(h) Termination of Maintenance Period

(i) Within City of Winnipeg limits:

(i) The Contract Administrator will terminate the maintenance period after the criteria specified in CW 3520 Item 9.10 have been met.

- Seedlings are detectable from at least 75% of the sown grass species and 65% of the sown wildflower species.

(ii) Within RM of Rosser and MTI jurisdiction:

(i) The Contract Administrator reserves the right to refuse acceptance of any or all areas seeded to grass if shown to be thin with bare patches uneven in distribution, discoloured or otherwise unhealthy. Any further preparation and reseeding required shall be done wholly at the Contractor’s expense at the next earliest opportunity weather and season permitting.

E51.4 Method of Measurement and Basis of Payment

E51.4.1 Method of Measurement shall be as follows:

(a) The stripping and stockpiling of topsoil will be measured on an area basis. The maximum area to be paid for shall be the volume indicated on Form B: Prices, which is based on the area to be stripped and re-topsoiled as a direct result of the specified works. Topsoil stripping and stockpiling above this quantity shall be considered incidental to Site Development and Restoration.

(i) The formula used to calculate topsoil stripping and stockpiling areas is: [3*(pipe diameter) +6] * pipe length for all excavated pipe sections.

(ii) Where areas vary due to field conditions or instruction from the Contract Administrator, the quantity of each pay item listed below will be adjusted as appropriate.

(b) Supply, placement and maintenance of topsoil and seed will be measured on an area basis. The area to be paid for shall be the total number of square metres topsoiled, seeded and maintained in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator. No payment will be made for topsoil and seed placed outside of the limits of placement as directed by the Contract Administrator.

(i) The formula used to calculate topsoiling and seeding areas is: [3*(pipe diameter) +6] * pipe length for all excavated pipe sections.

(ii) Where areas vary due to field conditions or instruction from the Contract Administrator, the quantity of each pay item listed below will be adjusted as appropriate.

E51.4.2 Basis of Payment shall be as follows:

(a) Stripping and Stockpiling Topsoil will be paid for at the Contract Unit Price per square meter of “Stripping and Stockpiling Topsoil” measured as specified, herein, which price shall be payment in full for supplying all labour and materials and performing all operations herein described, and all other items incidental to the Work included in this Specification.

(b) Placement and maintenance of topsoil and seed will be paid for at the Contract Unit Price per square metre for each type of "Topsoil Placement and Seeding", measured as specified herein, which price shall be payment in full for supplying all materials and for completing all operations herein described and all other items incidental to the work included in this Specification. Payment for topsoil placement and seeding shall be in accordance with the following:

(i) Sixty five (65%) percent of quantity following supply and placement.

(ii) Remaining thirty five (35%) percent of quantity following termination of the Maintenance Period

E52. ROAD RECONSTRUCTION

E52.1 General

(a) This Specification shall cover the road and parking lot reconstruction required to facilitate the Works.

(b) Road reconstruction shall be the responsibility of the Contractor and shall be done in accordance with CW 3110, 3130, 3310 and as amended in this Section.

(c) Road and parking lot reconstruction is required to facilitate the following Works, as shown on the Drawings and as listed below.

(i) Open cut Sturgeon Road crossing

(i) Class 1 backfill, asphalt re-surfacing

(ii) Open cut trenching within Red Fife Road

(i) Class 2 backfill, full granular and asphalt road structure reconstruction

(iii) Open cut trenching within Toowoomba Land Company parking lot

(i) Class 1 backfill, asphalt re-surfacing

(iv) Shaft construction within Inkster Boulevard and Brookside Boulevard merge lanes

(i) Class 1 backfill, re-concrete surfacing

E52.2 Materials

(a) Unless otherwise noted, all subgrade, geotextiles, granular sub-base, base course, asphaltic concrete and Portland concrete cement shall conform to the latest edition of the City of Winnipeg Standard Construction Specifications.

E52.3 Construction Methods

(a) All works shall be completed in accordance with the latest edition of the City of Winnipeg Standard Construction Specifications and the Street Cuts Manual.

E52.4 Measurement and Payment

(a) Road and parking lot reconstruction specifically required for the force main installation at the locations listed below will be measured and paid for in accordance with the appropriate City of Winnipeg Specifications and as listed in Form B: Prices. **All road restoration beyond the quantities listed on Form B: Prices will be considered incidental to Site Development and Restoration and no additional payment will be made for the additional quantities.**

(i) Sturgeon Road Reconstruction (Drawing 13472)

(ii) Red Fife Road Reconstruction (Drawing 13486, 13487)

(iii) Toowoomba Land Company Parking Lot Reconstruction (Drawing 13489, 13490)

(iv) Inkster Boulevard and Brookside Boulevard Reconstruction (Drawing 13490)

(b) All other costs associated with Road Reconstruction for any other Works will be considered incidental to Site Development and Restoration.

E53. GRAVEL SURFACING WORKS

E53.1 General

(a) This Specification shall cover the site works at Combination Air Valve Chamber 1 as well as the temporary gravel parking lot shown on Drawing 13499.

(b) Gravel surface Works shall be completed in accordance with CW 3110, 3130, and as amended in this Section.

E53.2 Materials

(a) All subgrade, geotextiles, granular sub-base, base course, shall conform to the latest edition of the City of Winnipeg Standard Construction Specifications and as shown on the Drawings.

E53.3 Construction Methods

(a) All works shall be completed in accordance with the latest edition of the City of Winnipeg Standard Construction Specifications.

(b) The Contractor shall remove and dispose of all granular material and geotextile associated with the temporary gravel parking lot shown on Drawing 13499 when the Contract Administrator has determined that the temporary parking lot is no longer required.

E53.4 Measurement and Payment

(a) Gravel surfacing works will be measured and paid for in accordance with the appropriate City of Winnipeg Specifications and as listed in Form B: Prices.

(b) The supply and installation of the Primus Liner will not be measured and will be paid for at the Contract Lump Sum Price for “Supply and Install of Primus Liner”, which price shall be paid in full for supplying all materials and for performing all operations herein described.

EROSION CONTROL

E54. EROSION CONTROL BLANKETS

E54.1 Description

E54.1.1 This Specification shall cover the supply and placement of erosion control blankets to provide temporary erosion control in localized areas (as directed by the Contract Administrator)

E54.2 Materials

E54.2.1 The blanket material shall consist of wheat or barley straw, coconut fibres, or other plants approved by the Contract Administrator. Acceptable products will be S32 BD Double Net Straw Blankets with **biodegradable** netting or approved alternative in accordance with B7. The blanket material shall be air dried, reasonably light in colour, and shall not be musty, mouldy, caked or otherwise of low quality. The blanket material shall be free of coarse (chaff) material and free of noxious weeds and/or seeds to prevent the introduction of weeds into previously seeded and planted areas.

E54.3 Construction Methods

E54.3.1 General

(a) The Contractor shall supply and place erosion control blankets immediately after final grading is completed.

(b) Erosion control blankets shall be placed as directed, measured and accepted by the Contract Administrator.

(c) Covered areas shall be inspected periodically and after runoff producing storm events. Damaged areas shall be repaired immediately as determined by the Contract Administrator. Areas requiring recovering as directed by the Contract Administrator will be re-measured and additionally paid for at the Contract Unit Price for the Work item.

E54.3.2 Installation

(a) The erosion control blankets shall be installed as per the manufacturer's recommended procedures. Blankets shall be rolled out on smoothed out soils starting from the top of the slope. The Contractor is to start by stapling the blanket at the top of the slope in a 150 mm deep by 150mm wide trench. The trench will be backfilled and compacted so that water will flow evenly onto the blanket.

(b) The Contractor shall roll the blankets down the slope insuring soil blanket contact. Edges are to be overlapped a minimum 50 mm with parallel blankets.

(c) If more than one blanket is need for the run down the slope then adjoining ends must be overlapped a minimum 100 mm shingle style. Overlapped areas are to be stapled with a staggered pattern of staples.

E54.3.3 Removal

(a) Immediately prior to placement of topsoil and sod and/or topsoil and seed all erosion control blankets shall be removed and disposed of off-Site.

E54.4 Measurement and Payment

E54.4.1 Supply, placement and removal of erosion control blankets will be measured on an area basis and paid for at the Contract Unit Price for "Erosion Control Blankets". The area to be paid for shall be the total number of square metres of ground covered by blankets, supplied and placed in accordance with this Specification, accepted and measured by the Contract Administrator.

E55. INSTALLATION OF SILT FENCE

E55.1 Description

E55.1.1 This specification covers the erection of temporary silt fencing, which shall be installed and maintained at the locations shown on the Drawings or as directed by the Contract Administrator, to control runoff and minimize the release of detrimental silt loading to watercourses.

E55.1.2 The scope of Work included in this specification is as follows:

(a) Supply and Install temporary silt fencing at the locations as indicated on the Drawings or as directed by the Contract Administrator, in accordance with the detailed drawing provided, immediately upon completion of the riprap placement and prior to undertaking any other activities on the Site where silt fencing is required.

(b) Maintain the silt fencing in serviceable condition throughout the entire duration of activities at the Site where silt fencing is required, including final restoration and cleanup of the construction Site.

(c) Remove the silt fencing and restore the area where the fencing was installed, without further disturbing the area and without releasing any deleterious substances to the adjacent watercourse.

E55.2 Materials

E55.2.1 Fence Posts

(a) Fence posts shall be 100 mm diameter untreated wood posts or 50 mm diameter steel.

E55.2.2 Filter Fabric

(a) Filter Fabric Shall be a woven geotextile material specifically designed for a silt fence applications, meeting the following minimum requirements:

Property	**Test Method**	**Value**
Grab Tensile Strength	ASTM D 4632	0.55 kN
Grab Tensile Elongation	ASTM D 4632	15%
Mullen Burst	ASTM D 4786	2060 kPa
Puncture	ASTM D 4833	0.285 kN
Trapezoid Tear	ASTM D 4533	0.285 kN
UV Resistance	ASTM D 435	5 80 % @ 500 hrs
Apparent Opening Size (AOS)	ASTM D 4751	0.60 mm
Flow Rate	ASTM D 4491	405 l/min/m2

Acceptable Product: “Amoco 2130 Silt Fence Fabric” or approved equal in accordance with B7.

E55.2.3 Wire Mesh

(a) Wire mesh shall be galvanized or plain metal with wire gauge = 3.0 mm, wire spacing @ 150 mm o/c.

E55.2.4 Fencing Material Fasteners

(a) Staples or wire ties of sufficient strength and spacing to withstand 500 N (100 lbf) pull test at any point on the wire mesh.

E55.3 Construction Methods

E55.3.1 Ensure that no deleterious substances are discharged into the adjacent watercourse at any time during construction activities.

E55.3.2 Silt Fence Installation

(a) Excavate 150 x 150 anchor trench along alignment of silt fence as indicated.

(b) Install fence posts as indicated. Ensure that fence posts are firmly driven into undisturbed soil, or are completely and firmly backfilled if installed via auger methods. Attach wire mesh as support backing for silt fence filter fabric with fasteners as specified in E55.2.4. Attach silt fence filter fabric on top of wire mesh in similar fashion. Overlap any fence seams (wire mesh or filter fabric) by 450 mm minimum. Ensure that wire mesh and filter fabric are installed on the upslope side of the post and are fully laid in anchor trench as shown.

(c) Install and compact impermeable excavated materials into anchor trench and slope as indicated. Compact to 95% of maximum dry density (ASTM D-698).

E55.3.3 Silt Fence Maintenance

(a) Inspect silt fence daily, prior to starting any other construction activities. If fence posts are found loose or not upright, repair in accordance with installation procedure as specified in E55.3.2. If silt fence is found to be loose or torn, repair or replace as necessary to comply with E55.3.2.

(b) If silt deposition at the fence is 300 mm or more in depth, carefully remove and dispose of silt offsite without disturbing silt fence.

E55.3.4 Silt Fence Removal

(a) The silt fence shall remain in place until new vegetation growth has established on the bank, as determined by the Contract Administrator.

(b) Upon authorization of the Contract Administrator, remove all fence posts, wire mesh, fabric, and fasteners from Site.

(c) Restore areas disturbed in accordance with E9 without releasing any deleterious substances to the adjacent watercourse.

E55.4 Measurement and Payment

E55.4.1 The supply, placement, and removal of silt fence shall be measured on a length basis and paid for at the Contract Unit Price per lineal metre for “Silt Fence”. The length to be paid for shall be the total number of metres supplied and placed in accordance with this Specification, accepted and measured by the Contract Administrator. Payment of silt fence shall be in accordance with the following payment schedule:

(a) Sixty percent (60%) of the Contract Unit Price per lineal metre for “Silt Fence” shall be paid following supply and installation.

(b) Forty percent (40%) of the Contract Unit Price per lineal metre for “Silt Fence” shall be paid following final removal.

E55.4.2 Removal of accumulated sediment from the silt fence is considered incidental to the Work and no separate measurement or payment will be made.

E56. STRAW WATTLES

E56.1 Description

E56.1.1 This Specification covers the erection of temporary straw wattles, which shall be installed and maintained as shown on the Drawings or as directed by the Contract Administrator to control runoff and minimize the release of detrimental silt loading to the watercourse.

E56.1.2 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.

E56.2 Materials

E56.2.1 The Contractor shall be responsible for the supply, safe storage and handling of all materials as shown on the Drawings.

E56.2.2 Straw Wattles shall be 300 mm (12") biodegradable Straw Wattles.

E56.3 Equipment

E56.3.1 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. The Contractor shall keep all equipment in good working order, and have sufficient standby equipment available at all times, as required.

E56.4 Construction Methods

E56.4.1 Installation

(a) Install the straw wattles at the locations as directed by the Contract Administrator.

(b) Straw wattles are to be installed in accordance with the manufacturer's installation instructions.

E56.4.2 Maintenance

(a) The Contractor shall ensure that the integrity of the straw wattle is maintained until natural vegetation is re-established at the site or as determined by the Contract Administrator. Any section of straw wattle that is found to be damaged or otherwise no longer be providing effective erosion and sediment control, as determined by the Contract Administrator, shall immediately be restored to the satisfaction of the Contract Administrator at no additional cost to the City.

(b) If sediment deposition at the base of the log is 150 mm or more in depth, the Contractor shall carefully remove and dispose of the sediment build up off-site without disturbing the straw wattle system.

E56.4.3 Removal

(a) The straw wattle erosion control shall remain in place until new vegetation growth has established on the riverbank slope or as determined by the Contract Administrator.

(b) Upon authorization of the Contract Administrator, the Contractor shall remove all straw wattles, posts and netting from the site.

(c) The Contractor shall take care not to release sediment or deleterious substances into the adjacent watercourse as part of straw wattle removal, as determined by the Contract Administrator.

E56.5 Measurement and Payment

E56.5.1 The supply, placement, and removal of straw wattles shall be measured on a length basis and paid for at the Contract Unit Price per lineal metre for "Straw Wattle". The length to be paid for shall be the total number of metres supplied and placed in accordance with this Specification, accepted and measured by the Contract Administrator. Payment of Straw Wattle shall be in accordance with the following payment schedule:

(a) Sixty percent (60%) of the Contract Unit Price per lineal metre for "Straw Wattle" shall be paid following supply and installation.

(b) Forty percent (40%) of the Contract Unit Price per lineal metre for "Straw Wattle" shall be paid following final removal.

E56.6 Removal of accumulated sediment from the straw wattle is considered incidental to the Work and no separate measurement or payment will be made for removal of accumulated sediment.