



THE CITY OF WINNIPEG

TENDER

TENDER NO. 81-2023

**2023 GOULET STREET REHABILITATION AND DES MEURONS
RECONSTRUCTION**

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 2023 Goulet Street Rehabilitation and Des Meurons Reconstruction

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, April 6, 2023.

B2.2 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. ENQUIRIES

B3.1 All enquiries shall be directed to the Contract Administrator identified in D6.1.

B3.2 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.

B3.3 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.

B3.4 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.

B3.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

B3.6 Any enquiries concerning submitting through MERX should be addressed to:
MERX Customer Support
Phone: 1-800-964-6379
Email: merx@merx.com

B4. CONFIDENTIALITY

B4.1 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.

B4.2 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.

B5. ADDENDA

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

- B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
- B5.3 Addenda will be available on the MERX website at www.merx.com.
- B5.4 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.
- B5.5 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.
- B5.6 Notwithstanding B3, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D6.

B6. SUBSTITUTES

- B6.1 The Work is based on the Plant, Materials and methods specified in the Tender.
- B6.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B6.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.
- B6.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance; and
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.
- B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in 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.
- B6.6 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.
- B6.6.1 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.

- B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base 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 B17.
- B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B7. BID COMPONENTS

- B7.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices; and
 - (c) Form G1: Bid Bond and Agreement to Bond.
- B7.2 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.
- B7.3 The Bid shall be submitted electronically through MERX at www.merx.com.
- B7.3.1 Bids will **only** be accepted electronically through MERX.
- B7.4 Bidders are advised that inclusion of terms and conditions inconsistent with the Tender document, including the General Conditions, will be evaluated in accordance with B17.1(a).

B8. BID

- B8.1 The Bidder shall complete Form A: Bid/Proposal, making all required entries.
- B8.2 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; or
 - (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.
- B8.2.1 If a Bid is submitted jointly by two (2) or more persons, each and all such persons shall identify themselves in accordance with B8.2.
- B8.3 In Paragraph 3 of Form A: Bid/Proposal, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B8.4 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; or

- (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.

B8.4.1 The name and official capacity of all individuals signing Form A: Bid/Proposal should be entered below such signatures.

B8.5 If a Bid is submitted jointly by two (2) or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B9. PRICES

B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B9.1.1 Prices stated on Form B: Prices shall not include any costs which may be incurred by the Contractor with respect to any applicable funding agreement obligations as outlined in D36. Any such costs shall be determined in accordance with D36.

B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.

B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B9.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B9.5 The Bidder shall enter the Total Bid Price from Form B: Prices into the Total Bid Price field in MERX.

B9.5.1 Bidders are advised that the calculation indicated in B17.4 will prevail over the Total Bid Price entered in MERX.

B10. DISCLOSURE

B10.1 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.

B10.2 The Persons are:

- (a) N/A

B11. CONFLICT OF INTEREST AND GOOD FAITH

B11.1 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.

B11.2 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;
- (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.

B11.3 In connection with their Bid, each entity identified in B11.2 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.

B11.4 Without limiting B11.3, 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.

B11.5 Without limiting B11.3, 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 B11.4 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.

B11.6 The final determination of whether a perceived, potential or actual Conflict of Interest exists shall be made by the City, in their sole discretion.

B12. QUALIFICATION

B12.1 The Bidder shall:

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

- (b) be 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.
- B12.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:
- (a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <https://www.winnipeg.ca/matmgt/Templates/files/debar.pdf>.
- B12.3 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); and
 - (d) have completed the Accessible Customer Service online training required by the Accessibility for Manitobans Act (AMA) (see B12.5 and D8).
- B12.4 Further to B12.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:
- (a) Written confirmation of a safety and health certification meeting SAFE Work Manitoba's SAFE Work Certified Standard (e.g., COR™ and SECOR™) in the form of:
 - (i) a copy of their valid Manitoba COR certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Certificate of Recognition (COR) Program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or
 - (ii) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or
 - (b) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>).
- B12.5 Further to B12.3(d), the Bidder acknowledges they and all Subcontractors have obtained training required by the Accessibility for Manitobans Act (AMA) available at <http://www.accessibilitymb.ca/training.html> for anyone that may have any interaction with the public on behalf of the City of Winnipeg.
- B12.6 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.
- B12.7 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B13. BID SECURITY

- B13.1 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, Materials Management Division website at <https://www.winnipeg.ca/MatMgt/templates/files/eBidsecurity.pdf>.
- B13.2 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; and
 - (e) the results of the verification must provide a clear, immediate and printable indication of pass or fail regarding B13.2(a).
- B13.3 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 B17.1(a).
- B13.4 Bonds passing the verification process will be treated as original and authentic.
- B13.4.1 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.
- B13.5 The Bid security of the successful Bidder and the next two (2) 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.
- B13.6 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.

B14. OPENING OF BIDS AND RELEASE OF INFORMATION

- B14.1 Bids will not be opened publicly.
- B14.2 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.
- B14.3 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.
- B14.4 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).
- B14.4.1 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.

B15. IRREVOCABLE BID

- B15.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid/Proposal.
- B15.2 The acceptance by the City of any Bid shall not release the Bids of the next two (2) 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.

B16. WITHDRAWAL OF BIDS

- B16.1 A Bidder may withdraw their Bid without penalty prior to the Submission Deadline.

B17. EVALUATION OF BIDS

- B17.1 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 therefrom (pass/fail);
 - (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B12 (pass/fail);
 - (c) Total Bid Price; and
 - (d) economic analysis of any approved alternative pursuant to B6.
- B17.2 Further to B17.1(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.
- B17.3 Further to B17.1(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.
- B17.4 Further to B17.1(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.
- B17.4.1 Further to B17.1(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.
- B17.4.2 Bidders are advised that the calculation indicated in B17.4 will prevail over the Total Bid Price entered in MERX.

B18. AWARD OF CONTRACT

- B18.1 The City will give notice of the award of the Contract or will give notice that no award will be made.
- B18.2 The City will have no obligation to award a Contract to a Bidder, even though one (1) or all of the Bidders are determined to be qualified, and the Bids are determined to be responsive.
- B18.2.1 Without limiting the generality of B18.2, 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 (1) 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.

- B18.3 The Work of this Contract is contingent upon Council approval of sufficient funding in the 2023 Capital Budget. If the Capital Budget approved by Council does not include sufficient funding for the Work, the City will have no obligation to award a Contract.
- B18.4 If funding for the Work is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, Bidders are advised that the terms of D36 shall immediately take effect upon confirmation of such funding, regardless of when funding is confirmed.
- B18.5 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 B17.
- B18.5.1 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, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm.
- C0.2 A reference in the Tender to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. 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. SCOPE OF WORK

D3.1 The Work to be done under the Contract shall consist of:

(a) Goulet Street:

- (i) Pavement Rehabilitation – Goulet Street from Rue Youville to Traverse Avenue; and
- (ii) Watermain Renewal – Goulet Street from Rue Youville to Des Meurons Street.

(b) Des Meurons Street:

- (i) Pavement Reconstruction – Des Meurons Street from Goulet Street to Marion Street; and
- (ii) Watermain Renewal – Des Meurons Street from Goulet Street to Marion Street.

D3.2 The major components of the Work are as follows:

(a) Pavement Rehabilitation:

- (i) planing of existing asphalt overlay as required;
- (ii) installation and repairs to catch basin and catch basin lead;
- (iii) repairs to existing manholes;
- (iv) installation of streetlights and associated infrastructure;
- (v) installation of Traffic Signal underground conduit, bases and pits;
- (vi) adjustment of existing pavement appurtenances;
- (vii) removal of existing retaining wall and OHSS poles and foundations;
- (viii) installation of structural soil cell systems;
- (ix) installations of rain gardens and deciduous trees;
- (x) full depth (two hundred (200) millimetres (mm) reinforced) concrete repairs of existing slabs and joints;
- (xi) construction of two hundred (200) mm plain dowelled concrete pavements;
- (xii) construction of curbs, curb ramps, bullnoses and miscellaneous concrete slabs as required;
- (xiii) construction of sidewalk and reinforced sidewalk;
- (xiv) construction of monolithic curb and one hundred (100) mm sidewalk with block outs for indicator surfaces and asphalt;
- (xv) construction of structural sidewalk with retaining walls;
- (xvi) construction of protected bike lane and transit stop improvements;
- (xvii) installation of directional tactile strips;
- (xviii) installation of interlocking paving stones;
- (xix) completion of boulevard grading;
- (xx) installation of topsoil and sod;

- (xxi) asphalt patching over full depth concrete repairs;
 - (xxii) placement of mainline asphalt overlay (average thickness one hundred (100) mm) utilizing automatic grade control for final lift; and
 - (xxiii) placement of tie-in asphalt overlay for project limits and private approaches.
- (b) Pavement Reconstruction:
- (i) removal of existing pavement;
 - (ii) excavation;
 - (iii) installation of subdrains;
 - (iv) installation of Traffic Signal underground conduit, bases and pits;
 - (v) compaction of existing sub-grade;
 - (vi) installation of catch basins and sewer service pipe;
 - (vii) installation of water service insulation;
 - (viii) repairs to existing manholes;
 - (ix) placement of geotextile fabric and geogrid;
 - (x) placement of sub-base and base course materials;
 - (xi) adjustment of existing pavement appurtenances;
 - (xii) construction of two hundred (200) mm plain dowelled concrete pavements;
 - (xiii) construction of curb ramps;
 - (xiv) construction of monolithic curb and one hundred (100) mm sidewalks with block-outs;
 - (xv) installation of paving stones;
 - (xvi) installation of detectable warning tiles;
 - (xvii) regrading private walkways;
 - (xviii) completion of boulevard grading; and
 - (xix) installation of topsoil and sod.
- (c) Watermain Renewal:
- (i) installation of approximately three hundred ninety (390) metres (m) of two hundred fifty (250) mm diameter PVC watermain by trenchless methods;
 - (ii) abandonment or removal of existing watermains, hydrants and gate valves;
 - (iii) installation of hydrant assemblies, gate valves and other appurtenances;
 - (iv) reconnection of water services;
 - (v) renewal of water services to property line;
 - (vi) connection into existing watermain;
 - (vii) installation of watermain and water service insulation;
 - (viii) temporary pavement surface restorations; and
 - (ix) completion of flushing hydrostatic leakage testing and disinfection of new watermain.

D4. SITE INVESTIGATION DUE DILIGENCE AND RISK

D4.1 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.

D5. DEFINITIONS

D5.1 When used in this Tender:

- (a) “**OHSS**” means Overhead Sign Support Structure;
- (b) “**Regional Street**” means those streets listed in Schedule E of the most recent City of Winnipeg By-Law No. 1481/77; and
- (c) “**Rehabilitation**” means pavement, curb and sidewalk repairs, replacement or adjustment of drainage infrastructure, adjustment of appurtenances in the pavement and boulevards, and an asphalt overlay.

D6. CONTRACT ADMINISTRATOR

D6.1 The Contract Administrator is Dillon Consulting Limited, represented by:

David Wiebe, P.Eng., PTOE, LEED AP
Project Manager

Telephone No. 204 453-2301

Email Address dwiebe@dillon.ca

D6.2 At the pre-construction meeting, David Wiebe, P.Eng., PTOE, LEED AP will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D7. CONTRACTOR'S SUPERVISOR

D7.1 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.

D7.2 At least two (2) Business Days prior to the commencement of any Work on the Site, the Contractor shall provide the Contract Administrator with a phone number where the supervisor identified in D7.1 or an alternate can be contacted twenty-four (24) hours a day to respond to an emergency.

D8. ACCESSIBLE CUSTOMER SERVICE REQUIREMENTS

D8.1 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.

D8.1.1 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.

- D8.1.2 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.

D9. UNFAIR LABOUR PRACTICES

- D9.1 Further to C3.2, the Contractor declares that in bidding for the Work and in entering into this Contract, the Contractor and any proposed Subcontractor(s) conduct their respective business in accordance with established international codes embodied in United Nations Universal Declaration of Human Rights (UDHR) <https://www.un.org/en/about-us/universal-declaration-of-human-rights> International Labour Organization (ILO) [https://www.ilo.org/global/lang--en/index.htm](https://www.ilo.org/global/lang-en/index.htm) conventions as ratified by Canada.
- D9.2 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.
- D9.3 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.).
- D9.4 Failure to provide the evidence required under D9.3, may be determined to be an event of default in accordance with C18.
- D9.5 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.
- D9.5.1 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.
- D9.5.2 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 clause D9.5. The City may also hold back the amount of the Unfair Labour Practice Penalty from payment for any amount it owes the Contractor.
- D9.5.3 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.

D10. FURNISHING OF DOCUMENTS

D10.1 Upon award of the Contract, the Contractor will be provided with 'issued for construction' Contract Documents electronically, including Drawings in PDF format only.

SUBMISSIONS

D11. AUTHORITY TO CARRY ON BUSINESS

D11.1 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.

D12. SAFE WORK PLAN

D12.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan 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 C4.1 for the return of the executed Contract Documents, if applicable.

D12.2 The Safe Work Plan shall be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/safety/default.stm>.

D12.3 Notwithstanding B12.4 at any time during the term of the Contract, the City may, at their sole discretion and acting reasonably, require an updated COR Certificate or Annual Letter of good Standing. A Contractor, who fails to provide a satisfactory COR Certificate or Annual Letter of good Standing, will not be permitted to continue to perform any Work.

D13. INSURANCE

D13.1 The Contractor shall provide and maintain the following insurance coverage:

- (a) commercial general liability insurance, in the amount of at least three million dollars (\$3,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability, broad form property damage cover and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;
- (b) Automobile Liability Insurance 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 five million dollars (\$5,000,000.00) inclusive for loss or damage including personal injuries and death resulting from any one (1) accident or occurrence; and
- (c) an all risks Installation Floater carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.

D13.2 Deductibles shall be borne by the Contractor.

D13.3 All policies shall be taken out with insurers licensed in the Province of Manitoba.

D13.4 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 the C4.1 for the return of the executed Contract Documents, as applicable.

D13.5 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. CONTRACT SECURITY

D14.1 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.

D14.1.1 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; and
- (e) the results of the verification must provide a clear, immediate and printable indication of pass or fail regarding D14.1(b).

D14.1.2 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.

D14.1.3 Digital bonds passing the verification process will be treated as original and authentic.

D14.2 The Contractor shall provide the Contract Administrator identified in D6 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.

D14.3 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 D14.1(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.

D15. SUBCONTRACTOR LIST

D15.1 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 or prior to a pre-construction meeting, or 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 C4.1 for the return of the executed Contract Documents, if applicable.

D16. DETAILED WORK SCHEDULE

D16.1 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 Documents, as applicable.

D16.2 The detailed work schedule shall consist of the following:

(a) a Gantt chart for the Work based on the critical path schedule.

D16.3 Further to D16.2(a), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each trade, or Specification division. The time shall be on the horizontal axis, and the type of trade shall be on the vertical axis.

D17. REQUIREMENTS FOR SITE ACCESSIBILITY PLAN

D17.1 The Contractor shall provide the Contract Administrator with an Accessibility Plan 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 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 (1) crossing in each direction for each intersection (one (1) north/south crosswalk and one (1) 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; and
- (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; and
- (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; and
 - (c) Third and subsequent Offences – A pay reduction will be issued in the amount of two hundred fifty dollars (\$250.00) per instance and per day.

SCHEDULE OF WORK

D18. COMMENCEMENT

- D18.1 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.
- D18.2 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 D11;
 - (ii) evidence of the workers compensation coverage specified in C6.15;
 - (iii) the twenty-four (24) hour emergency response phone number specified in D7.2;
 - (iv) the Safe Work Plan specified in D12;
 - (v) evidence of the insurance specified in D13;
 - (vi) the Contract security specified in D14;
 - (vii) the subcontractor list specified in D15;
 - (viii) the detailed work schedule specified in D16;
 - (ix) the Requirements for Site Accessibility Plan specified in D17; and
 - (x) the direct deposit application form specified in D32.
 - (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.
- D18.3 The Contractor shall commence the Work on Site no later than May 23, 2023 as directed by the Contract Administrator and weather permitting.

D19. WORKING DAYS

- D19.1 Further to C1.1(tt);
- D19.1.1 The Contract Administrator will determine daily if a Working Day has elapsed and will record their assessment. On a weekly basis the Contract Administrator will provide the Contractor with a record of the Working Days assessed for the preceding week. The Contractor shall sign each report signifying that they agree with the Contract Administrator's determination of the Working Days assessed for the report period.

- D19.1.2 Work done to restore the Site to a condition suitable for Work, shall not be considered “work” as defined in the definition of a Working Day.
- D19.1.3 Further to D20.1, if a Contractor receives permission from the Contract Administrator for Work to be performed on Saturdays and Sundays, these days will be considered Working Days if the Contract Administrator deems that they are also required on Site.
- D19.1.4 When the Work includes two (2) or more major types of Work that can be performed under different atmospheric conditions, the Contract Administrator shall consider all major types of Work in determining whether the Contractor was able to work in assessing Working Days.

D20. RESTRICTED WORK HOURS

- D20.1 Further to clause 3.10 of CW 1130, the Contractor shall require written permission forty-eight (48) hours in advance from the Contract Administrator for any work to be performed between 2000 hours and 0700 hours, or on Saturdays, Sundays, Statutory Holidays and or Civic Holidays.

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 Work by others on or near the Site will include but not necessarily be limited to:
- (a) City of Winnipeg Traffic Signals – Traffic Signals Branch will be responsible for coordinating removal of above ground plant and cabling to facilitate the installation of the underground plant. The Contractor must coordinate with Traffic Signals such that the signals operations at each intersection are maintained except where permitted by the Contract Administrator and Traffic Signals Branch. This may result in Work being completed in multiple stages;
 - (b) City of Winnipeg Traffic Services – Instructions for installation of traffic signage locations (in accordance with E5) and required line painting;
 - (c) City of Winnipeg Transit – The Contractor will be required to coordinate with Transit for the location of temporary stops in order to maintain service that is safe and minimize disruption during construction. Transit will remove and reinstall shelters, benches and signage after construction;
 - (d) City of Winnipeg Water and Waste – Investigation of condition of curb stops and watermain valves. Potential emergency repairs to Water and Waste infrastructure;
 - (e) City of Winnipeg Geomatics Branch – various works on survey monuments;
 - (f) Manitoba Hydro – Manitoba Hydro will oversee the pole stabilization during excavation operations near Manitoba Hydro poles. Adjustment of infrastructure boxes and manholes as necessary;
 - (g) Manitoba Hydro Gas – Manitoba Hydro will evaluate the feasibility of lowering existing small gas services during roadway excavation. Manitoba Hydro may be required to rock wrap existing gas mains and/or services during roadway excavation;
 - (h) Bell/MTS, Shaw, Telus – Adjustment of infrastructure boxes as necessary as well as overseeing of excavation around their specific infrastructure; and
 - (i) Benchmark – Benchmark will remove and reinstall advertising Transit benches.

D21.3 Further to D21.1 the Contractor shall cooperate and coordinate all activities with all parties performing required Work by Others. The Contractor must include and accommodate Work by Others identified in D21.2 or additional parties, in their construction schedule as per D16 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 C6.1, the sequence of Work shall be as follows:

D22.1.1 The Work shall be divided into two (2) stages. Stages are further subdivided into major items of Work.

D22.1.2 **Stage 1** – The Work shall include:

- (a) Watermain Renewal from:
 - (i) Goulet Street south curb lane from Rue Youville to Des Meurons Street; and
 - (ii) Des Meurons Street southbound curb lane from Goulet Street to Marion Street.
- (b) Pavement Rehabilitation from:
 - (i) Goulet Street south and middle lane between Rue Youville and Travers Avenue.
- (c) Pavement Reconstruction from:
 - (i) Des Meurons Street southbound lanes between Goulet Street and Marion Street.

D22.1.3 The construction of the watermain along Goulet Street and Des Meurons Street must commence prior to starting the pavement reconstruction and rehabilitation. Activities from the roadworks may commence prior to the completion of the watermain renewal upon written approval from the Contract Administrator.

D22.1.4 Stage 2 – The Work shall include:

- (a) Goulet Street north lane between Rue Youville and Traverse Avenue:
 - (i) Pavement Rehabilitation and Bicycle Lane Construction.
- (b) Des Meurons Street northbound lanes between Goulet Street and Marion Street:
 - (i) Pavement Reconstruction.

D22.1.5 Placing the soil cells, tress, topsoil and finished grading of all boulevard and median areas shall be completed prior to commencing construction of the asphaltic concrete overlay, including the scratch course.

D22.1.6 All asphaltic concrete Work shall be performed using a lane-at-a-time method (see E6.1 for minimum requirements of traffic lanes to be left open at various times).

D22.1.7 At the end of any day, there shall be no drop-off along any longitudinal joint, excepting the longitudinal joint between the gutter and approaches.

D22.1.8 Immediately following the completion of the asphaltic concrete works of each stage, the Contractor shall clean up the Site and remove all plant, surplus Material, waste and debris, other than that left by the City or other Contractors in that stage and relocate to the next stage or after Stage 2 remove items from the Site.

D23. CRITICAL STAGES

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

- (a) Critical Stage 1 – Completion of the Watermain Renewal Work on Goulet Street and Des Meurons Street within twenty-five (25) Working Days from the commencement of the Watermain Renewal Work.

D23.2 When the Contractor considers the Work associated with Critical Stage 1 to be completed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Completion. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.

D23.3 The date on which the Critical Stage 1 Work has been accepted by the Contract Administrator as being completed to the requirements of the Contract is the date on which completion of Critical Stage 1 has been achieved.

D24. SUBSTANTIAL PERFORMANCE

D24.1 The Contractor shall achieve Substantial Performance within one hundred ten (110) consecutive Working Days of the commencement of the Work as specified in D18.

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 re-inspected.

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 within one hundred fifteen (115) consecutive Working Days of the commencement of the Work as specified in D18.

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 re-inspected.

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 Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:

- (a) Critical Stage 1 listed in D23.1(a) – three thousand two hundred dollars (\$3,200.00);
- (b) Substantial Performance – three thousand two hundred dollars (\$3,200.00); and
- (c) Total Performance – two thousand dollars (\$2,000.00).

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. COVID-19 SCHEDULE DELAYS

- D27.1 The City acknowledges that the schedule for this Contract may be impacted by the COVID-19 pandemic. Commencement and progress of the Work shall be performed by the Contractor with due consideration to the health and safety of workers and the public, directives from health authorities and various levels of government and in close consultation with the Contract Administrator.
- D27.2 If the Contractor is delayed in the performance of the Work by reason of the COVID-19 pandemic, 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 COVID-19 will affect the start date. The Contractor shall provide sufficient evidence that the delay is directly related to COVID-19, including but not limited to evidence related to availability of staff, availability of Material or work by others.
- D27.4 For any delay related to COVID-19 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 D20 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 COVID-19, 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 COVID-19, 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 COVID-19 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) Reflective crack maintenance (during one (1) year warranty period) as specified in CW 3250-R7;
 - (b) Sodding (maintenance period) as specified in CW 3510-R9; and
 - (c) Trees and perennials maintenance period as specified in E49.
- 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 (1) representative of the Contract Administrator, one (1) representative of the City and one (1) 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 B12.4, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at their sole discretion and acting reasonably, require updated proof of compliance, as set out in B12.4.

MEASUREMENT AND PAYMENT

D32. PAYMENT

D32.1 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.

D33. FUEL PRICE ADJUSTMENT

D33.1 The Contract is subject to a fuel price adjustment which will be calculated monthly based on eligible Work completed utilizing the following mathematical formulas;

- (a) where the price of fuel has increased – $((CFI/BFI)-1.15) \times Q \times FF$; and
- (b) where the price of fuel has decreased – $((CFI/BFI)-0.85) \times Q \times FF$; where
 - (i) BFI = base fuel index
 - (ii) CFI = current fuel index
 - (iii) FF = fuel factor
 - (iv) Q = monetary value of Work applied in the calculation.

D33.1.1 Eligible Work will be determined in accordance with D33.5.

D33.1.2 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 fifteen percent (15%) regular unleaded gasoline at self-service filling stations and eighty-five percent (85%) diesel fuel at self-service filling stations.

D33.1.3 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.

D33.1.4 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.

- D33.2 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.
- D33.3 The fuel escalation or de-escalation adjustment will not be applied if the CFI is within \pm fifteen percent (15%) of the BFI.
- D33.4 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.
- D33.5 The Fuel Factor (FF) rates will be set as follows:
- (a) The Fuel Factor rate shall be set at 2.7% of the monetary value of all Work based on unit prices except for the portions of the Contract identified below;
 - (b) The Fuel Factor will not apply to Part C and Part D identified on Form B: Prices related to Water & Waste Work.

WARRANTY

D34. WARRANTY

- D34.1 Notwithstanding C13.2, the warranty period shall begin on the date of Substantial Performance and shall expire one (1) year thereafter for pavement rehabilitation works, and two (2) years thereafter for pavement reconstruction and watermain renewal works, unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.
- D34.2 Notwithstanding C13.2 or D34.1, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Substantial Performance if:
- (a) a portion of the Work cannot be completed because of unseasonable weather or other conditions reasonably beyond the control of the Contractor but that portion does not prevent the balance of the Work from being put to its intended use.
- D34.2.1 In such case the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in C13.2 for the warranty period to begin.

DISPUTE RESOLUTION

D35. DISPUTE RESOLUTION

- D35.1 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 D35.
- D35.2 The entire text of C21.4 is deleted, and amended to read: "Intentionally Deleted"
- D35.3 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 Materials Management 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.
- D35.4 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; and
 - (iii) Department Head.

- D35.4.1 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.
- D35.4.2 As these negotiations are not an adjudicative hearing, neither party may have legal counsel present during the negotiations.
- D35.4.3 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.
- D35.4.4 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 D35.4.3, 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.

THIRD PARTY AGREEMENTS

D36. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

- D36.1 In the event that funding for the Work of the Contract is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, the following terms and conditions shall apply, as required by the applicable funding agreements.
- D36.2 Further to D36.1, in the event that the obligations in D36 apply, actual costs legitimately incurred by the Contractor as a direct result of these obligations ("Funding Costs") shall be determined by the actual cost to the Contractor and not by the valuation method(s) outlined in C7.4. In all other respects Funding Costs will be processed in accordance with Changes in Work under C7.
- D36.3 For the purposes of D36:
- (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.
- D36.4 Modified Insurance Requirements
- D36.4.1 If not already required under the insurance requirements identified in D13, the Contractor will be required to provide wrap-up liability insurance in an amount of no less than two million dollars (\$2,000,000) inclusive per occurrence. Such policy will be written in the joint names of the City, Contractor, Consultants and all sub-Contractors and sub-consultants and include twelve (12) months completed operations. The Government of Manitoba and their Ministers, officers, employees, and agents shall be added as additional insureds.

- D36.4.2 If not already required under the insurance requirements identified in D13, the Contractor will be required to provide builders' risk insurance (including boiler and machinery insurance, as applicable) providing all risks coverage at full replacement cost, or such lower level of insurance that the City may identify on a case-by-case basis, such as an installation floater.
- D36.4.3 The Contractor shall obtain and maintain third party liability insurance with minimum coverage of two million dollars (\$2,000,000.00) per occurrence on all licensed vehicles operated at the Site. In the event that this requirement conflicts with another licensed vehicle insurance requirement in this Contract, then the requirement that provides the higher level of insurance shall apply.
- D36.4.4 Further to D13.4, insurers shall provide satisfactory Certificates of Insurance to the Government of Manitoba prior to commencement of Work as written evidence of the insurance required. The Certificates of Insurance must provide for a minimum of thirty (30) days' prior written notice to the Government of Manitoba in case of insurance cancellation.
- D36.4.5 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.
- D36.5 Indemnification By Contractor
- D36.5.1 In addition to the indemnity obligations outlined in C17 of the General Conditions for Construction, the Contractor agrees to indemnify and save harmless the Government of Canada and the Government of Manitoba and each of their respective Ministers, officers, servants, employees, and agents from and against all claims and demands, losses, costs, damages, actions, suit or other proceedings brought or pursued in any manner in respect of any matter caused by the Contractor or arising from this Contract or the Work, or from the goods or services provided or required to be provided by the Contractor, except those resulting from the negligence of any of the Government of Canada's or the Government of Manitoba's Ministers, officers, servants, employees, or agents, as the case may be.
- D36.5.2 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.
- D36.6 Records Retention and Audits
- D36.6.1 The Contractor shall maintain and preserve accurate and complete records in respect of this Contract and the Work, including all accounting records, financial documents, copies of contracts with other parties and other records relating to this Contract and the Work during the term of the Contract and for at least six (6) years after Total Performance. Those records bearing original signatures or professional seals or stamps must be preserved in paper form; other records may be retained in electronic form.
- D36.6.2 In addition to the record keeping and inspection obligations outlined in C6 of the General Conditions for Construction, the Contractor shall keep available for inspection and audit at all reasonable times while this Contract is in effect and until at least six (6) years after Total Performance, all records, documents, and contracts referred to in D36.6.1 for inspection, copying and audit by the City of Winnipeg, the Government of Manitoba and/or the Government of Canada and their respective representatives and auditors, and to produce them on demand; to provide reasonable facilities for such inspections, copying and audits, to provide copies of and extracts from such records, documents, or contracts upon request by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada

and their respective representatives and auditors, and to promptly provide such other information and explanations as may be reasonably requested by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada from time-to-time.

D36.7 Other Obligations

- D36.7.1 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.
- D36.7.2 If the Lobbyists Registration Act (Manitoba) applies to the Contractor, the Contractor represents and warrants that it has filed a return and is registered and in full compliance with the obligations of that Act, and covenants that it will continue to comply for the duration of this Contract.
- D36.7.3 The Contractor shall comply with all applicable legislation and standards, whether federal, provincial, or municipal, including (without limitation) labour, environmental, and human rights laws, in the course of providing the Work.
- D36.7.4 The Contractor shall properly account for the Work provided under this Contract and payment received in this respect, prepared in accordance with generally accepted accounting principles in effect in Canada, including those principles and standards approved or recommended from time-to-time by the Chartered Professional Accountants of Canada or the Public Sector Accounting Board, as applicable, applied on a consistent basis.
- D36.7.5 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.
- D36.7.6 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 H2: LABOUR AND MATERIAL PAYMENT BOND
(See D14)

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. 81-2023

2023 Goulet Street Rehabilitation and Des Meurons Reconstruction

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
 - (i) 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;

- (ii) 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;
 - (iii) 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 D15)

2023 Goulet Street Rehabilitation and Des Meurons Reconstruction

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
SURFACE WORKS		
<i>Supply of Materials</i>		
Base Course and Sub-Base Course		
Geotextiles		
Geogrid		
Paving Stones		
Concrete		
Asphalt		
Clear Stone Galleries		
Topsoil/Sod/Trees/ Soil Cells/Rain Gardens		
<i>Installation/Construction</i>		
Excavation		
Base Course and Sub-Base Course		
Geotextiles		
Traffic Control and Traffic Management		
Concrete		
Asphalt		
Retaining Walls		
Clear Stone Galleries		
Topsoil/Sod/Trees/Soil Cells/Rain Gardens		
Streetlight Works		
Signal Works – Conduits, anchor bolts, concrete for bases		
UNDERGROUND WORKS		
<i>Supply of Materials</i>		
Watermain Pipe		
Valves		
Hydrants		
Catch basins/Manholes		
Connection Pipe		

FORM J: SUBCONTRACTOR LIST
(See D15)

2023 Goulet Street Rehabilitation and Des Meurons Reconstruction

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
Sub drains		
<i>Installation/Construction</i>		
Watermain Pipe		
Valves		
Hydrants		
Catch basins/Manholes		
Connection Pipe		
Sub drains		
OTHER:		

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, Materials Management Division website at <http://www.winnipeg.ca/matmgt/Spec/Default.stm>.
- E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.2.3 Further to C2.4(d), Specifications included in the Tender shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B6. 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 B6.
- E1.4 The following are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
	Cover Sheet	
P-3561-01	GOULET ST – PLAN -PROFILE (STA. 1+440 TO 1+560)	A1
P-3561-02	GOULET ST – PLAN -PROFILE (STA. 1+560 TO 1+710)	A1
P-3561-03	GOULET ST – PLAN -PROFILE (STA. 1+710 TO 1+860 - NORTH)	A1
P-3561-04	GOULET ST – PLAN -PROFILE (STA. 1+710 TO 1+860 - SOUTH)	A1
P-3561-05	GOULET ST – PLAN -PROFILE (STA. 1+860 TO 2+010 - NORTH)	A1
P-3561-06	GOULET ST – PLAN -PROFILE (STA. 1+860 TO 2+010 - SOUTH)	A1
P-3561-07	GOULET ST – PLAN -PROFILE (STA. 2+010 TO 2+085)	A1
P-3561-08	GOULET ST – PLAN -PROFILE (STA. 2+085 TO END) AND ENFIELD CR SIDEWALK	A1
P-3561-09	DES MEURONS ST – RECONSTRUCTION	A1
P-3561-10	DES NERYIBS ST CONCRETE JOINT PLAN	A1
P-3561-11	SECTIONS	A1
P-3561-12	DETAILS	A1
P-3561-13	TRAFFIC STAGING – STAGE 1 (1 OF 3)	A1
P-3561-14	TRAFFIC STAGING – STAGE 1 (2 OF 3)	A1
P-3561-15	TRAFFIC STAGING – STAGE 1 (3 OF 3)	A1
P-3561-16	TRAFFIC STAGING – STAGE 2 (1 OF 3)	A1
P-3561-17	TRAFFIC STAGING – STAGE 2 (2 OF 3)	A1
P-3561-18	TRAFFIC STAGING – STAGE 2 (3 OF 3)	A1
P-3561-19	DES MEURONS ST – WATERMAIN RENEWAL	A1
P-3561-20	GOULET ST – WATERMAIN RENEWAL (1 OF 2)	A1
P-3561-21	GOULET ST – WATERMAIN RENEWAL (2 OF 2)	A1
P-3561-22	YOUVILLE ST – WATERMAIN RENEWAL	A1
P-3561-23	RETAINING WALLS	A1
P-3561-24	RETAINING WALLS – DETAILS	A1

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
P-3561-25	MATERIALS & PLANTING PLAN (L1)	A1
P-3561-26	MATERIALS & PLANTING PLAN (L2)	A1
P-3561-27	MATERIALS & PLANTING PLAN (L3)	A1
P-3561-28	MATERIALS & PLANTING PLAN (L4)	A1
P-3561-29	DETAILS 1 (L5)	A1
P-3561-30	DETAILS 2 (L6)	A1
S-1354	TRAFFIC SIGNALS – BRAEMAR AVE & GOULET ST	A1
S-1358	TRAFFIC SIGNALS – DES MEURONS ST & GOULET ST	A1
S-1454	TRAFFIC SIGNALS – GOULET ST & TRAVERSE AVE	A1
S-1462	TRAFFIC SIGNALS – DES MEURONS ST & MARION ST	A1
S-2182	TRAFFIC SIGNALS – ENFIELD CRES & GOULET ST	A1
1-04707-DE-50000-P38190	STREET LIGHT INSTALLATION/RELOCATION	A1

E2. MOBILIZATION AND DEMOBILIZATION PAYMENT

DESCRIPTION

- E2.1 This Specification shall cover all operations relating to the mobilization and demobilization of the Contractor to the project location(s).
- E2.2 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 Works as hereinafter specified.
- E2.3 The inclusion of a payment item for the Work under this Specification shall not release or reduce the responsibilities of the Contractor under any other Specification in this Contract.

SCOPE OF WORK

- E2.4 Further to C12 of the General Conditions, where Mobilization and Demobilization is included as a Bid item, it shall consist of the following, as applicable:
- (a) Mobilization shall include, but not be limited to:
 - (i) All activities and associated costs for transportation of the Contractor's personnel, equipment, and operating supplies to the Site, and/or Sites, and/or between Sites;
 - (ii) Establishment of offices, buildings, other necessary general facilities and equipment parking/staging areas for the Contractor's operations at the Site or Sites;
 - (iii) Premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable;
 - (iv) General cleanup and housekeeping needed maintain a neat and orderly project Site(s); and
 - (v) Other job related items.
 - (b) Demobilization shall include, but not be limited to:
 - (i) All activities and costs for transportation of personnel, equipment, and supplies not used in the project from the Site, and/or Sites, and/or between Sites;
 - (ii) Disassembly, removal, and Site cleanup and restoration of offices, buildings, and other facilities assembled on the Site and/or Sites;
 - (iii) Repair of access roads, temporary haul roads, and equipment parking areas leaving the project Site in the same or better condition than at the start of the project;
 - (iv) General cleanup and housekeeping needed to restore a neat and orderly project Site.

E2.5 Access to the Site, equipment parking, and staging areas are limited to that shown on the Drawings or as approved by the Contract Administrator.

MEASUREMENT AND PAYMENT

E2.6 The lump-sum price for the Mobilization and Demobilization Bid item shall not exceed five percent (5.00%) of the total Bid price for the Contract.

E2.6.1 Further to B9, B17, C12 and E2.6, should the lump sum price exceed five percent (5%) of the Total Bid Price the lump sum price will be reduced to five percent (5%) of the Total Bid Price, the Total Bid Price will be determined using the reduced lump sum price and payment will be based on the reduced lump sum price.

E2.7 Payment for Mobilization:

(a) Sixty percent (60%) of the lump-sum price will be paid to the Contractor for Mobilization on the first Progress Estimate for the Contract.

E2.8 Payment for Demobilization:

(a) The remaining forty percent (40%) of the lump-sum price will be paid upon:
(i) restoration of the Site and/or Sites to the satisfaction of the Contract Administrator;
and
(ii) distribution of the Declaration of Total Performance.

E2.9 Pay Reduction for Accessibility Plan

(a) The Demobilization payment will be reduced by the number of pay adjustments incurred in accordance with D17 and as determined by the Contract Administrator.

E2.10 Mobilization and Demobilization will be paid only once (to a maximum of one hundred percent (100%)), regardless of the number of times the Contractor mobilizes to the Site and/or Sites.

E3. GEOTECHNICAL REPORT

E3.1 Further to C3.1, the geotechnical report is provided to aid the Contractor's evaluation of the pavement structure and/or existing soil conditions. The geotechnical report is contained in Appendix 'A'.

E4. OFFICE FACILITIES

E4.1 The Contractor shall supply office facilities meeting the following requirements:

- (a) The field office shall be for the exclusive use of the Contract Administrator;
- (b) The building shall be conveniently located near the Site of the Work;
- (c) The building shall have a minimum floor area of twenty-five (25) square metres, a height of 2.4 m with two (2) windows for cross ventilation and a door entrance with a suitable lock;
- (d) The building shall be suitable for all weather use. It shall be equipped with an electric heater and air conditioner so that the room temperature can be maintained between either sixteen (16) to eighteen (18) degrees Celsius or twenty-four (24) to twenty-five (25) degrees Celsius;
- (e) The building shall be adequately lighted with fluorescent fixtures and have a minimum of three (3) wall outlets;
- (f) The building shall be furnished with one (1) desk, one (1) drafting table, table three (3) m by 1.2 m, one (1) stool, one (1) four (4) drawer legal size filing cabinet and a minimum of twelve (12) chairs;
- (g) A portable toilet shall be located near the field office building. The toilet shall have a locking door and be for the exclusive use of the Contract Administrator and other personnel from the City; and

- (h) The field office building and the portable toilet shall be cleaned on a weekly basis immediately prior to each Site meeting. The Contract Administrator may request additional cleaning when they deem it necessary.

- E4.2 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.
- E4.3 The office facilities will be provided from the date of the commencement of the Work to the date of Total Performance.
- E4.4 On a one (1) time basis, where directed by the Contract Administrator, the Contractor shall relocate the office facilities to a location more convenient for the remaining Work.

E5. PROTECTION OF EXISTING TREES

E5.1 Description

- (a) This Specification shall cover all operations relating to the protection of existing riverbank and boulevard trees during construction.
- (b) 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 other things necessary for and incidental to the satisfactory performance and completion of all Work hereinafter specified.

E5.2 Construction Methods

- E5.2.1 Field-verify the presumed limits of Work indicated on the Drawings, and flag all trees that require pruning or removal to facilitate the Work, subject to the Contract Administrator’s approval. Overhanging branches in the Work zone shall only be pruned if they interfere with the Work. No trees may be removed or pruned without written approval from the Contract Administrator.
- E5.2.2 Trees within or adjacent to a construction area that are not approved for removal by the Contract Administrator must be protected during construction by means of a barrier surrounding a “Tree Protection Zone” (TPZ) as outlined in this Specification.
- E5.2.3 Activities which are likely to injure or destroy the tree are not permitted within the TPZ.
- E5.2.4 Tree pruning or root pruning of City of Winnipeg owned trees may only be done by a Contractor approved by the project’s certified arborist or Urban Forestry Branch.
- E5.2.5 No objects may be attached to trees protected by City of Winnipeg by-laws without written authorization by the City of Winnipeg.
- E5.2.6 No City of Winnipeg tree or tree protected by a City of Winnipeg by-law may be removed without the written permission of the City of Winnipeg.
- E5.2.7 **Tree Protection Zone**
 - (a) Table 1 shows the minimum distance for determining a TPZ. Minimum protection distances are to be measured from the outside edge of the tree base toward the drip line, and may be limited by an existing paved surface, provided that surface remains intact through the construction period. Some Site conditions may dictate the need for a smaller TPZ. The City of Winnipeg Urban Forestry Branch must be notified in these instances to determine if a smaller TPZ is acceptable in the specific circumstance and advise of any additional tree protection or removal requirements.

Table 1 – Tree Protection Zones

Trunk Diameter at Breast Ht. (DBH)	Minimum Protection Distance Required
<10 cm	2.0 m
11-40 cm	2.4 m
41-50 cm	3.0 m

51-60 cm	3.6 m
61-70 cm	4.2 m
71-80 cm	4.8 m
81-90 cm	5.4 m
91-100 cm+	6.0 m

E5.2.8 Tree Protection Barriers

- (a) Tree protection barriers shall be erected around trees to be protected to keep crowns and branching structure clear from contact by equipment, materials and activities; to preserve roots and soil condition in an intact and non-compacted state; and to identify the TPZ in which no soil disturbance is permitted and activities are restricted, unless otherwise approved by the Contract Administrator.
- (b) The required barrier is a 1.2 m high orange plastic web snow fencing on fifty (50) mm by one hundred (100) mm frame or as directed by the City of Winnipeg Urban Forestry Branch in accordance with the City of Winnipeg Protection of Existing Tree Specifications. The barrier can be lowered around branches lower than 1.2 m. The barrier location can be adjusted to align with curbs and edges at clear path of travel zones.
- (c) Tree strapping Material shall be installed on individual trees, in accordance with CW 1140, where Work will be completed within the TPZ.
- (d) Tree protection barriers shall be erected prior to the commencement of any construction or grading activities on the Site and are to remain in place throughout the entire duration of any adjacent Work. The Contractor shall notify the City of Winnipeg prior to commencing any construction activities to confirm that the tree protection barriers are in place. Tree protection barriers shall be removed prior to the spring freshet and re-established in areas of future adjacent Work following recession of high river levels.
- (e) All supports and bracing used to safely secure the barrier shall be located outside the TPZ and shall minimize damage to roots.
- (f) No grade change, storage of materials or equipment is permitted within the TPZ. The tree protection barrier must not be removed without the written authorization of the City of Winnipeg.

E5.2.9 The Contractor shall take the following precautionary steps to prevent damage to existing trees:

- (a) Material shall not be stockpiled or vehicle and equipment parked on boulevards within two (2) m of trees.
- (b) Where authorized, operation of equipment within the dripline of the trees shall be kept to the minimum required to perform the Work. Equipment shall not be parked, repaired, refuelled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposition on areas where trees are located.
- (c) Take precautions to ensure tree limbs overhanging the Site are not damaged by construction equipment. Contact the Forestry Branch for consultation on pruning of overhanging or damaged limbs and branches and other unanticipated problems with trees during construction of the Works.

E5.2.10 Root Protection, Cutting and Care

- (a) Avoid cutting roots. If root cutting appears to be necessary, obtain approval from the Contract Administrator before proceeding. If required and approved, root pruning must be performed under the direction of the Forestry Branch.
- (b) Cut roots cleanly with sharp, sterilized hand tools to promote quick wound closure and regeneration.

- (c) Minimize damage by avoiding excavation during hot, dry weather.
- (d) Keep protected plants well-watered before and after digging.
- (e) Cover exposed roots with approved temporary root cover Material such as soil, mulch or damp burlap immediately after exposure. Temporary root covers shall be kept damp as long as they are in place.

E5.2.11 American elm trees are not to be pruned between April 1 and August 1 and Siberian elm trees between April 1 and July 1 of any year under provisions of The Dutch Elm Disease Act.

E5.2.12 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the Forestry Branch. Damages must be repaired by an individual with a Manitoba Arborist licence or by the Forestry Branch.

E5.2.13 The Forestry Branch will remove and replace any trees deemed to have died or that are dying due to damage from carelessness during construction. Removal and compensation costs will be determined by size, market price of the largest transplantable tree of same or different species and may include appraised value of existing tree as determined by current International Society of Arboriculture evaluation procedure presently used by Forestry Branch in conjunction with City Claims Branch. Estimated compensation of a two hundred fifty (250) mm and six hundred (600) mm diameter American elm on a boulevard will be approximately four thousand seven hundred dollars (\$4,700.00) and twenty-seven thousand dollars (\$27,000.00) respectively.

E5.3 Measurement and Payment

- (a) Tree protection shall be considered incidental to Site Development and no additional measurement payments will be made for Work described in this Specification.

E5.4 Forestry compensation arising from damage or destruction of trees that are not approved for removal will be assessed by the Forestry Branch and shall be deducted from the Contractor's progress claims.

E6. TRAFFIC CONTROL

E6.1 Further to clauses 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; and

- (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.
 - (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.
- E6.2 Upon request from the Contract Administrator, the Contractor shall provide records demonstrating that the Site has been maintained.
- E6.3 Further to E6.1(c) and E6.1(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. The Contractor shall make arrangements to drop off the stockpiled materials to Traffic Services at 495 Archibald Street.
- E6.4 Any changes to the approved Traffic Management Plan must be submitted to the Contract Administrator a minimum of five (5) Working Days prior to the required change for approval.
- E6.5 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.

E7. TRAFFIC MANAGEMENT

- E7.1 Further to clause 3.7 of CW 1130:
- (a) the Contractor shall refer to the Traffic Staging Drawings P-3561-14 to P-3561-19 for traffic management details for each stage; and
 - (b) any proposed modifications to the construction staging and/or traffic management plans outlined in the Contract Documents must be approved by the Contract Administrator.

E8. REFUSE AND RECYCLING COLLECTION

- E8.1 While access to refuse and/or recycling collection vehicles is restricted, on collection day(s) the Contractor shall move all of the affected property owners refuse and/or recycling materials to a nearby common area, prior to an established time, in accordance with E8.2 to permit the normal collection vehicles to collect the materials. Immediately following recycling collection the Contractor shall return recycling receptacles to the addresses marked on the receptacles.
- E8.2 Collection Schedule:

Goulet Street from Rue Youville to Travers Avenue

<i>Collection Day(s):</i>	Residential Garbage and Recycling – Tuesday
<i>Collection Time:</i>	Front End Bin Service – 421-453 Marion Street and 319-323 Rue Youville – Wednesday 0700
	Back lane residential and commercial pickup along Rue Youville back lane (421-453 Marion Street, 319-323 Rue Youville) between Marion Street and Goulet Street. Contractor to ensure access to back lane is maintained for back lane pickup. For on-street pickup, Contractor is to relocate bins to common collection point and return back to the property as required.
<i>Common Collection Area:</i>	Contractor to ensure access to Rue Youville back lane between Marion Street and Goulet Street is maintained.

Des Meurons Street from Goulet Street to Marion Street

Collection Day(s): Residential Garbage and Recycling – Tuesday

Collection Time: Front End Bin Service – 324 Enfield – Wednesday 0700

Back lane residential and commercial pickup along Des Meurons Street (321-325 Des Meurons Street, 324 Enfield Crescent) between Marion Street and Goulet Street. Contractor to ensure access to back lane is maintained for back lane pickup. For on-street pickup, Contractor is to relocate bins to common collection point and return back to the property as required.

Common Collection Area: Contractor to ensure access to Des Meurons Street back lane between Marion Street and Goulet Street is maintained.

E8.3 No measurement or payment will be made for the Work associated with this Specification.

E9. PEDESTRIAN SAFETY

E9.1 During the project, a temporary snow fence shall be installed where hazards exist adjacent to pedestrian facilities, such as open excavations. The Contractor shall be responsible for maintaining the snow fence in a proper working condition. No measurement for payment shall be made for this Work.

E10. WATER OBTAINED FROM THE CITY

E10.1 Further to clause 3.7 of CW 1120, the Contractor shall pay for all costs, including sewer charges, associated with obtaining water from the City in accordance with the Waterworks and Sewer By-laws.

E11. SURFACE RESTORATIONS

E11.1 Further to clause 3.3 of CW 1130, when Total Performance is not achieved in the year the Contract is commenced, the Contractor shall temporarily repair any Work commenced and not completed to the satisfaction of the Contract Administrator. The Contractor shall maintain the temporary repairs in a safe condition as determined by the Contract Administrator until permanent repairs are completed. The Contractor shall bear all costs associated with temporary repairs and their maintenance.

E12. INFRASTRUCTURE SIGNS

E12.1 The Contractor shall obtain infrastructure signs from the Traffic Services Sign Shop at 421 Osborne Street. The Contractor shall mount each sign securely to a rigid backing Material approved by the Contract Administrator. The Contractor shall fasten each sign to a suitable support and erect and maintain one (1) sign at each street as directed by the Contract Administrator. When the Contract Administrator considers the Work on the street complete, the Contractor shall remove and dispose of the signs and supports. No measurement for payment will be made for performing all operations herein described and all other items incidental to the Work described.

E13. ASPHALT PATCHING OF MISCELLANEOUS CONCRETE

DESCRIPTION

E13.1 General

E13.1.1 Further to CW 3410, this Specification covers the placement of asphalt patches in various situations to prepare a concrete pavement for subsequent placement of mainline asphalt pavement overlay. This includes patching full depth concrete repairs, cracks, joints, and vertical faults.

- E13.1.2 Referenced City of Winnipeg Standard Construction Specifications:
(a) CW 1130 – Site Requirements; and
(b) CW 3410 – Asphaltic Concrete Pavement Works.

MATERIALS

- E13.2 Asphalt Materials
E13.2.1 Asphalt Material supplied shall be in accordance with CW 3410 Type 1A Asphalt Material.
E13.3 Equipment
E13.3.1 Equipment shall be in accordance with CW 3410 Clause 8.

CONSTRUCTION METHODS

- E13.4 Full Depth Concrete Repairs
E13.4.1 Place asphaltic concrete over the newly constructed joint repair area with greater than twenty (20) mm elevation difference between the repair surface and the adjacent surface. Remove any loose or debonded asphalt at the joint perimeter and place new asphaltic concrete in these areas as well.
E13.4.2 Dispose of all Material in accordance with CW 1130 Section 3.4.
E13.4.3 Ensure surface is dry and clean prior to placement of asphaltic concrete patching Material.
E13.4.4 Prepare the joint repair area surface with a uniform application of tack coat applied in small quantities sufficient to wet the concrete surface.
E13.4.5 Place and compact asphaltic concrete over the joint repair area in accordance with CW 3410 Clause 9.3 and to the satisfaction of the Contract Administrator so that the finished elevation of the patch is flush with the adjacent surrounding area.
E13.4.6 Compact the asphaltic concrete to an average of ninety-five percent (95%) of the 75 blow Marshal Density of the paving mixture with no individual test being less than ninety percent (90%).
E13.4.7 Traffic is not permitted on the patch area until the asphalt has cooled to ambient temperature.

MEASUREMENT AND PAYMENT

- E13.5 Asphalt Patching of Miscellaneous Concrete will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Asphalt Patching of Miscellaneous Concrete". The area to be paid for will be the total number of square metres of full depth joints, cracks and joints, and vertical faults patched in accordance with this Specification.

E14. PORTLAND CEMENT MONOLITHIC CONCRETE CURB AND SIDEWALK WITH BLOCK OUTS FOR ASPHALT PAVEMENT OR INDICATOR SURFACES

DESCRIPTION

- E14.1 This Specification shall supplement CW 3325-R5 "Portland Cement Concrete Sidewalks".

CONSTRUCTION METHODS

- E14.2 Add the following to section 9:
E14.2.1 As shown on the Drawings and as directed by the Contract Administrator, construct sidewalk with block outs and/or monolithic curb and sidewalk with block outs, to allow for the placement of asphalt or installation of indicator surfaces.

- E14.2.2 Verify dimensions of paving stones (indicator surface) prior to construction of the block-outs. Gaps between paving stones and concrete pavement shall not exceed five (5) mm.
- E14.2.3 When constructing the sidewalk adjacent to rain gardens, tree openings and trench drains:
- (a) The sidewalk shall be constructed with a thickened edge near tree openings and trench drains, as shown on the Drawings and as directed by the Contract Administrator.
 - (b) Verify locations of tree openings and trench drains prior to installing the formwork for the sidewalk.
- E14.2.4 Concrete curbs for monolithic curb and sidewalk with block outs shall be constructed in accordance with CW 3240.

MEASUREMENT AND PAYMENT

- E14.3 Add the following to section 12:
- E14.3.1 Construction of monolithic concrete curb and sidewalk with block outs for asphalt pavement or indicator surfaces will be measured on surface area basis. The surface area to be paid for shall be the number of square metres constructed in accordance with this Specification and accepted by the Contract Administrator, as computed by measurements made by the Contract Administrator.

BASIS OF PAYMENT

- E14.4 Add the following to section 13:
- E14.4.1 Construction of monolithic concrete curb and sidewalk with block outs for asphalt pavement or indicator surfaces will be paid for at the Contract Unit Price per square meter for the "Items of Work" listed here below, measured as specified herein, 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.
- E14.4.2 Items of Work:
- (a) Type 1 Concrete Monolithic Curb and one hundred (100) mm Sidewalk with Block Outs; and
 - (b) Type 1 Concrete Monolithic Curb and one hundred (100) mm Sidewalk with Asphalt Block Outs.
- E14.4.3 Concrete thickness greater than the specified sidewalk thickness as a result of shaping the base Material to accommodate the block outs is incidental to the listed Items of Work.
- E14.4.4 The thickened edge near rain gardens, tree openings and trench drains will be considered incidental to the listed Items of Work.

E15. PAVING STONES FOR INDICATOR SURFACES

DESCRIPTION

- E15.1 This Specification shall supplement CW 3330-R5 "Installation of Interlocking Paving Stones".

MATERIALS

- E15.2 Add the following to section 5:
- E15.2.1 Paving Stones for indicator surfaces shall be as shown on the Drawings.

E15.2.2 Paving Stones for indicator surfaces shall be:

Barkman Concrete paving stones –
Charcoal Holland Paver (sixty (60) mm by two hundred ten (210) mm by two hundred ten (210) mm)
<https://www.barkmanconcrete.com/>

E15.2.3 Paving Stones over bus stop flag bases only shall be:

Barkman Concrete paving stones –
Natural Holland Paver (sixty (60) mm by two hundred ten (210) mm by two hundred ten (210) mm)
<https://www.barkmanconcrete.com/>

E15.2.4 Sand:

(a) Clean brick sand as minimum thirteen (13) mm depth setting bed. Bedding sand shall be fine aggregate as specified in Specification CW 3330.

CONSTRUCTION METHODS

E15.3 Add the following to section 9.2 “Preparation of Sub-grade, Sub-base and Sand-base”:

E15.3.1 Preparation of Sand-Base for Paving Stones in Sidewalk Block Outs.

E15.3.2 Place a fifteen (15) mm layer of bedding sand in the blocked out sidewalk areas.

E15.3.3 The bedding sand shall be spread and levelled so that the paving stones when installed are five (5) mm higher than the finished grade.

E15.3.4 No more sand shall be spread than can be covered in with paving stone on the same day.

E15.3.5 The bedding sand shall not be compacted or disturbed prior to laying the paving stones.

E15.4 Add the following to section 9.3 “Installation of Paving Stones”:

E15.4.1 For indicator surface paving stones, commence installation of paving stones against the long edge of the block out to obtain the straightest possible course of installation.

MEASUREMENT AND PAYMENT

E15.5 Add the following to section 12:

E15.6 Supply and Installation of Paving Stones for Indicator Surfaces

E15.6.1 Paving stones for indicator surfaces will be measured on surface area basis. The surface area to be paid for shall be the number of square metres constructed in accordance with this Specification and accepted by the Contract Administrator, as computed by measurements made by the Contract Administrator.

BASIS OF PAYMENT

E15.7 Add the following to section 13:

E15.7.1 The supply and installation of paving stones for indicator surfaces will be paid for at the Contract Unit Price per square meter for “Paving Stone Indicator Surfaces”, measured as specified herein, 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.

E15.7.2 Concrete thickness greater than the specified sidewalk thickness as a result of shaping the base Material to accommodate the block outs is incidental to the listed Items of Work.

E16. ONE HUNDRED FIFTY (150) MM REINFORCED CONCRETE SIDEWALK

DESCRIPTION

E16.1 This Specification covers the Work related to the installation of one hundred fifty (150) mm reinforced concrete sidewalk.

REFERENCES

E16.2 Referenced Standard Construction Specifications:

- (a) CW 3235 – Renewal of Existing Miscellaneous Concrete Slabs; and
- (b) CW 3325 – Portland Cement Concrete Sidewalk.

E16.3 Referenced Standard Details and Drawings:

- (a) All applicable Contract Drawings.

MATERIALS AND EQUIPMENT

E16.4 Materials:

- (a) Materials supplied shall be as per CW 3325 Clause 5.
- (b) Reinforcing steel supplied shall be as per CW 3235 Clause 2.2.

E16.5 Equipment

- (a) Equipment as per CW 3325 Clause 8.

CONSTRUCTION METHOD

E16.6 One Hundred Fifty (150) mm Reinforced Concrete Sidewalk

- (a) One hundred fifty (150) mm Reinforced Concrete Sidewalk shall be constructed as shown on the Contract Drawings.

MEASUREMENT AND PAYMENT

E16.7 One Hundred Fifty (150) mm Reinforced Concrete Sidewalk

- (a) Construction of one hundred fifty (150) mm reinforced concrete sidewalk will be measured on a surface area basis and will be paid for at the Contract Unit Price per square metres for "Type 5 Concrete one hundred fifty (150) mm Reinforced Sidewalk", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in the Specification.

E17. SIXTY (60) MM LIP CURB

DESCRIPTION

E17.1 This Specification covers the Work related to the installation of sixty (60) mm Lip Curb.

REFERENCES

E17.2 Referenced Standard Construction Specifications:

- (a) CW 3310 – Portland Cement Concrete Pavement Works.

E17.3 Referenced Standard Details and Drawings:

- (a) seventy-five (75) mm Lip Curb – SD-202A; and
- (b) all applicable Contract Drawings.

MATERIALS AND EQUIPMENT

E17.4 Materials

- (a) Materials supplied shall be as per CW 3310 Clause 5.

E17.5 Equipment

- (a) Equipment as per CW 3310 Clause 8.

CONSTRUCTION METHOD

E17.6 Sixty (60) mm Lip Curb

- (a) Sixty (60) mm Lip Curb shall be constructed as shown on the Contract Drawings.

MEASUREMENT AND PAYMENT

E17.7 Sixty (60) mm Lip Curb

- (a) Construction of sixty (60) mm Lip Curb will be measured on a length basis and will be paid for at the Contract Unit Price per metre for "Sixty (60) mm Lip Curb", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in the Specification.

E18. SUPPLY AND INSTALL DIRECTIONAL TACTILE STRIP

DESCRIPTION

- E18.1 This Specification covers the supply and installation of directional bar tiles in one hundred (100) mm concrete sidewalks. These are used at bus stops where the sidewalk must cross a Multi-Use Path or bicycle path.

REFERENCES

E18.2 Referenced Specifications and Drawings

- E18.2.1 The latest version of the City of Winnipeg Standard Construction Specifications:
 - (a) CW 3235 – Renewal of Existing Miscellaneous Concrete Slabs;
 - (b) CW 3310 – Portland Cement Concrete Pavement Works; and
 - (c) CW 3325 – Portland Cement Concrete Sidewalk.

MATERIALS AND EQUIPMENT

E18.3 Acceptable Directional Tactile Strip product is (or equivalent in accordance with B6):

- (a) three hundred five (305) mm by six hundred ten (610) mm Cast in Place (Wet Set) with Anchors – Manufactured by ADA Solutions;
- (b) part# 1224BAR1875Y;
- (c) Flush Mount, Federal Yellow;
- (d) fasteners: six (6) mm diameter by thirty-eight (38) mm long SS FH Bolts (Hex Drive) and six (6) mm diameter by thirty-eight (38) mm long Zinc Inserts; and
- (e) Sealant: Manufacturer recommended.

E18.3.1 Product Specifications found in Appendix 'B' of this document.

E18.3.2 All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

CONSTRUCTION METHODS

- E18.4 Install Wet Set Replaceable units as per manufacturer's recommendations, and as shown on Contract Drawings.
- E18.5 Where necessary, cut Wet Set Replaceable units accurately using a sixty (60) tooth carbide or diamond blade with a suitable cutting device. No cut unit shall measure less than two hundred fifty (250) mm in length. In accordance with manufacturer's recommendations, supplemental fasteners and inserts shall be added as needed when the distance between the cut face of the unit and the original hardware exceeds one hundred (100) mm.
- E18.6 Install Wet Set Replaceable units true to grade, in location, layout pattern as indicated on the Drawings.
- E18.7 Wet Set Replaceable units shall be set flush into a minimum sixty-five (65) mm depth of concrete. Vibrate or tamp (with rubber mallet) the Wet Set Replaceable units into the fresh concrete to insure that there are no voids underlying the units and that the units are flush with the adjacent substrate. Temporary weights can be added as necessary in the event of float during initial set of the units.
- E18.8 Joint Lines between successive Wet Set Replaceable Units: Maintain a three (3) mm to five (5) mm consistent joint line between successive units.
- E18.9 Tooled Edge Detail: maintain a three (3) mm to six (6) mm tooled edge detail along the perimeter of the Wet Set Replaceable unit installation. Installation of the tooled edge detail facilitates future removal and replacement of the units.
- E18.10 Positive Plastic Sheet: particularly in direct sunlight and when temperatures exceed twenty-five (25) degrees Celsius, remove the protective plastic sheeting from the Wet Set Replaceable units within forty-eight (48) hours of installation of the unit. Failure to do so will be solely at the Contractors risk and may result in the protective plastic bonding to the unit thus requiring a considerable effort to remove the protective plastic sheeting. If plastic sheeting cannot be removed, it will be at the Contractors expense to replace that unit.

MEASUREMENT AND PAYMENT

- E18.11 Directional Tactile Strip
- E18.11.1 Directional Tactile Strip shall be measured on a unit basis and paid for at the Contract Unit Price per unit for the item listed here below. The number of units to be paid for shall be the total number of Directional Tactile Strip supplied and installed in accordance with this Specification, accepted and measured by the Contract Administrator.
- (a) Directional Tactile Strip: three hundred five (305) mm by six hundred ten (610) mm tiles.

E19. SUPPLY AND INSTALL WATERMAIN AND WATER SERVICE INSULATION

DESCRIPTION

- E19.1 Notwithstanding 3.12 of CW 2110, this Specification covers the supply and installation of insulation in roadway excavations over watermains and water services.
- E19.2 Referenced Standard Construction Specifications:
- (a) CW 2030 – Excavation Bedding and Backfill; and
- (b) CW 3110 – Sub –grade, Sub-base and Base Course Construction.
- E19.3 Referenced Standard Details:
- (a) SD-018 – Watermain and Water Service Insulation.

MATERIALS

E19.4 Acceptable insulation is:

- (a) Extruded Polystyrene rigid foam insulation – Type 4, 101.6 mm (four (4) inches) in thickness.
DOW – Roofmate or Highload 40
Owen’s Corning – Foamular 350 or Foamular 400.
50.8 mm (two (2) inches) by 1,219.2 mm (forty-eight (48) inches) by 2,438.4 mm (ninety-six (96) inches), 50.8 mm (two (2) inches) by 609.6 mm (twenty-four (24) inches) by 2,438.4 mm (ninety-six (96) inches), 101.6 mm (four (4) inches) by 609.6 mm (twenty-four (24) inches) by 2,438.4 mm (ninety-six (96) inches).

E19.5 Sand Bedding:

- (a) In accordance with CW 2030.

CONSTRUCTION METHODS

E19.6 Prior to the installation of any sub-base Material or geotextile Material, locate all existing water services. Further to SD-018, where directed by the Contract Administrator, excavate the sub-grade to allow the top of the insulation to be installed flush with the surrounding sub-grade. Install the insulation on a level surface centered over the located watermain or water service for the full width of the roadway excavation. Install sand bedding if required to level the surface. Stockpile and dispose of excavated Material in accordance with CW 3110.

E19.7 Thickness of insulation is one hundred (100) mm (four (4) inches). If using fifty (50) mm (two (2) inches) panels two (2) layers are required. Total width of insulation to be as directed by the Contract Administrator. Place sufficient full width panels to meet or exceed the specified width.

E19.8 Place insulation panels adjacent to each other over the specified area with no gaps between panels and less than fifteen (15) mm of elevation difference along the adjoined edges. Where two (2) inches thick panels are being used, offset the top layer to prevent the panel joints from aligning with the joints in the lower layer.

E19.9 Use full panels of insulation where possible. Where necessary cut insulation panels to obtain coverage to specified lengths. Insulation pieces shall be a minimum of dimension of three hundred (300) mm in width or length.

E19.10 Take appropriate measures to ensure panels are not displaced when installing geotextiles and during backfilling operations.

MEASUREMENT AND PAYMENT

E19.11 Watermain and Water Service Insulation shall be measured on an area basis and paid for at the Contract Unit Price per square metre of “Watermain and Water Service Insulation”. The area to be paid for shall be the total square meters of watermain and water service insulation supplied and installed in accordance with this Specification, accepted and measured by the Contract Administrator.

- (a) Excavation of the roadway subgrade in accordance with E19.6 will not be measured for payment and will be included in the payment for “Watermain and Water Service Insulation”.

E20. WATERMAIN WORKS – CONNECTION TO EXISTING WATER SERVICES

E20.1 This Specification shall amend clause 4.22 of CW 2110.

- (a) Connecting to existing lead water services will be measured and paid for in accordance with Clause 4.13 of CW 2110, “Connecting Existing Copper Water Services to New Watermain” for each connection made, regardless of the Material of the existing water

service being connected to. Connecting to existing lead water services will not be included in the installation of a curb stop.

E21. REPAIR MANHOLE BENCHING

DESCRIPTION

E21.1 General

E21.1.1 This Specification covers the repair of benching in existing manholes.

CONSTRUCTION METHODS

E21.2 Repair Manhole Benching

E21.2.1 The Contractor shall remove and dispose of existing loose or crumbling benching mortar to the satisfaction of the Contract Administrator.

E21.2.2 The Contractor shall bench and channel the manhole floor with mortar or concrete in accordance with CW 2130, SD-010 and SD-011. Flow channels shall curve smoothly and provide a smooth transition between inlet and outlet pipes.

MEASUREMENT AND PAYMENT

E21.3 Repair of manhole benching will be measured on a unit basis and paid for at the Contract Unit Price for "Repair Benching". The number to be paid for shall be the total number of manholes that have been repaired in accordance with this Specification, accepted and measured by the Contract Administrator.

E22. WORKING AROUND MANITOBA HYDRO POLES

DESCRIPTION

E22.1 When excavation for the road within three (3.0) metres of a Manitoba Hydro wood pole, a Safety Watch will be required. The Contractor shall provide a digger truck capable of holding the pole in place while excavation and granular subbase backfill is completed.

(a) The digger truck to be provided by the Contractor shall be to the satisfaction of the Contract Administrator and Manitoba Hydro Safety Watch personnel.

(b) See Appendix 'C' for detail showing allowable excavations around existing poles.

CONSTRUCTION METHOD

E22.2 The pole rigging sling to be provided by the Contractor shall be to the satisfaction of the Contract Administrator and Manitoba Hydro Safety Watch personnel.

E22.3 The sling is to be wrapped around the pole and connected it to the winch line of the digger truck. The sling is to be situated just above the halfway mark of the pole between ground level and the top of the pole.

E22.4 Manitoba Hydro Safety Watch personnel will provide instructions to the Contractor for attaching and detaching the pole sling.

MEASUREMENT AND PAYMENT

E22.5 The Work described in this Specification will be considered incidental to "Excavation" and no measurement or payment will be made.

E23. DOWELS AND TIE BARS

E23.1 Further to Section 9.2.3 of CW 3310, no measurement of payment will be made for dowels or tie bars that are drilled along a joint between new sections of concrete constructed as part of this

Contract. Dowels or tie bars that are drilled into new concrete pavement will be considered incidental to the construction of the concrete pavement.

E24. INSTALLATION OF TRAFFIC SERVICES SIGN CLAMPS

DESCRIPTION

E24.1 General

- E24.1.1 This Specification covers all operations relating to the Installation of Traffic Services Sign Clamps.
- E24.1.2 The Contractor shall install all new sign support clamps at the locations shown on the Drawings or as directed by the Contract Administrator.
- E24.1.3 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Works as hereinafter specified.

MATERIALS

E24.2 Traffic Services Sign Clamps

- E24.2.1 The Contract Administrator will arrange for Traffic Service to have the sign clamps delivered to Site. The Contractor is to store the sign clamps in a secure location until the Material is ready for installation.

CONSTRUCTION METHODS

E24.3 Installation

- E24.3.1 Installation of Traffic Services Sign Clamps is to be done in conjunction with the concrete sidewalk and placed into the fresh concrete at locations determined by the City or the Contract Administrator. The Base Course Material is to be prepared at each location to accommodate the Installation of Traffic Services Sign Clamps.

MEASUREMENT AND PAYMENT

- E24.4 All costs in connection with the installation of sign support clamps are incidental to the Contract.

E25. TRANSIT SHELTER FOUNDATIONS

DESCRIPTION

- E25.1 This Specification shall cover the installation of concrete bus shelter pad foundations as identified on the Drawings.
- E25.2 The Work to be done by the Contractor under this Specification shall include the furnishings of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all works as hereinafter specified.

REFERENCES

E25.3 Referenced Specification and Drawings

- (a) The latest version of the City of Winnipeg Standard Construction Specifications:
 - (i) CW 3310 – Portland Cement Concrete Pavement Works; and
 - (ii) CW 3325 – Portland Cement Concrete Sidewalk.

MATERIALS AND EQUIPMENT

E25.4 General

- (a) All materials supplied under this Specification shall be of a type approved by the Contract Administrator and shall be subject to inspection and testing by the Contract Administrator.
- (b) The Contractor shall be responsible of the supply, safe storage and handling of all materials set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

E25.5 Concrete and Reinforcing Steel

- (a) Concrete shall be Type 5 as per the latest version of the CW 3310 Specification.
- (b) All other materials as per Clause 2 of the latest version of the CW3310 Specification.

CONSTRUCTION METHODS

E25.6 Construction shall take place in accordance with the Drawings, CW 3310 and CW 3325.

E25.7 All forming is incidental to the unit price Bid for the Specification.

E25.8 Verify dimensions of bus shelter pads prior to construction.

E25.9 Meet existing grades and slopes unless otherwise indicated on the Drawings. Notify the Contract Administrator where this requirement will not result in positive drainage.

E25.10 Removal of an existing concrete bus shelter pad shall be incidental to the Work.

MEASUREMENT AND PAYMENT

E25.11 Transit Shelter Foundations

E25.11.1 Construction of the Transit Shelter Foundations shall be paid for at the Contract Unit Price per square metre for "Transit Shelter Foundations", measured as specified herein, performed in accordance with this Specification and accepted by the Contract Administrator, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work. The area to be paid for shall be the total number of square metres of Transit Shelter Foundations constructed in accordance with this Specification and as measure and accepted by the Contract Administrator.

E26. BUS STOP FLAG FOUNDATION

DESCRIPTION

E26.1 The Work covered under this item shall include all concreting operations related to construction of cast-in-place concrete foundations for bus stop flags in accordance with this Specification and as shown on the Drawings.

E26.2 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 Works as hereinafter specified.

MATERIALS

E26.3 General

- (a) The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification.
- (b) Materials as specified on the Drawings.

E26.4 Handling and Storage of Materials

- (a) All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with CSA Standard A23.1-04.

E26.5 Testing and Approval

- (a) All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.
- (b) All materials shall be approved by the Contract Administrator at least seven (7) days before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials in whole or in part, do not conform to the Specifications detailed herein or are found to be defective in manufacture or have become damaged in transit, storage or handling operations, then such materials shall be rejected by the Contract Administrator and replaced by the Contractor at their own expense.

CONSTRUCTION METHODS

E26.6 Salvaging of Existing Flag Signs

- (a) Salvage existing flag signs and/or base plates for reuse in new locations. Store the materials until needed for reinstallation.
- (b) Demolish existing flag foundation to at least 0.5 m below grade. Alternatively, remove entire flag foundation.

E26.7 Location and Alignment of Foundations

- (a) Foundation construction shall not commence until the Contractor has obtained clearance from the appropriate Utility Authorities.
- (b) Foundations shall be placed in the positions shown on the Drawings and as directed by the Contract Administrator in the field.
- (c) The deviation of the axis of any finished foundation shall not differ by more than one percent (1%) from the vertical.

E26.8 Excavation

- (a) The Contractor is responsible for determining the excavation method at each foundation location.
- (b) Excavations for foundations shall be made with equipment designed to remove a core of the diameter shown on the Drawings, or hydro-jet excavation to a depth to bypass and/or expose adjacent utilities.
- (c) Upon reaching the required elevation, the bottom of the excavation shall be cleaned as directed by the Contract Administrator in the field.
- (d) All excavated Material from the foundations shall be promptly hauled away from the Site to an approved disposal area as located by the Contractor.
- (e) Upon completion of the cleaning out of the bottom to the satisfaction of the Contract Administrator, the reinforcement and anchor bolts shall be set in place and the concrete poured immediately. Under no circumstances shall a hole be left to stand open after boring has been complete.

E26.9 Sleeving

- (a) Timber or steel sleeving shall be used to temporarily line the bore to prevent bulging or caving of the walls and to protect men at Work in the bore.
- (b) The sleeving shall be designed by the Contractor and constructed to resist all forces that may tend to distort it.

- (c) The sleeving shall be withdrawn as the concrete is placed in the bore. The sleeving shall extend at least one (1) m below the top of the freshly deposited concrete at all times.
- (d) The clearance between the face of the bore hole and the sleeving shall not exceed seventy-five (75) mm.

E26.10 Inspection of Bores

- (a) Concrete shall not be placed in a bore until the bore has been inspected and approved by the Contract Administrator.
- (b) The Contractor shall have available suitable light for the inspection of each bore throughout its entire length.
- (c) All improperly set sleeving, bore, or bottom shall be corrected to the satisfaction of the Contract Administrator.

E26.11 Placing Reinforcing Steel

- (a) Reinforcement shall be:
 - (i) placed in accordance with the details shown on the Drawings;
 - (ii) rigidly fastened together; and
 - (iii) lowered into the bore intact before concrete is placed.
- (b) Spacers shall be utilized to properly locate the reinforcing steel cage in the bore.

E26.12 Placing Anchor Bolts

- (a) The anchor bolts shall be aligned with a steel template matching the bolt holes in the sign structure base plate. **Extreme care shall be used in this operation to ensure bolts are aligned properly.** Placement of anchor bolts without the steel template will not be permitted.
- (b) The threaded portion of the anchor bolts projecting above the top surface of foundation shall be coated with oil, before the concrete is poured, to minimize the fouling of threads splattered by concrete residue.

E26.13 Placing Metal Bases

- (a) Contractor to install/reinstall metal bases following curing of concrete foundations.
- (b) Metal bases are to be installed plumb, level, and flush to the concrete foundation. Contractor to use stainless steel washers to level bases as required.

E26.14 Placing Concrete

- (a) Care shall be taken to ensure that anchor bolts are vertically aligned and that anchor bolts and conduits are properly positioned prior to placement of concrete.
- (b) Concrete shall not have a free fall of more than two (2.0) m and shall be placed so that the aggregates will not separate or segregate. The slump of the concrete shall not exceed one hundred ten (110) mm. The concrete shall be vibrated throughout the entire length of the foundation.
- (c) Concrete shall be placed to the elevations as shown on the Drawings. The top surface of the foundation shall be finished smooth and even with a hand float.
- (d) The shaft shall be free of water prior to placing of concrete. Concrete shall not be placed in or through water unless authorized by the Contract Administrator.

E26.15 Protection of Newly Placed Concrete

- (a) Newly laid concrete threatened with damage by rain, snow, fog, or mist shall be protected with a tarpaulin or other approved means.

E26.16 Curing Concrete

- (a) The top of the freshly finished concrete foundations shall be covered and kept moist by means of wet polyester blankets immediately following finishing operations and shall be maintained at above ten (10) degrees Celsius for at least seven (7) consecutive days thereafter.
- (b) After the finishing is completed, the surface shall be promptly covered with a minimum of a single layer of clean, damp polyester blanket.
- (c) Concrete shall be protected from the harmful effects of sunshine, drying winds, surface dripping or running water, vibration and mechanical shock. Concrete shall be protected from freezing until at least twenty-four (24) hours after the end of the curing period.
- (d) Changes in temperature of the concrete shall be uniform and gradual and shall not exceed three (3) degrees in one (1) hour or twenty (20) degrees in twenty-four (24) hours.

E26.17 Reinstall Existing Flag Signs

- (a) Reinstall flag sign on metal base.
- (b) Restore sidewalk and pavers as necessary such that pavers are flush with adjacent sidewalk.

QUALITY CONTROL

E26.18 All workmanship and all Materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator, including all operations from the selection and production of Materials, through to final acceptance of the Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any Materials or Works that are not in accordance with the requirements of this Specification.

E26.19 The Contractor shall be responsible for making a thorough inspection of Materials to be supplied under this Contract. All Material shall be free of surface imperfections and other defects.

MEASUREMENT AND PAYMENT

E26.20 Bus Stop Flag Foundations

E26.20.1 Salvaging of existing bus stop flags, demolition of existing foundations, and construction of new bus stop flag foundations will be measured on a unit basis and will be paid for at the Contract Lump Sum Price per foundation for "Transit Bus Flag Foundation" for Works constructed in accordance with this Specification and accepted by the Contract Administrator.

E27. GREEN BIKE LANE TREATMENT

DESCRIPTION

- E27.1** This Specification covers the supply and installation of Green Methyl Methacrylate Area (MMA) Bike Lane Treatment as referred to in:
- (a) Contract Drawings;
 - (b) Appendix 'D' – CycleGrip MMAX Specification – Methyl Methacrylate Bike Lane Treatment; and
 - (c) Appendix 'E' – Application Instructions – MMAX Area Markings.

MATERIAL

E27.2 CycleGrip® MMAX kit – includes CycleGrip® MMAX Resin (green), CycleGrip® MMAX Aggregate and Catalyst.

E27.3 Source:

Available from:
ENNIS-FLINT
Attention: Deryk Upton
Ph: (604) 315-8765
Email: dupton@ennisflint.com
Web: www.ennisflint.com

CONSTRUCTION METHODS

E27.4 Surface is to be prepared in accordance with the Manufacturer's instructions.

E27.5 Treatment is to be installed in accordance with the Manufacturer's instructions.

MEASUREMENT AND PAYMENT

E27.6 Supply and installation of MMA bike lane treatment will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Green Bike Lane Treatment". The area to be paid for will be the total number of square metres of MMA bike lane treatment supplied and installed in accordance with this Specification, as accepted and measured by the Contract Administrator.

E28. REMOVE AND SALVAGE OVERHEAD SIGN SUPPORT STRUCTURES

DESCRIPTION

E28.1 This Specification shall cover the removal, salvage, hauling and unloading of all OHSS's as noted on the Contract Drawings.

E28.2 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.

E28.3 The Work under this Specification shall include the following items, or as otherwise directed by the Contract Administrator:

- (a) removal/salvage of the existing OHSS's along the north side of Goulet Street from Rue Youville to Traverse Avenue;
- (b) temporary storage of the OHSS components (if required) until such point they are hauled to the City of Winnipeg Bridge Yard; and
- (c) hauling/unloading of the existing OHSS's to the City of Winnipeg's yard.

SUBMITTALS

E28.4 The Contractor shall submit the following to the Contract Administrator, in accordance with the Specification:

- (a) OHSS Removal Method Statement at least three (3) Calendar Days prior to any OHSS removal works identifying the means and methods to be utilized to remove the structure.

CONSTRUCTION METHODS

E28.5 Removal

E28.5.1 The Contractor shall exercise great care to not damage any portion of the OHSS being removed. The Contractor will be responsible for repairing any damage to the existing OHSS's to the Contract Administrator's satisfaction caused as a result of the Contractor's removal/hauling/unloading operations.

E28.5.2 The OHSS's shall be lifted and secured with nylon ropes or other approved methods. Use of steel chains and steel hooks against hot-dip galvanized or powder coated surfaces will not be permitted. The structure components (shaft and arm etc.) shall be placed on timber blocking and secured with nylon ropes during their transportation to the City of Winnipeg Bridge Yard.

E28.6 Hauling and Unloading

E28.6.1 The Contractor shall deliver all salvaged OHSS components, including all miscellaneous bolts, washers, nuts, etc. to the City of Winnipeg's Bridge Yard at 960 Thomas Avenue. Access into the compound will be through Gate B1 and entry into the bridge yard will be through Gate B2.

- (a) The Contractor shall provide a minimum of twenty-four (24) hours' notice prior to delivery of the OHSS components. The Contractor shall coordinate with:

Mike Terleski, C.E.T.
Bridge Operations Technologist
Public Works
P: (204) 986-8510

- (b) The Contractor shall be responsible for unloading of all OHSS components at the City of Winnipeg Bridge Yard as directed by the City's representative, including the provision of all necessary labour, Materials and equipment to unload the components.

MEASUREMENT AND PAYMENT

E28.7 Removal/salvaging, hauling and unloading of the OHSS will be paid for at the Contract Lump Sum Prices for "Removal of OHSS". The payment will be considered full payment for supplying all Materials and for performing all operations herein described and all other items incidental to the Work.

E29. DEMOLITION OF EXISTING CONCRETE RETAINING WALLS AND OVERHEAD SIGN SUPPORT STRUCTURE FOUNDATIONS

DESCRIPTION

E29.1 General

E29.1.1 This Specification shall cover all operations relating to the removal and disposal of concrete retaining walls and existing OHSS foundations as specified herein and as shown on the Drawings. This Specification shall cover concrete removal Works, including all necessary staging, demolition, removal, salvaging, transporting, unloading, stockpiling, dismantlement and disposal of applicable materials.

E29.1.2 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 Works as hereinafter specified.

E29.2 Scope of Work

E29.2.1 The Work under this Specification shall generally include the following Items of Work:

- (a) removing and disposing of existing concrete as shown on the Drawings or as otherwise directed by the Contract Administrator on Site. Removals are identified as follows:
- (i) sidewalk retaining wall; and
 - (ii) abandonment of three (3) existing OHSS foundations (consisting of removal of the top meter of the foundations and infill of the voids) as specified herein and as shown on the Drawings.

- (b) removing concrete with appropriate equipment satisfactory to the Contract Administrator;
- (c) providing saw cuts where necessary to limit the extent of demolition;
- (d) repairing any over demolition and reinforcing damage to the satisfaction of the Contract Administrator; and
- (e) disposal of the removed Material at an appropriate off-Site disposal centre.

SUBMITTALS

- E29.3 The Contractor shall submit a proposed Construction Method Statement including schedule, methods and sequence of removal operations to the Contract Administrator for review and approval at least ten (10) Business Days prior to the commencement of any scheduled removal works on Site. This Submission shall clearly identify all removal equipment to be used for the works as well as identify the disposal Site for the removed Material.

MATERIALS

E29.4 General

- (a) All materials supplied under this Specification shall be of a type approved by the Contract Administrator and shall be subject to inspection and testing by the Contract Administrator.
- (b) The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

E29.5 Equipment

E29.5.1 General

- (a) All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

CONSTRUCTION METHODS

E29.6 General

- (a) Concrete shall be removed to the limits shown on the Drawings. Any unsound concrete detected beyond the removal extents depicted in the Drawings shall be reported to the Contract Administrator immediately. Removals beyond the limits shown on the Drawings shall only proceed as directed by and in the presence of the Contract Administrator.
- (b) The Contractor shall prevent movement, settlement or damage of existing structures to remain, services, paving, trees, landscaping and adjacent grades. If the safety of the new structure and/or existing structures or services appears to be endangered during structural removal operations, the Contractor shall cease operations and notify the Contract Administrator immediately.
- (c) The Contractor shall provide flagmen, guards, barricades, railings and necessary warning lights, and whenever necessary, warning signs and lights at the excavations, temporary sidewalks, removals, and/or other construction, to secure the safety of workmen and the public. The safety precautions shall comply with all Provincial Statutes applicable to the Work. The Contractor shall provide all other protective measures as may be required by any law in force in Manitoba and the Canada Labour Code.
- (d) The Contractor shall be fully responsible for ensuring the public safety in all areas, and shall be held responsible for any loss or damage caused due to neglect by the Contractor or his employees.
- (e) Under no circumstances shall the Contractor close any portion of existing roadways or walkways to traffic without prior written approval of the Contract Administrator, except as shown on the Drawings. If any existing roadway is to be closed to traffic in no case shall the Contractor commence any construction operations until such time as all the signs,

barricades, and flashers have been erected to the satisfaction of the Contract Administrator.

- (f) Remove concrete and other removal items with appropriate equipment satisfactory to the Contract Administrator. The Contractor shall take all necessary precautions to ensure that Material does not fall onto any active roadways or sidewalks during removal operations.
- (g) In no case shall the Contractor be permitted to use removal equipment, or other equipment or methods which may cause damage to any remaining structural elements or to any new construction. In the event that any element is damaged, the Contractor shall repair such element at his own expense to the satisfaction of the Contract Administrator.
- (h) The Contractor shall only use methods of concrete removal that shall not damage the existing structure to remain or new structures.
- (i) Provide sawcuts where necessary to limit the extent of demolition.
- (j) Repair any over demolition and reinforcing steel damage to the satisfaction of the Contract Administrator.

E29.7 Sidewalk Retaining Wall

- (a) The portion of sidewalk retaining wall shall be removed to the underside of the footing or one (1) m below grade (whichever is less). The sidewalk retaining wall shall be cleanly removed to the limits shown on the Drawings.

E29.8 Abandonment of OHSS Foundations

- (a) The OHSS foundations shall be demolished and abandoned to a minimum of one (1) m below the final grade. Removals beyond the limits shown on the Drawings shall only proceed as directed by and in the presence of the Contract Administrator. Removal limits shall be approved by the Contract Administrator. Care shall be taken when removing the foundations to not damage adjacent infrastructure including but not limited to roadworks, sidewalk, and utilities.

E29.9 Details of Existing Structure

- (a) The applicable details and structure dimensions of the existing structures are shown on the Drawings for information only in establishing the methods and limits of Work.
- (b) The accuracy of this information is not guaranteed and the Contractor must verify all information before commencing Work.

E29.10 Waste Handling and Disposal of Removed Materials

- (a) Wherever practical, the Contractor shall recycle disposed materials.
- (b) The Contractor shall promptly haul all removed materials indicated for disposal, off and away from the Site. No storage of any materials on-Site shall be allowed without written approval from the Contract Administrator. It shall be the Contractor's responsibility to find suitable disposal areas away from the Site.

QUALITY CONTROL

E29.11 Inspection

- (a) All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified Work.
- (b) The Contractor shall be wholly responsible for the control of all operations incidental thereto, notwithstanding any inspection or acceptance that may have been previously given. The Contract Administrator reserves the right to reject any materials or Works, which are not in accordance with the requirements of this Specification.

E29.12 Access

- (a) The Contractor shall allow the Contract Administrator free access to all parts of the Work at all times. The Contractor shall supply samples to the Contract Administrator or his inspector for testing purposes as required. There shall be no charge to the City for samples taken.

MEASUREMENT AND PAYMENT

E29.13 Concrete Removals

- (a) Sidewalk Retaining Wall:
 - (i) Sidewalk Retaining Wall concrete removals shall not be measured and shall be paid for at the Contract Lump Sum Price for "Demolition of Existing Concrete Retaining Walls", which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.
- (b) Abandonment of OHSS Foundations:
 - (i) Abandoning OHSS foundations shall be measured on a unit basis and paid for at the Contract Unit Price per unit item of "Removal of OHSS Pile Foundation", 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 and accepted by the Contract Administrator. The voids shall be filled with suitable Material following the foundation abandonment.

E30. STRUCTURAL EXCAVATION

DESCRIPTION

E30.1 General

- E30.1.1 This Specification shall cover all operations relating to the clearing, grubbing and structural excavation for the retaining wall sidewalk, or other structural works requiring structural excavation as specified herein or on the Drawings.
- E30.1.2 The Works 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.

E30.2 Scope of Work

- E30.2.1 The Work under this Specification shall involve:
 - (a) excavating all Material required to construct the structural works; and
 - (b) limits of the structural excavation are as identified on the Drawings.

SUBMITTALS

- E30.3 The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the commencement of any scheduled Work on the Site, a proposed Schedule, including methods and sequence of operation.

MATERIALS

E30.4 General

- (a) All materials supplied under this Specification shall be of a type approved by the Contract Administrator, and shall be subject to the inspection and testing by the Contract Administrator.
- (b) The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

E30.5 Excavation

- (a) Excavated Material shall be unclassified excavation and shall include the excavation and satisfactory disposal of all cleared and grubbed materials, surplus concrete pavement, asphalt pavement, earth, gravel, sandstone, loose detached rock, shale, rubbish, cemented gravel or hard pan, disintegrated stone, rock in ledge or mass formation wet or dry, trees, shrubs, or all other Material of whatever character which may be encountered.
- (b) All excavated Material shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.

E30.6 Equipment

- E30.6.1 All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

CONSTRUCTION METHODS

E30.7 Excavation

- (a) Prior to commencing any excavation Works, underground clearances shall be obtained from all applicable utilities by the Contractor. Due care and caution shall be taken by the Contractor to work around all identified underground utilities.
- (b) Excavations shall be completed to the elevations required to construct the Works or to such other elevations as may be directed by the Contract Administrator in the field. Excavation sequence shall be done in a "top down" direction, in order to maintain stability. The dimensions of excavation shall be such as to give sufficient clearances for the construction of forms and their subsequent removal.
- (c) All Material shall be brought to the surface by approved method, and shall be disposed of away from the Site. The bottom of the excavation shall be kept free from excessive moisture or free-flowing water.

E30.8 Excavated Material

- E30.8.1 All excavated Material remaining after backfilling operations shall become the property of the Contractor and shall be removed from the Site.

QUALITY CONTROL

E30.9 Inspection

- (a) After each excavation is complete, the Contractor shall notify the Contract Administrator to inspect the excavation.
- (b) All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified Work.
- (c) The Contractor shall be wholly responsible for the Control of all operations incidental thereto, notwithstanding and inspection or acceptance that may have been previously given. The Contract Administrator reserves the right to reject any materials or Works, which are not in accordance with the requirements of this Specification.

E30.10 Access

- (a) The Contractor shall allow the Contract Administrator free access to all parts of the Work at all times. The Contractor shall supply samples to the Contract Administrator or his inspector for testing purposes as required. There shall be no charge to the City for samples taken.

MEASUREMENT AND PAYMENT

E30.11 Structural excavation shall not be measured and will be incidental to the Contract Lump Sum Price for "Construction of Structural Sidewalk and Retaining Walls", which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E31. STRUCTURAL CONCRETE

DESCRIPTION

E31.1 General

E31.1.1 This Specification shall cover all operations relating to the preparation of Portland Cement structural concrete for, and all concreting operations related to, the construction of structural concrete Works as specified herein and as shown on the Drawings, namely the retaining wall sidewalk.

E31.1.2 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.

E31.2 Referenced Specifications and Drawings

E31.2.1 The latest edition and subsequent revisions of the following:

- (a) American Concrete Publication SP4 – Formwork for Concrete;
- (b) ASTM A1035 – Standard Specification for Deformed and Plain, Low-Carbon, Chromium, Steel Bars for Concrete Reinforcement;
- (c) ASTM B418 – Standard Specification for Cast and Wrought Galvanic Zinc Anodes;
- (d) ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete;
- (e) ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete;
- (f) ASTM C494 – Standard Specification for Chemical Admixtures for Concrete;
- (g) ASTM C711 – Standard Test Method for Low-Temperature Flexibility and Tenacity of One-Part, Elastomeric, Solvent-Release Type Sealants;
- (h) ASTM C881- Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete;
- (i) ASTM C1017 – Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete;
- (j) ASTM C1059 – Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete;
- (k) ASTM G155 – Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials;
- (l) CSA A23.1 – Concrete Materials and Methods of Concrete Construction;
- (m) CSA-A3001 – Cementitious Materials for Use in Concrete; and
- (n) CSA O121 – Douglas Fir Plywood.

E31.3 Scope of Work

- (a) Construction of Structural Sidewalk and Retaining Wall.

SUBMITTALS

E31.4 General

- (a) The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the commencement of any scheduled Work on the Site, a proposed schedule, including methods and sequence of operations.
- (b) The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the commencement of any Work on Site, the proposed materials to be used.

E31.5 Concrete Mix Design Requirements

- (a) The Contractor shall submit a concrete mix design statement to the Contract Administrator for each of the concrete types specified herein that reflects the specified performance properties of the concrete. The mix design statement shall contain all the information as outlined on the concrete mix design statement as shown on the Manitoba Ready Mix Concrete Association website (www.mrmca.com). In addition, the mix design statement must indicate the expected method of placement (buggies, chute, or pump) methods are to be used, the method of placement must include a clear description of the pumping methods (line, vertical drop, length of hose, etc.).
- (b) The Supplier shall submit directly, in confidence, to the City of Winnipeg, the concrete mix designs for each of the concrete types specified herein. The purpose of this confidential submission will be for record keeping purposes only. The concrete mix design shall contain a description of the constituents and proportions, and at the minimum the following:
 - (i) cementitious content in kilograms per cubic metre or equivalent units, and type of cementitious materials;
 - (ii) designated size, or sizes, of aggregates, and the gradation;
 - (iii) aggregate source location(s);
 - (iv) weights of aggregates in kilograms per cubic metre or equivalent units. Mass of aggregates is saturated surface dry basis;
 - (v) maximum allowable water content in kilograms per cubic metre or equivalent units and the water/cementitious ratio;
 - (vi) the limits for slump;
 - (vii) the limits for air content; and
 - (viii) quantity of other admixtures.
- (c) The concrete mix design statements must be received by the Contract Administrator a minimum of ten (10) Business Days prior to the scheduled commencement of concrete placement for each of the concrete types. The concrete mix designs must be received by the City of Winnipeg a minimum of five (5) Business Days prior to the scheduled commencement of concrete placement for each of the concrete types.
- (d) The mix design statement shall also include the expected slump measurement for each concrete type. The tolerances for acceptance of slump measurements in the field, by the Contract Administrator, shall be in accordance to CSA A23.1-04 Clause 4.3.2.3.2.
- (e) Any change in the constituent materials of any approved mix design shall require submission of a new concrete mix design statement, mix design, and mix design test data. If, during the progress of the Work, the concrete supplied is found to be unsatisfactory for any reason, including poor workability, the Contract Administrator may require the Contractor to make any necessary adjustments and associated resubmissions.

E31.6 Concrete Mix Design Test Data

- (a) Concrete:
 - (i) The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the scheduled commencement of concrete placement, test data showing that the concrete to be supplied will meet the performance criteria stated in this Specification for each concrete type.
 - (ii) All tests shall be based on the concrete samples taken from the point of discharge into the formwork. For example, at the concrete chute from the delivery truck if being

placed by buggies, or at the end of the pump line should the Contractor choose to pump the concrete into place.

(b) Aggregates:

- (i) The Contractor shall furnish, in writing to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the scheduled commencement of concrete placement, the location of the sources where aggregate will be obtained in order that some may be inspected and tentatively accepted by the Contract Administrator. Changes in the source of aggregate supply during the course of the Contract shall not be permitted without notification in writing to and the expressed approval of the Contract Administrator.
 - (ii) The Contractor shall submit to the Contract Administrator for review and approval recent test information on sieve analysis of fine and coarse aggregates in accordance with CSA Standard Test Method A23.2-2A.
 - (iii) The Contractor shall submit to the Contract Administrator for review and approval recent test information on tests for organic impurities in fine aggregates for concrete, in accordance with CSA Standard Test Method A23.2- 7A.
 - (iv) The Contractor shall submit to the Contract Administrator for review and approval recent test information on relative density and absorption of coarse aggregate, in accordance with CSA Standard Test Methods A23.2-12A.
 - (v) The Contractor shall submit to the Contract Administrator for review and approval recent test information on petrographic examination of aggregates for concrete, in accordance with CSA Standard Test Methods A23.2-15A. The purpose of the petrographic analysis is to ensure the aggregates provided are of the highest quality for use in the production of concrete and will produce a durable overlay. An acceptable aggregate will have an excellent rating as judged by an experienced petrographer, with a (weighted) petrographic number typically in the range of one hundred (100) to one hundred twenty (120).
 - (vi) The Contractor shall submit to the Contract Administrator for review and approval recent test information on resistance to degradation of large-size coarse aggregate by abrasion and impact in the Los Angeles Machine, in accordance with CSA Standard Test Method A23.2-16A.
 - (vii) The Contractor shall submit to the Contract Administrator for review and approval recent test information on potential alkali reactivity of cement aggregate combinations (mortar bar method), in accordance with CSA Standard Test Method A23.2-27A.
- (c) The Contractor shall submit to the Contract Administrator copies of all Material quality control test results.

E31.7 Notification of Ready Mix Supplier

- (a) The Contractor shall submit to the Contract Administrator the name and qualifications of the Ready Mix Concrete Supplier that he is proposing to use, at least ten (10) Business Days prior to the scheduled commencement of concrete placement. The Contract Administrator will verify the acceptability of the Supplier and the concrete mix design requirements. Acceptance of the Supplier and the concrete mix design(s) by the Contract Administrator does not relieve or reduce the responsibility of the Contractor or Supplier from the requirements of this Specification.

E31.8 Concrete Pour Sequence and Schedule

- (a) The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to scheduled commencement of concrete placement, the proposed concrete placement schedule for all other structural concrete placements of this Specification.

MATERIALS

E31.9 General

- (a) The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification.

E31.10 Testing and Approval

- (a) All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the testing laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.
- (b) All materials shall be approved by the Contract Administrator at least seven (7) days before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials in whole or in part, do not conform to the Specifications detailed herein or are found to be defective in manufacture or have become damaged in transit, storage, or handling operations, then such materials shall be rejected by the Contract Administrator and replaced by the Contractor at their own expense.

E31.11 Adhesive Agent

- (a) Adhesive agent for bonding steel reinforcing or dowels to concrete shall conform to the requirements of ASTM C881, Type V, Grade 3, Class A, B, and C, except linear shrinkage. An acceptable product would be Hilti Hit-RE 500 V3.

E31.12 Concrete Strength and Workability

- (a) Structural Concrete:
- (i) Proportioning of fine aggregate, coarse aggregate, cement, water, and air-entraining agent shall be such as to yield concrete having the required strength and workability, as follows:

Type C-1 Concrete

- Minimum Compressive Strength at fifty-six (56) days = thirty-five (35) MPa
- Maximum water-to cementing materials ratio = 0.40
- Aggregate: twenty (20) mm nominal
- Air Content: five percent (5.0%) to eight percent (8.0%)
- Chloride Ion Penetrability at fifty-six (56) days: < one thousand five hundred (1,500) coulombs
- Slump = seventy-five (75) mm ± twenty-five (25) mm

E31.13 Concrete Aggregate

- (a) Fine Aggregate:
- (i) Fine aggregate shall consist of sand having clean, hard, strong, durable, uncoated grains; free from injurious amounts of dust, soft or flaking particles, shale, alkali, organic matter, load, or other deleterious substance.
- (ii) Fine aggregate shall be well-graded throughout and shall conform to the following gradation requirements:

Sieve Size	Percent of Total Dry Weight Passing Each Sieve
10 mm	100%
5 mm	95 - 100%
2.5 mm	80 - 100%
1.25 mm	50 - 90%
630 µm	25 - 65%
315 µm	10 - 35%
160 µm	2 - 10%
80 µm	0 - 3%

- (b) Coarse Aggregate (twenty (20) millimetres Nominal) Coarse aggregate shall be clean and free from alkali, organic, or other deleterious matter, shall have an absorption not exceeding three percent (3%), and shall conform to the following gradation requirements:

Sieve Size	Percent of Total Dry Weight Passing Each Sieve
28 mm	100%
20 mm	85 - 100%
14 mm	60 - 90%
10 mm	25 - 60%
5 mm	0 - 10%
2.5 mm	0 - 5%

E31.14 Cementitious Materials

- (a) Cementitious materials shall conform to the requirements of CSA-A3001 and shall be free from lumps.
- (b) Should the Contractor choose to include a silica fume admixture in the concrete mix design, the substitution of silica fume shall not exceed eight percent (8%) by mass of cement.
- (c) Should the Contractor choose to include fly ash in the concrete mix design, the fly ash shall be Class F and the substitution shall not exceed thirty percent (30%) by mass of cement.
- (d) Cementitious materials shall be stored in a suitable weather-tight building that shall protect these materials from dampness and other destructive agents. Cementitious materials that have been stored for a length of time resulting in the hardening, or the formation of lumps, shall not be used in the Work.

E31.15 Water

- (a) Water to be used for all operations in the Specification, including mixing and curing of concrete or grout, surface texturing operations, and saturating the substrate shall conform to the requirements of CSA A23.1 and shall be free of oil, alkali, acidic, organic materials or deleterious substances. The Contractor shall not use water from shallow, stagnant, or marshy sources.

E31.16 Admixtures

- (a) Air-entraining admixtures shall conform to the requirements of ASTM C260.
- (b) Chemical admixtures shall conform to the requirements of ASTM C494 or C1017 for flowing concrete.
- (c) All admixtures shall be compatible with all other constituents. The addition of calcium chloride, accelerators and air-reducing agents, will not be permitted, unless otherwise approved by the Contract Administrator.

E31.17 Bonding Agents

- (a) Latex Bonding Agent:
- (i) Latex bonding agent shall conform to the requirements of ASTM C1059, Type II. Polyvinyl acetate-based latexes will not be permitted. An acceptable product would be SikaCem 810. An acceptable product for concrete greater than twenty-eight (28) days in age would be Planicrete AC.
- (b) Epoxy Bonding Agent:
- (i) Epoxy bonding agent shall be SikaTop Armatec-110 EpoCem or equivalent as approved by the Contract Administrator.

E31.18 Bonding Grout

- (a) For latex bonding grouts, the grout for bonding the new concrete to the existing concrete shall be mixed in accordance with manufacturer's Specifications.

- (b) The consistency of the bonding grout shall be such that it can be brushed on the existing concrete surface in a thin, even coating that will not run or puddle in low spots.

E31.19 Curing Compound

- (a) Curing compounds shall be liquid membrane-forming and conform to the requirements of ASTM C309. Curing compounds shall be resin-based and white-pigmented. An acceptable product would be WR Meadows 1215 WHITE Pigmented Curing Compound.

E31.20 Curing Blankets

- (a) Curing blankets for wet curing shall be one hundred percent (100%) polyester, three (3) mm thick, and white in colour. Alternately, a ten (10) ounces burlap, five (5) mil polyethylene, curing blanket white in colour shall be used. An acceptable product would be Curelap together with a second layer of burlap.

E31.21 Patching Mortar

- (a) Patching mortar shall be made of the same Material and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than one (1) part cement to two (2) parts sand by damp loose volume. White Portland Cement shall be substituted for a part of the grey Portland Cement on exposed concrete in order to produce a colour matching the colour of the surrounding concrete, as determined by a trial patch. The quantity of mixing water shall be no more than necessary for handling or placing.

E31.22 Reinforcing Steel

- (a) Reinforcing steel shall conform to the requirements of ASTM A1035 CM Grade 100 Low-Carbon Chromium Steel. An acceptable product would be ChromX 4100.

E31.23 Bar Accessories

- (a) Bar accessories shall be of a type approved by the Contract Administrator. They shall be made from a non-rusting Material, and shall not stain, blemish, or spall the concreted surface for the life of the concrete.
- (b) Bar chairs, bolsters, and bar supports shall be cementitious Material as acceptable to the Contract Administrator. Plastic, PVC or galvanized bar chairs may be permitted if accepted in writing by the Contract Administrator prior to installation.

E31.24 Formwork

- (a) Formwork materials shall conform to CSA Standard A23.1, and American Concrete Publication SP4, "Formwork for Concrete."
- (b) Form sheeting plywood to be covered with form liner or to be directly in contact with soil shall be exterior Douglas Fir, concrete form grade, conforming to CSA O121, a minimum of twenty (20) mm thick.
- (c) Where form liner is not being used, form sheeting shall be Douglas Fir, overlay form liner type conforming to CSA O121.
- (d) Boards used for formwork shall be fully seasoned and free from defects such as knots, warps, cracks, etc., which may mark the concrete surface.
- (e) No formwork accessories will be allowed to be left in place within fifty (50) mm of the surface following form removal. Items to be left in place beyond fifty (50) mm must be made from a non-rusting Material and shall not stain, blemish, or spall the concrete surface for the life of the concrete.
- (f) Forms for exposed surfaces that do not require a form liner may be either new plywood or steel as authorized by the Contract Administrator.
- (g) Studding shall be spruce or pine and shall have such dimensions and spacing that they shall withstand without distortion all the forces to which the forms shall be subjected.

- (h) Whalers shall be spruce or pine, with minimum dimensions of one hundred (100) mm by one hundred and fifty (150) mm. Studding shall be spruce or pine, with minimum dimensions of fifty (50) by one hundred and fifty (150) mm.
- (i) Stay-in-place formwork or falsework is not acceptable and shall not be used by the Contractor unless specifically shown on the Drawings.

E31.25 Form Coating

- (a) Form coating shall not stain the surface of the concrete.

E31.26 Permeable Formwork Liner

- (a) Permeable formwork liner shall be a draining synthetic lining finished with two (2) different surfaces. The side in contact with the concrete shall be smooth and perform as a filter to prevent the leaching of fine cement particles when the formwork is in place. The other side shall be fibrous and act as a draining element to help evacuate the water and the excess air at the surface. An acceptable product would be Texel Drainform. This formwork liner shall be used on all exposed substructure and superstructure formed surfaces, except soffit surfaces, or where a normal form finish is specified.

E31.27 Precompressed Foam Joint Filler

- (a) Sidewalk expansion joint seal shall be precompressed foam joint filler and conform to the requirements of ASTM C711 and ASTM G155. An acceptable product would be EMSEAL BEJS Sticks.
- (b) The seal width shall be as indicated on the Drawings.
- (c) Sealant system shall be comprised of three (3) components:
 - (i) cellular polyurethane foam impregnated with hydrophobic one hundred percent (100%) acrylic, water-based emulsion, factory coated with highway-grade, fuel resistant silicone;
 - (ii) field-applied epoxy adhesive primer; and
 - (iii) field-injected silicone sealant bands.
- (d) Impregnation agent to have proven non-migratory characteristics. Silicone coating to be highway-grade, low-modulus, fuel resistant silicone applied to the impregnated foam sealant at a width greater than maximum allowable joint extension and which when cured and compressed will form a bellows. Depth of seal as recommended by manufacturer. Bridge expansion joint system (BEJS) stick to be installed into manufacturer's standard field-applied epoxy adhesive.
- (e) Material shall be capable, as a dual seal, of movements of plus fifty percent (+50%) to minus fifty percent (-50%) (one hundred percent (100%) total) of nominal Material size. Changes in plane and direction shall be executed in accordance with manufacturer recommendations. Transitions shall be warranted to be watertight at inside and outside corners through the full movement capabilities of the product.
- (f) All substitute candidates to be certified in writing to be free in composition of any waxes or asphalts, wax compounds, or asphalt compounds. All substitute candidates shall be certified in writing to be:
 - (i) capable of withstanding sixty-five (65) degrees Celsius for three (3) hours while compressed down to the minimum of movement capability dimension of the basis of design product (minus fifty percent (-50%) of normal Material size) without evidence of any bleeding of impregnation medium from the Material; and
 - (ii) that the same Material after the heat stability test will self-expand to the maximum of movement capability dimension of the basis-of-design product (plus fifty percent (+50%) of nominal Material size) within twenty-four (24) hours at room temperature twenty (20) degrees Celsius.

E31.28 Low Density Polyethylene Foam

- (a) Low density polyethylene foam shall be supplied and installed to the thicknesses and extents shown on the Drawings. The maximum density of polyethylene foam shall be thirty (30) kilograms per cubic metres (kg/m^3). An acceptable product would be EthafoamTM 180.

E31.29 Epoxied Plain Dowels

- (a) Sidewalk and retaining wall plain dowels shall conform to the requirements of CSA-G30.18 Grade 300.
- (b) The dowels shall be shop-coated with epoxy conforming to the requirements of ASTM Standard D3963M. All bar ends shall be free of burs and distortions. All visible defects in the epoxy shall be field-coated with epoxy.
- (c) The dowels shall be fabricated to the details shown on the Drawings.

E31.30 Equipment

E31.30.1 General

- (a) All equipment shall be of a type accepted by the Contract Administrator. The equipment shall be kept in good working order, kept free from hardened concrete or foreign materials, and shall be cleaned at frequent intervals.

E31.30.2 Vibrators

- (a) The Contractor shall have sufficient numbers of internal concrete vibrators and experienced operators on Site to properly consolidate all concrete in accordance with ACI 309. The type and size of vibrators shall be appropriate for the particular application, the size of the pour, and the amount of reinforcing and shall conform to standard construction procedures.
- (b) The Contractor shall use rubber coated vibrators for consolidating concrete containing epoxy-coated reinforcing steel.
- (c) The Contractor shall have standby vibrators available at all times during the pour.

E31.30.3 Supply of Structural Concrete

- (a) All structural concrete shall be supplied from a plant certified by the Manitoba Ready Mix Concrete Association. The Contractor, upon request from the Contract Administrator, shall furnish proof of this certification.
- (b) All mixing of concrete must meet the provisions of CSA A23.1-04, Clause 5.2, Production of Concrete.
- (c) Time of Hauling:
 - (i) The maximum time allowed for all types of concrete to be delivered to the Site of the Work, including the time required to discharge, shall not exceed ninety (90) minutes after batching. Batching of all types of concrete is considered to occur when any of the mix ingredients are introduced into the mixer, regardless of whether or not the mixer is revolving.
 - (ii) Each batch of concrete delivered to the Site shall be accompanied by a time slip issued at the batching plant, bearing the time of batching. In hot or cold weather, or under conditions contributing to quick stiffening of the concrete, a time less than ninety (90) minutes may be specified by the Contract Administrator. The Contractor will be informed of this requirement twenty-four (24) hours prior to the scheduled placing of concrete.
 - (iii) To avoid the reduction of delivery and discharge time in hot weather, the Contractor will be allowed to substitute crushed ice for a portion of the mixing water provided the specified water/cementitious ratio is maintained. All of the ice shall be melted completely before discharging any of the concrete at the delivery point.
 - (iv) Unless otherwise noted in Table E10.1, "Requirements for Hardened Concrete", no retarders shall be used.

- (v) The concrete, when discharged from truck mixers or truck agitators, shall be of the consistency and workability required for the job without the use of additional mixing water. If the slump of the concrete is less than that designated by the mix design statement, then water can be added on Site provided the additional water meets the requirements of CSA A23.1-04 5.2.4.3.2. If additional water is to be added on Site, it must be done under the guidance of the Suppliers' designated quality control person. The Supplier shall certify that the addition of water on Site does not change the Mix Design for the concrete supplied. Any other water added to the concrete without such control will be grounds for rejection of the concrete by the Contract Administrator.
- (vi) A record of the actual proportions used for each concrete placement shall be kept by the Supplier and a copy of this record shall be submitted to the Owner upon request.

E31.30.4 Delivery of Concrete

- (a) The Contractor shall satisfy himself that the Concrete Supplier has sufficient plant capacity and satisfactory transporting equipment to ensure continuous delivery at the rate required. The rate of delivery of concrete during concreting operations shall be such that the development of cold joints will not occur. The methods of delivering and handling the concrete shall facilitate placing with a minimum of rehandling, and without damage to the structure or the concrete.

E31.30.5 Concrete Placement Schedule

- (a) The Contractor shall submit to the Contract Administrator the proposed concrete placement schedule for all concrete placements for review and approval.
- (b) The Contractor shall adhere strictly to the concrete placement schedule, as approved by the Contract Administrator.

E31.30.6 Preparation for Concreting Against Hardened Concrete

- (a) All hardened concrete against which new concrete is to be placed shall be prepared in the following manner:
 - (i) Concrete shall be removed to sound concrete or to the limits as shown on the Drawings, whichever is greater. The resulting surface shall be roughened by water jet to remove latent cement and miscellaneous debris.
 - (ii) All existing surfaces and exposed reinforcing steel are to be sandblasted to reveal a clean substrate and kept clean until concrete placement. Sandblasting shall be followed by a high pressure water wash to remove all residues.
 - (iii) Immediately prior to placing new concrete, bonding grout shall be thoroughly brushed onto the entire surface of the existing hardened concrete in a thin and even coating that will not run or puddle.

E31.30.7 Placing Structural Concrete

- (a) General
 - (i) The Contractor shall notify the Contract Administrator at least one (1) Working day prior to concrete placement so that an adequate inspection may be made of formwork, shoring, reinforcement, and related Works. No concrete pour shall be scheduled without the prior written approval of the Contract Administrator.
- (b) Placing Structural Concrete
 - (i) Equipment for mixing or conveying concrete shall be thoroughly flushed with clean water before and after each pour. Water used for this purpose shall be discharged outside the forms. All equipment and processes are subject to acceptance by the Contract Administrator.
 - (ii) Concrete shall be conveyed from the mixer to the place of final deposit by methods which will prevent segregation and a marked change in consistency.
 - (iii) Runways for concrete buggies and all pumping equipment shall be supported directly by the formwork and not on reinforcement.

- (iv) Before depositing any concrete, all debris shall be removed from the space to be occupied by the concrete, and any mortar splashed upon the reinforcement or forms shall be removed.
- (v) Formwork liners shall be cooled immediately prior to placing concrete by spraying with cold water.
- (vi) Placing of concrete, once started, shall be continuous. No concrete shall be placed on concrete which has sufficiently hardened to cause the formation of seams or "cold joints" within the section. If placing must be interrupted, construction joints shall be located where shown on the Drawings or as accepted by the Contract Administrator.
- (vii) Concrete shall be placed as nearly as possible in its final position. Rakes or mechanical vibrators shall not be used to transport concrete.
- (viii) The maximum free drop of concrete into the forms shall not be greater than 1.5 m, otherwise rubber tubes or pouring ports spaced not more than 1.5 m vertically and 2.5 m horizontally shall be used. The Contractor shall obtain the Contract Administrator's acceptance, prior to pouring concrete, of all placing operations.
- (ix) All concrete, during and immediately after depositing, shall be consolidated by mechanical vibrators so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into the corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Mechanical vibrators shall have a minimum frequency of seven thousand (7,000) revolutions per minute immersed.
- (x) Vibrators shall be inserted systematically into the concrete at intervals such that the zones of influence of the vibrator overlap (generally three hundred (300) to nine hundred (900) mm). Apply the vibrator at any point until the concrete is sufficiently compacted (five (5) to fifteen (15) seconds), but not long enough for segregation to occur. The vibrators shall be inserted vertically and withdrawn out of the concrete slowly. Spare vibrators in good working condition shall be kept on the job Site during all placing operations.
- (xi) Concrete shall not be placed during rain or snow unless adequate protection is provided for formwork and concrete surfaces, to the satisfaction of the Contract Administrator.

E31.30.8 Finishing of Concrete Surfaces

(a) Finishing Operations for Unformed Surfaces

- (i) The Contractor shall ensure that sufficient personnel are provided for the finishing of the slab surfaces. In the event that the depositing, vibrating, and screeding operations progress faster than the concrete finishing, the Contractor shall reduce the rate of concrete placement or cease the depositing of concrete until the exposed area of unfinished concrete has been satisfactorily minimized. The Contract Administrator's judgement in this matter shall be final and binding on the Contractor. All loads of concrete that exceed the ninety (90) minute discharge time limit during the delay, while the finishing operations catch up, shall be rejected.

(b) Type 1 Finish – Unformed Surfaces

- (i) All unformed concrete surfaces, shall be finished as outlined hereinafter.
- (ii) Screeding of all unformed concrete surfaces shall be performed by the sawing movement of a straightedge along wood or metal strips or form edges that have been accurately set at required elevations.
- (iii) Screeding shall be done on all concrete surfaces as a first step in other finishing operations. Screeding shall be done immediately after the concrete has been vibrated.
- (iv) After screeding, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared. Concrete surfaces after floating shall have a uniform, smooth, granular texture.

- (v) After final floating, the slab surface shall receive coarse transverse scored texture by Drawing a steel tined broom uniformly across the slab surface, to the satisfaction of the Contract Administrator.

CONSTRUCTION METHODS

E31.31 Debris Containment

- (a) The Contractor shall ensure that all debris including, but not limited to: concrete debris, concrete cutting fluids, formwork debris, and repair materials do not enter the waterway in any way including by the bridge or culvert or adjacent roadway drainage system.

E31.32 General Curing

- (a) Cold Weather curing shall be in accordance with CSA A23.1, refer to E31.35 for cold weather curing requirements.
- (b) Hot weather curing shall be in accordance with CSA A23.1, refer to E31.36 for hot weather curing requirements.
- (c) The use of curing compound will not be allowed on concrete areas that are to receive additional concrete or waterproofing.
- (d) Unformed concrete surfaces shall be covered and kept moist by means of wet polyester blankets for seven (7) consecutive days immediately following finishing operations or otherwise approved by the Contract Administrator and shall be maintained at above ten (10) degrees Celsius for at least seven (7) consecutive days. Construction joints shall only be covered and kept saturated by means of wet polyester curing blankets for the curing period.
- (e) Unformed mortar surfaces shall be covered and kept moist by means of wet polyester blankets for three (3) consecutive days immediately following finishing operations or otherwise approved by the Contract Administrator and shall be maintained at above ten (10) degrees Celsius for at least seven (7) consecutive days. Construction joints shall only be covered and kept saturated by means of wet polyester curing blankets for the curing period.
- (f) Unformed concrete surfaces shall have curing compound applied immediately after the wet curing period.
- (g) Unformed mortar surfaces do not require application of curing compound after the wet curing period.
- (h) The use of curing compound shall not be allowed on concrete areas that are to receive additional concrete, a waterproofing membrane, or an asphalt overlay.
- (i) Concrete shall be protected from the harmful effects of sunshine, drying winds, surface dripping, or running water, vibration, and mechanical shock. Concrete shall be protected from freezing until at least twenty-four (24) hours after the end of the curing period.
- (j) Changes in temperature of the concrete shall be uniform and gradual and shall not exceed three (3) degrees Celsius in any one (1) hour period or twenty (20) degrees Celsius in any twenty-four (24) hour period.
- (k) Care shall be exercised to ensure that the polyester curing blanket is well drained and that it is placed as soon as the surface will support it without deformation. The Contractor shall ensure that water from the polyester curing blankets does not run into areas where concrete placement and finishing operations are underway. If this occurs, concrete placement shall stop until the problem is corrected satisfactory to the Contract Administrator.

E31.33 Form Removal

- (a) All forms for concrete repairs shall remain in place for a minimum of three (3) days. The Contract Administrator must be notified at least twenty-four (24) hours prior to any form removal. The Contractor must receive approval from the Contract Administrator prior to beginning Work.

- (b) All forms for mortar repairs shall remain in place for a minimum of three (3) days. The Contract Administrator must be notified at least twenty-four (24) hours prior to any form removal. The Contractor must receive approval from the Contract Administrator prior to beginning Work.
- (c) The minimum strength of concrete and mortar in place for safe removal of soffit forms for horizontal or inclined members, as well as vertical forms shall be twenty (20) MPa, with the added provisions that the member shall be of sufficient strength to carry safely its own weight, together with superimposed construction loads.
- (d) Field-cured test specimens, representative of the in-place concrete being stripped, may be tested to verify the concrete strength.

E31.34 Patching of Formed Surfaces

- (a) Immediately after forms have been removed, but before any repairing or surface finishing is started, the concrete surface shall be inspected by the Contract Administrator. Any repair or surface finishing started before this inspection may be rejected and required to be removed.
- (b) All formed concrete surfaces shall have bolts, ties, struts, and all other timber or metal parts not specifically required for construction purposes cut back fifty (50) mm from the surface before patching.
- (c) Minor surface defects caused by honeycomb, air pockets greater than five (5) mm in diameter, and voids left by strutting, and tie holes shall be repaired by removing the defective concrete to sound concrete, dampening the area to be patched and then applying patching mortar. A slurry grout consisting of water and cement shall be thoroughly brushed onto the area to be patched. When the slurry grout begins to lose the water sheen, the patching mortar shall be applied. It shall be struck-off slightly higher than the adjacent surface and left for one (1) hour before final finishing to permit initial shrinkage of the patching mortar and it shall be touched up until it is satisfactory to the Contract Administrator. The patch shall be cured as specified in this Specification, and the final colour shall match the surrounding concrete.
- (d) All objectionable fins, projections, offsets, streaks, or other surface imperfections shall be removed by approved means to the Contract Administrator's satisfaction. Cement washes of any kind shall not be used.
- (e) Concrete shall be cast against forms that will produce plane surfaces with no bulges, indentations, or protuberances other than those shown on the Drawings. The arrangement of panel joints shall be kept to a minimum. Panels containing worn edges, patches, or other defects that will impair the texture of concrete surfaces shall not be used. All fins on the concrete surfaces shall be removed.

E31.35 Cold Weather Concreting

- (a) The requirements of this section shall be applied to all concreting operations during cold weather; i.e., if the mean daily temperature falls below five (5) degrees Celsius during placing or curing.
- (b) Supplementary equipment, as required below, shall be at the job Site if concrete is likely to be placed in cold weather.
- (c) Formwork and reinforcing steel shall be heated to at least five (5) degrees Celsius before concrete is placed.
- (d) The temperature of the concrete shall be maintained at not less than ten (10) degrees Celsius for seven (7) days or fifteen (15) degrees Celsius for five (5) days or twenty (20) degrees Celsius for three (3) days after placing. The concrete shall be kept above freezing temperature for at least a period of seven (7) days. In no case shall the heating be removed until the concrete has reached a minimum compressive strength, which will be specified by the Contract Administrator for Work under construction, and as determined from compressive strength tests for specimens secured under the same conditions as the concrete works in question.

- (e) Aggregates shall be heated to a temperature of not less than twenty (20) degrees Celsius and not more than sixty-five (65) degrees Celsius. Water shall be heated to a temperature between fifty-five (55) degrees Celsius and sixty-five (65) degrees Celsius. The temperature of the concrete at the time of placement shall be within the range specified in CSA A23.1 for the thickness of the section being placed.
- (f) When the mean daily temperature may fall below five (5) degrees Celsius, a complete hoarding of the Work, together with supplementary heat, shall be provided.
- (g) When the ambient temperature is below minus fifteen (-15) degrees Celsius, the hoarding shall be constructed so as to allow the concrete to be placed without the hoarding having to be opened. If the mixing is done outside of the hoarding, the concrete shall be placed by means of hoppers installed through the hoarding. The hoppers are to be plugged when not in use.
- (h) When the ambient temperature is equal to or above minus fifteen (-15) degrees Celsius, the Contractor will be permitted to open small portions of the hoarding for a limited time to facilitate the placing of the concrete.
- (i) Before depositing any of the concrete, the Contractor shall show that enough heating equipment is available to keep the air temperature surrounding the forms within the specified range. This shall be accomplished by bringing the temperature inside of the hoarding to the specified twenty (20) degrees Celsius, at least twelve (12) hours prior to the start of the concrete placing.
- (j) The Contractor shall supply all required heating apparatus and the necessary fuel. When dry heat is used, a means of maintaining atmospheric moisture shall be provided. The relative humidity within the heated enclosure shall be maintained at a minimum of forty percent (40%) during concrete placing and finishing operations. Surface moisture evaporation rates shall not exceed the limits specified in CSA A23.1. Following finishing operations, exposed concrete surfaces shall be protected from excessive drying by applying curing compound, covering the surfaces with polyethylene, or providing water curing.
- (k) Sufficient standby heating equipment must be available to allow for any sudden drop in outside temperatures and any breakdowns which may occur in the equipment.
- (l) Combustion-type heaters may be used if their exhaust gases are vented outside the enclosures and not allowed to come into contact with concrete surfaces. Fire extinguishers must be readily at hand wherever combustion-type heaters are used.
- (m) The Contractor shall keep a curing record of each concrete pour. The curing record shall include: date and location of the pour, mean daily temperature, hoarding relative humidity, temperatures above and below the concrete surface at several points, and notes regarding the type of heating, enclosure, unusual weather conditions, etc. This record shall be available for inspection by the Contract Administrator at the end of the concrete operations.

E31.36 Hot Weather Concreting

- (a) General:
 - (i) The requirements of this section shall be applied during hot weather; i.e., air temperatures above twenty-five (25) degrees Celsius during placing.
 - (ii) Concrete shall be placed at as low a temperature as possible, preferably below fifteen (15) degrees Celsius, but not above twenty-two (22) degrees Celsius. Aggregate stockpiles may be cooled by watersprays and sunshades.
 - (iii) Ice may be substituted for a portion of the mixing water; providing it has melted by the time mixing is completed.
 - (iv) Form and conveying equipment shall be kept as cool as possible before concreting, by shading them from the sun, painting their surfaces white, and/or the use of watersprays.
 - (v) Sunshades and wind breaks shall be used as required during placing and finishing.
 - (vi) Work shall be planned so that concrete can be placed as quickly as possible to avoid "cold joints."

- (vii) The Contract Administrator's approval is necessary before the Contractor may use admixtures, such as retardants, to delay setting or water-reducing agents to maintain workability and strength, and these must then appear in the Mix Design Statement submitted to the Contract Administrator.
- (viii) Curing shall follow immediately after the finishing operations.
- (b) Hot-Weather Curing:
 - (i) When the air temperature is at or above twenty-five (25) degrees Celsius, curing shall be accomplished by water spray or by using saturated absorptive fabric, in order to achieve cooling by evaporation. Mass concrete shall be water cured for the basic curing period when the air temperature is at or above twenty (20) degrees Celsius, in order to minimize the temperature rise of the concrete.
- (c) Job Preparation:
 - (i) When the air temperature is at or above twenty-five (25) degrees Celsius, or when there is a probability of it rising to twenty-five (25) degrees Celsius during the placing period, facilities shall be provided for protection of the concrete in place from the effects of hot and/or drying weather conditions. Under severe drying conditions, as defined in CSA A23.1 the formwork, reinforcement, and concreting equipment shall be protected from the direct rays of the sun or cooled by fogging and evaporation.
- (d) Concrete Temperature:
 - (i) The temperature of the concrete as placed shall be as low as practicable and in no case greater than that shown below for the indicated size of the concrete section.

Thickness of Section (m)	Temperatures, °C	
	Minimum	Maximum
Less than 0.3	10	27
0.3 to 1.0	10	27
1.0 to 2.0	5	25

E31.37 Cleanup

- (a) The Contractor shall cleanup equipment and construction debris on at least a daily basis to the satisfaction of the Contract Administrator.

E31.38 Quality Assurance and Quality Control

- (a) The Contract Administrator shall be afforded full access for the inspection and control and assurance testing of concrete and constituent materials, both at the Site of Work and at any plant used for the production of concrete, to determine whether the concrete is being supplied in accordance with this Specification.
- (b) The Contract Administrator reserves the right to reject concrete in the field that does not meet the Specifications.
- (c) The Contractor shall provide, without charge, the samples of concrete and the constituent materials required for Quality Assurance tests and provide such assistance and use of tools and construction equipment as is required.
- (d) Quality Assurance and Control tests shall be used to determine the acceptability of the concrete supplied by the Contractor.
- (e) The Contractor shall be required to undertake Quality Control tests, of all concrete supplied. All test results are to be copied to the Contract Administrator immediately after the tests have been performed.
- (f) The frequency and number of concrete Quality Control tests shall be in accordance with the requirements of CAN/CSA A23.1. An outline of the quality tests is indicated below.

E31.39 Concrete Testing

- (a) Slump tests shall be made in accordance with CSA Standard Test Method A23.2-5C, "Slump of Concrete". If the measured slump falls outside the limits in E31.12, "Concrete Strength and Workability" of this Specification, a second test shall be made. In the event of

a second failure, the Contract Administrator reserves the right to refuse the use of the batch of concrete represented.

- (b) Air content determinations shall be made in accordance with CSA Standard Test Method A23.2-4C, "Air Content of Plastic Concrete by the Pressure Method". If the measured air content falls outside the limits in E31.12, "Concrete Strength and Workability" of this Specification, a second test shall be made at any time within the specified discharge time limit for the mix. In the event of a second failure, the Contract Administrator reserves the right to reject the batch of concrete represented.
- (c) The air-void system shall be proven satisfactory by data from tests performed in accordance with the latest edition and all subsequent revisions of ASTM Standard Test Method C457. The spacing factor, as determined on concrete cylinders moulded in accordance with CSA Standard Test Method A23.2-3C, shall be determined prior to the start of construction on cylinders of concrete made with the same materials, mix proportions, and mixing procedures as intended for the project. If deemed necessary by the Contract Administrator to further check the air-void system during construction, testing of cylinders may be from concrete as delivered to the job Site and shall be carried out by the Contract Administrator. The concrete shall be considered to have a satisfactory air-void system when the average of all tests shows a spacing factor not exceeding two hundred thirty (230) microns with no single test greater than two hundred sixty (260) microns.
- (d) Rapid chloride permeability testing shall be performed in accordance with ASTM C1202.
- (e) Samples of concrete for test specimens shall be taken in accordance with CSA Standard Test Method A23.2-1C, "Sampling Plastic Concrete".
- (f) Compressive strength tests at twenty-eight (28) days shall be the basis for acceptance of all concrete supplied by the Contractor. For each twenty-eight (28) day strength test, the strength of two (2) companion standard-cured test specimens shall be determined in accordance with CSA Standard Test Method A23.2-9C, "Compressive Strength of Cylindrical Concrete Specimens", and the test result shall be the average of the strengths of the two (2) specimens. A compressive strength test at seven (7) days shall be taken, the strength of which shall be used only as a preliminary indication of the concrete strength, a strength test being the strength of a single standard cured specimen.
- (g) Compressive strength tests on specimens cured under the same conditions as the concrete Works shall be made to check the strength of the in-place concrete so as to determine if the concrete has reached the minimum allowable working compressive strength and also to check the adequacy of curing and/or cold weather protection. At least two (2) field-cured test specimens shall be taken to verify strength of the in-place concrete. For each field cured strength test, the strength of field-cured test specimens shall be determined in accordance with CSA Standard Test Method A23.2-9C, "Compressive Strength of Cylindrical Concrete Specimens", and the test result shall be the strength of the specimen.

E31.40 Corrective Action

- (a) If the results of the tests indicate that the concrete is not of the specified quality, the Contract Administrator shall have the right to implement additional testing, as required, to further evaluate the concrete, at the Contractor's expense. The Contractor shall, at his/her own expense, correct such Work or replace such materials found to be defective under this Specification in an acceptable manner to the satisfaction of the Contract Administrator.

MEASUREMENT AND PAYMENT

E31.41 Goulet Street Structural Concrete

- (a) The supply and placement of structural concrete will not be measured. This Item of Work is considered incidental to the Contract Lump Sum Price for the "Construction of Structural Sidewalk and Retaining Walls", 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, and accepted by the Contract Administrator.

E32. REINFORCING STEEL

DESCRIPTION

- E32.1 This Specification shall cover all operations relating to the supply, fabrication, and placement of retaining wall sidewalk concrete reinforcement, and associated bar accessories, as specified herein and as shown on the Drawings.
- E32.2 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.
- E32.3 Referenced Specifications and Drawings
- E32.3.1 The latest edition and subsequent revisions of the following:
- (a) ASTM A955M – Standard Specification for Deformed and Plain Stainless-Steel Bars for Concrete Reinforcement;
 - (b) ASTM A615M – Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement;
 - (c) ASTM C881 – Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete;
 - (d) ASTM A1035 – Standard Specification for Deformed and Plain, Low-Carbon, Chromium, Steel Bars for Concrete Reinforcement;
 - (e) CAN/CSA A23.1/A23.2 – Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete;
 - (f) CAN/CSA G30.18 – Billet-Steel Bars for Concrete Reinforcement; and
 - (g) Reinforced Steel Institute of Canada – Reinforcement Steel Manual of Standard Practice.
- E32.4 Scope of Work
- E32.4.1 The Work under this Specification shall involve supplying and placing all low carbon chromium reinforcing, as shown on the Drawings for the Works.

SUBMITTALS

- E32.5 The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the commencement of any schedule Work on the Site, a proposed schedule, including methods and sequence of operations.

MATERIALS

- E32.6 General
- (a) All materials supplied under this Specification shall be of a type approved by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.
 - (b) The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.
- E32.7 Handling and Storage of Materials
- (a) All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with the latest edition and all subsequent revisions of CAN/CSA-A23.1, "Storage of Materials", except as otherwise specified herein.
 - (b) Bundles of reinforcing steel shall be identified by tags containing bar marks.

- (c) The Contractor shall handle and store the reinforcing steel in a manner that ensures it is not damaged or contaminated with dirt or other materials.
- (d) The reinforcing steel shall not be placed directly on the ground. Timber pallets shall be placed under the reinforcing steel to keep them free from dirt and mud and to provide easy handling.

E32.8 Reinforcing Steel

- (a) Reinforcing steel shall be deemed to include all reinforcing bars, tie-bars, dowels and sleeves of any Material as shown on the Drawings.
- (b) Black steel as shown on the Drawings and shall conform to the requirements of CAN/CSA G30.18, Grade 400W.
- (c) Low carbon chromium steel, as shown on the Drawings, shall conform to the requirements of ASTM A1035 CM Grade 100 Low-Carbon Chromium Steel. An acceptable product would be ChromX 4100.
- (d) Reinforcing deformations shall conform to the requirements of ASTM A615M. All hooks and bends shall be bent using pin diameters and dimensions recommended by RSIC.
- (e) If, in the opinion of the Contract Administrator, any reinforcing steel provided for the concrete Works exhibit flaws in manufacture or fabrication, such Material shall be immediately removed from the Site and replaced with acceptable reinforcing steel.
- (f) All reinforcing steel shall be straight and free from paint, oil, millscale, and injurious defects. Rust, surface seams, or surface irregularities shall not be cause for rejection, provided that the minimum dimensions, cross sectional area, and tensile properties of a hand-wire-brushed specimen are not less than the requirements of CAN/CSA G30.18, ASTM A 615 and ASTM A 1035.

E32.9 Bar Accessories

- (a) Bar accessories shall be of types suitable for each type of reinforcing and acceptable to the Contract Administrator. They shall be made from a non-rusting Material, and they shall not stain, blemish, or spall the concrete surface for the life of the concrete.
- (b) Bar chairs, bolsters, and bar supports shall be made from cementitious Material. No plastics or PVC, or galvanized bar supports shall be used.
- (c) The use of pebbles, pieces of broken stone or brick, plastic, metal pipe, and wooden blocks, shall not be permitted.
- (d) Placing of bar supports shall be done to meet the required construction loads.
- (e) Tie wire shall be the following:
 - (i) Black annealed wire; and
 - (ii) Nylon-, epoxy-, or plastic-coated wire.
- (f) Bar accessories shall include bar chairs, spacers, clips, wire ties, wire (sixteen (16) gauge minimum), or other similar devices that may be approved by the Contract Administrator. The supplying and installation of bar accessories shall be deemed to be incidental to the supplying and placing of reinforcing steel.

E32.10 Mechanical Splices

- (a) Mechanical splices shall meet the requirements of the reinforcing steel manufacturer. The proposed mechanical splice shall be submitted to the Contract Administrator for acceptance.

E32.11 Bonding Agent/Grout

- (a) Epoxy resin shall conform to the requirements of ASTM C881. Type I or Type IV, Grade 3 epoxy shall be used for bonding reinforcing steel into hardened concrete. An approved product is Hilti RE500 V3 or equal, as approved by the Contract Administrator in accordance with B6.

- (b) Bonding agents for bonding reinforcing steel into holes in hardened concrete other than epoxy resin may be permitted provided that they develop a minimum pullout resistance of fifty (50) kN within forty-eight (48) hours after installation.

E32.12 Equipment

E32.12.1 General

- (a) All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

CONSTRUCTION METHODS

E32.13 Fabrication of Reinforcing Steel

- (a) All reinforcing steel shall be fabricated in accordance with the latest edition of the Reinforcement Steel Manual of Standard Practice by the RSIC, to the lengths and shapes as shown on the Drawings.
- (b) Low carbon chromium steel reinforcing shall be bent to the proper shape in a plant that has suitable devices for bending as recommended in Reinforcing Steel Institute of Canada (RSIC) Manual of Standard Practice.
- (c) Heating shall not be used as an aid in bending of low carbon chromium steel reinforcing. The equipment used in the plant shall not cause any surface contamination or damage to the surface of the bars. Bar cutting shall be done by shearing or with a water-cooled saw. Torch cutting shall not be permitted.

E32.14 Placing and Fastening of Reinforcing Steel

(a) General

- (i) Reinforcing steel shall be placed accurately in the positions shown on the Drawings and shall be retained in such positions by means of a sufficient number of bar accessories so that the bars shall not be moved out of alignment during or after the depositing of concrete. The Contract Administrator's decision in this matter shall be final.
- (ii) Reinforcing steel shall be free of all foreign Material in order to ensure a positive bond between the concrete and steel. The Contractor shall also remove any dry concrete which has been deposited on the steel from previous pouring operations before additional concrete may be placed. Intersecting bars shall be tied positively at each intersection.
- (iii) Splices in reinforcing steel shall be made only where indicated on the Drawings. Prior acceptance by the Contract Administrator shall be obtained where other splices must be made. Welded splices shall not be permitted.
- (iv) Reinforcing steel shall be placed to provide a clear space between the reinforcing bars as shown on the Drawings to accurately place preformed holes where necessary.
- (v) Reinforcing steel shall not be straightened or re-bent in a manner that shall injure the metal. Bars with bends not shown on the Drawings shall not be used.
- (vi) Heating of reinforcing steel shall not be permitted without prior acceptance by the Contract Administrator.
- (vii) Reinforcing steel shall be placed within the tolerances specified in CAN/CSA A23.1.
- (viii) The Contractor shall supply and place all necessary support accessories to ensure proper placement of reinforcing steel. All reinforcement shall be accurately placed in the positions shown on the Drawings, and firmly tied and chaired before placing the concrete.
- (ix) Distances from the forms shall be maintained by means of stays, spacers, or other approved supports. Spacers and supports for holding reinforcing steel at the required location and ensuring the specified concrete cover over the reinforcing steel shall be as specified in E32.9, "Bar Accessories".

- (x) Welding or tack welding is not permitted.
- (xi) Unless otherwise shown on the Drawings, the minimum distance between bars shall be forty (40) mm.
- (xii) Bars shall be tied at all intersections, except where spacing is less than two hundred fifty (250) mm in each direction, when alternate intersections may be tied.

E32.15 Splicing

- (a) General
 - (i) Splices shall only be provided as shown on the Drawings. Splices other than as shown on the Drawings shall not be permitted without the written approval of the Contract Administrator.
 - (ii) For lapped splices, the bars shall be placed in contact and wired together in such a manner as to maintain a clearance of not less than the required minimum clear distance to other bars, and the required minimum distance to the surface of the concrete. In general, suitable lap lengths shall be supplied as detailed on the Drawings. If this information is not detailed on the Drawings, a minimum of thirty-five (35) bar diameters lap length shall be provided.

QUALITY CONTROL

E32.16 Inspection

- (a) All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified Work.
- (b) The Contractor shall be wholly responsible for the control of all operations incidental thereto, notwithstanding any inspection or acceptance that may have been previously given. The Contract Administrator reserves the right to reject and materials or Works, which are not in accordance with the requirements of this Specification.
- (c) A minimum of one (1) Business Day advance notice shall be given to the Contract Administrator prior to the placing of any concrete to allow for inspection of the reinforcing steel.
- (d) After all reinforcing steel has been placed, a final inspection shall be made prior to the placement of concrete to locate any damage or deficiencies. All visible damage or any deficiencies shall be repaired to the satisfaction of the Contract Administrator before concrete is placed.

E32.17 Access

- (a) The Contract Administrator shall be afforded full access for the inspection and control testing of reinforcing steel, both at the Site of Work and at any plant used for the fabrication of the reinforcing steel, to determine whether the reinforcing steel is being supplied in accordance with this Specification.

E32.18 Quality Assurance

E32.18.1 Testing

- (a) Quality Assurance testing shall be used to determine the acceptability of the reinforcing steel supplied by the Contractor.
- (b) The Contractor shall provide, without charge, the samples of reinforcing steel required for Quality Assurance Tests and provide such assistance and use of tools and construction equipment as is required.

MEASUREMENT AND PAYMENT

- E32.19 Supplying and placing reinforcing steel shall will not be measured. This Item of Work is considered incidental to the Contract Lump Sum Price for the "Construction of Structural

Sidewalk and Retaining Walls”, 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, and accepted by the Contract Administrator.

E33. RETAINING WALL SUBDRAIN SYSTEMS

DESCRIPTION

E33.1 General

- E33.1.1 This Specification covers all operations relating to the supply and installation of the subsurface drainage system located behind each retaining wall.
- E33.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of the 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.

MATERIAL AND EQUIPMENT

E33.2 General

- (a) The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in the Specification. All materials supplied under this Specification shall be subject to inspection and acceptance by the Contract Administrator.

E33.3 Drain Pipes, Fittings and Accessories

- (a) Perforated and non-perforated drain pipes, fittings, and other accessories and appurtenances for the drain pipe system, shall conform to the requirements of the City of Winnipeg Standard Construction Specification CW 3120-R4 Clause 2.4.
- (b) The drain cap at the subdrain end shall be affixed to prevent rodent intrusion. An approved product to use is ASD Canada Inc. Part #0633AA.

E33.4 Drainage Fabric

- (a) Drainage fabric shall be in accordance with CW3120-R4.

E33.5 Drainage Material

- (a) Drainage Material shall be in accordance with Specification CW 3120-R4.

E33.6 Equipment

- (a) All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

CONSTRUCTION METHODS

E33.7 Subdrain Systems

- (a) Install a perforated drain pipe system behind each retaining wall in accordance with CW 3120-R4 and the Drawings. The supply and installation of this drain pipe system shall include the drain pipe, connections, all required fittings, drain pipe backfill materials, and the drainage fabric.
- (b) The drain pipe shall be laid to the line and grade shown on the Contract Drawings or as directed by the Contract Administrator with the separate sections securely jointed together by means of tightly drawn coupling bands.

MEASUREMENT AND PAYMENT

- E33.8 The supply and installation of the subsurface drainage system will not be measured. This Item of Work is considered incidental to the Contract Lump Sum Price for the “Construction of Structural Sidewalk and Retaining Walls”, 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, and accepted by the Contract Administrator.

E34. SIDEWALK EXPANSION JOINTS

DESCRIPTION

E34.1 General

E34.1.1 This Specification covers all items related to the supply and installation of the retaining wall sidewalk expansion joints.

E34.1.2 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.

E34.2 Referenced Specifications and Drawings

E34.2.1 The latest edition and subsequent revisions of the following:

- (a) ASTM C711 – Standard Test Method for Low-Temperature Flexibility and Tenacity of One-Part, Elastomeric, Solvent-Release Type Sealants; and
- (b) ASTM G155 – Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.

MATERIALS

E34.3 General

- (a) All materials supplied under this Specification shall be of a type approved by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.
- (b) The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

E34.4 Precompressed Foam Joint Filler

- (a) Roadway expansion joint seal shall be precompressed foam joint filler and conform to the requirements of ASTM C711 and ASTM G155. An acceptable product would be EMSEAL BEJS Sticks.
- (b) The seal width shall be as indicated on the Drawings.
- (c) Sealant system shall be comprised of three (3) components:
 - (i) cellular polyurethane foam impregnated with hydrophobic one hundred percent (100%) acrylic, water-based emulsion, factory coated with highway-grade, fuel resistant silicone;
 - (ii) field-applied epoxy adhesive primer; and
 - (iii) field-injected silicone sealant bands.
- (d) Impregnation agent to have proven non-migratory characteristics. Silicone coating to be highway-grade, low-modulus, fuel resistant silicone applied to the impregnated foam sealant at a width greater than maximum allowable joint extension and which when cured and compressed will form a bellows. Depth of seal as recommended by manufacturer. Bridge expansion joint system (BEJS) stick to be installed into manufacturer's standard field-applied epoxy adhesive.
- (e) Material shall be capable, as a dual seal, of movements of plus fifty percent (+50%) to minus fifty percent (-50%) (one hundred percent (100%) total) of nominal Material size. Changes in plane and direction shall be executed in accordance with manufacturer recommendations. Transitions shall be warranted to be watertight at inside and outside corners through the full movement capabilities of the product.

- (f) All substitute candidates to be certified in writing to be free in composition of any waxes or asphalts, wax compounds, or asphalt compounds. All substitute candidates shall be certified in writing to be:
 - (i) capable of withstanding sixty-five (65) degrees Celsius for three (3) hours while compressed down to the minimum of movement capability dimension of the basis of design product (minus fifty percent (-50%) of normal Material size) without evidence of any bleeding of impregnation medium from the Material; and
 - (ii) that the same Material after the heat stability test will self-expand to the maximum of movement capability dimension of the basis-of-design product (plus fifty percent (+50%) of nominal Material size) within twenty-four (24) hours at room temperature twenty (20) degrees Celsius.

E34.5 Low Density Polyethylene Foam

- (a) Low density polyethylene foam shall be supplied and installed to the thicknesses and extents shown on the Drawings. The maximum density of polyethylene foam shall be thirty (30) kg/m³. An acceptable product would be EthafoamTM 180.

CONSTRUCTION METHODS

E34.6 Foam Installation

- (a) Install the low density polyethylene foam in accordance with the manufacturer's recommendations.

E34.7 Seal Installation

- (a) Install the precompressed foam joint filler in accordance with the manufacturer's recommendations.

MEASUREMENT AND PAYMENT

- E34.8 Sidewalk Expansion Joints will not be measured and will be incidental to the Contract Lump Sum Price for "Construction of Structural Sidewalk and Retaining Walls" for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E35. STRUCTURAL BACKFILL

DESCRIPTION

E35.1 General

- E35.1.1 This Specification shall cover all operations related to backfill work for the retaining wall sidewalk as herein specified and in the latest versions of City of Winnipeg Standard Construction Specifications CW 3110 and CW 3170, and as shown on the Drawings.
- E35.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supply, and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E35.2 Referenced Specifications and Drawings

- (a) The latest version of the City of Winnipeg Standard Construction Specifications:
 - (i) CW 3110 – Subgrade, Sub-Base, and Base Construction;
 - (ii) CW 3130 – Supply and Installation of Geotextile Fabrics;
 - (iii) CW 3170 – Earthwork and Grading; and
 - (iv) CW 3310 – Portland Cement Concrete Pavement Works.

E35.3 Scope of Work

- (a) The Work under this Specification shall involve:
 - (i) supplying and placing backfill suitable excavated Site Material, clay, granular backfill and free draining backfill for all structural works. CW 3110 shall be applicable to all sidewalk works; and
 - (ii) supplying and placing structural backfill for all other elements required to construct the Works.

MATERIALS

E35.4 General

- (a) All materials supplied under this Specification shall be of type approved by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.
- (b) The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

E35.5 Handling and Storage of Materials

- (a) All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.
- (b) All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.
- (c) All Material shall be accepted by the Contract Administrator at least seven (7) days before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials in whole or in part, so not conform to the Specification detailed herein, or are found to be defective in manufacture, or have become damaged in transit, storage or handling operation, then such Material shall be rejected by the Contract Administrator and replaced by the Contractor at his own expense.

E35.6 Granular Backfill

- (a) Granular Base Material
 - (i) Granular base Material shall be in accordance with CW 3110 Base Course Material.

E35.7 Suitable Site Material Backfill

- (a) Site Material Backfill
 - (i) Backfill with Site Material shall be in accordance with Clause 5.4 CW 3170 Fill Material.

E35.8 Geotextile Fabric

- (a) The non-woven geotextile shall conform to CW 3130.

E35.9 Equipment

- E35.9.1 All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

CONSTRUCTION METHODS

E35.10 Backfilling

- (a) All materials shall be accepted by the Contract Administrator at least seven (7) days before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials in whole or in part, do not conform to the Specification detailed herein, or are found to be defective in manufacture, or have become damaged in transit, storage, or handling operations, then such Material shall be rejected by the Contract Administrator and replaced by the Contractor at his own expense.

- (b) Any backfill Material that does not meet the gradation and/or compaction requirements of this Specification shall be removed and replaced by the Contractor at his own expense, to the satisfaction of the Contract Administrator.
- (c) Backfill materials shall be free of frozen lumps and shall be placed and compacted in an unfrozen state. Backfill shall not be placed on frozen subsoil.

E35.11 Geotextile Fabric

- (a) Install geotextile fabric under all granular backfill Material.
- (b) Unroll geotextile fabric as smooth as possible.
- (c) Install the geotextile fabric in the longest continuous practical length, free from tension, stress, folds, wrinkles and creases.
- (d) Install geotextile fabric in accordance with this Specification and procedures recommended by the manufacturer.
- (e) Overlap joint a minimum of six hundred (600) mm and as indicated on the Drawings.
- (f) Install pins as required to hold geotextile fabric in place.
- (g) Cut or fold geotextile fabric to conform to curves.
- (h) Construction vehicles shall be permitted directly on the geotextile fabric.
- (i) Remove or replace geotextile fabric improperly installed or damaged as directed by the Contract Administrator.

E35.12 Backfill Operations

- (a) The Contract Administrator shall be notified at one (1) Working Day in advance of any backfilling operation. No backfill shall be placed against any concrete until approved by the Contract Administrator.
- (b) The geotextile fabric shall be placed prior to any backfilling operations.
- (c) The Contractor shall be required to provide necessary water or equipment during compaction of backfill Material to achieve the required densities.
- (d) The Contractor shall place granular backfill Material in one hundred fifty (150) mm lifts and shall compact each lift. The backfill shall be compacted to one hundred percent (100%) Standard Proctor.
- (e) The Contractor shall place suitable Site Material backfill in one hundred fifty (150) mm lifts and shall compact each lift. The backfill shall be compacted to ninety-eight percent (98%) Standard Proctor.

QUALITY CONTROL

E35.13 Inspection

- (a) All workmanship and materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operation from the selection and production of materials through to final acceptance of the specified Work.
- (b) The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or acceptance that may have previously been given. The Contract Administrator reserves the right to reject any materials or Works, which are not in accordance with requirements of this Specification.
- (c) The Contractor shall be required to retain a qualified third-party testing company to undertake Quality Assurances tests. All test results are to be copied to the Contract Administrator immediately after the tests have been performed.
- (d) All backfilling Work shall take place under the supervision of the Contract Administrator. The Contractor shall notify the Contract Administrator when backfilling Work is to take place.

- (e) The frequency and number of tests to be made shall be subject to approval by the Contract Administrator.

MATERIALS

- E35.14 All Material supplied and placed under this Specification shall be subject to testing and acceptance by the Contract Administrator in accordance with this Specification.
- E35.15 Access
 - (a) The Contractor shall allow the Contract Administrator free access to all parts of the Work at all times. The Contractor shall supply samples to the Contract Administrator or his inspector for testing purposes as required. There shall be no charge to the City for samples taken.
- E35.16 Corrective Action
 - (a) Any backfill Material that does not meet the gradation and/or compaction requirements of the Specification shall be removed and replaced by the Contractor at his own expense, to the satisfaction of the Contract Administrator.

MEASUREMENT AND PAYMENT

- E35.17 Structural Backfill shall not be measured and will be incidental to the Contract Lump Sum Price for "Construction of Structural Sidewalk and Retaining Walls", which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E36. HYDRO EXCAVATION

DESCRIPTION

- E36.1 This Specification covers the removal of earthen Material immediately adjacent to underground utilities infrastructure by means of high pressure water spray, and the recovery of evacuated Material by vacuum type means or equivalent method as approved by the Contract Administrator.
- E36.2 This Specification covers minor subsurface investigation that the Contract Administrator may initiate.

EQUIPMENT

- E36.3 Hydro Excavation unit shall be capable of maintain a minimum working pressure of ten thousand (10,000) psi, at a rate of ten (10) to twelve (12) gallons per minute. Unit should be adjustable, so as to provide adequate pressure to remove earthen Material identified by the Contract Administrator.
- E36.4 Spray head shall be equipped with a rotating nozzle, in order to provide a wider path of cut.

CONSTRUCTION METHODS

- E36.5 Hydro-Removal of Earthen Material
 - (a) Earthen Material adjacent to utility entity shall be sprayed with high pressure water so as to remove all such Material identified by the Contract Administrator.
- E36.6 Recovery of Excavated Material
 - (a) The recovery of excavated Material shall be done using a vacuum type method, or other type of method approved by the Contract Administrator.
 - (b) The recovery of Material shall follow immediately behind the excavation, to avoid excavated areas from filling with excavated Material.

- (c) The use of mechanical sweepers will not be allowed.
- (d) Dispose of Material in accordance with Section 3.4 of CW 1130.

E36.7 Backfill of Hydro Excavated Hole

- (a) The Contractor shall be responsible for the backfill of the hydro excavation hole upon the completion of the Work described herein, to the approval of the Contract Administrator.

MEASUREMENT AND PAYMENT

E36.8 Hydro Excavation of earthen Material will be measured on an hourly basis and paid for at the Contract Unit Price per hour for "Hydro Excavation". The hours to be paid for will be the total number of hours of Hydro Excavation in accordance with this Specification, accepted and measured by the Contract Administrator.

E37. WORKING IN CLOSE PROXIMITY TO GAS INFRASTRUCTURE

DESCRIPTION

E37.1 While working in close proximity to gas infrastructure, all procedures and precautions outlined in the Appendix 'F' – Safe Excavation and Safety Watch Guideline manual, as well as any supplemental direction from Manitoba Hydro contained in Appendix 'G', must be adhered to. Ensure that all locates and clearances are current and have been received and understood prior to construction.

MEASUREMENT AND PAYMENT

E37.2 Hydro excavation to locate and verify gas infrastructure as typically required by Manitoba Hydro will be considered incidental to the Work.

E37.3 Any costs associated performing Safety Watches will be considered incidental to the Work.

E38. TRAFFIC SIGNAL MATERIALS

DESCRIPTION

E38.1 Further to CW 3620 2.11, Anchor Bolt Templates and Top Rings:

- (a) Master anchor bolt templates and Oversized D top rings are provided by the City shall be used by the Contractor for all bases constructed under the provisions of this Specification.
- (b) When using anchor bolt templates and top rings for pouring concrete they both must be oiled (both inside and out) for ease of removal and cleaning. Following the removal of anchor bolt template and top ring, they both must be cleaned immediately.
- (c) The templates shall be suitably cleaned by the Contractor at the end of the Contract and be returned to the City. The template shall be cleaned free of concrete residue and any other debris and returned to the City in a "like-new" condition.
- (d) In the event of loss or damage to materials supplied by the City, the cost of replacement materials shall be borne by the Contractor.
- (e) The Contractor shall contact the City of Winnipeg Stores Foreman to coordinate the pickup of the materials. Prior to pickup of the materials the Contractor will be required to obtain specific account information from the Traffic Signals Branch.
 - (i) Public Works Stores
Attn: Stores Foreman
1277 Pacific Avenue
Winnipeg, Manitoba R3E 1G7
Phone: (204) 794-4333

E38.2 Further to CW 3620 2.10, City Supplied Materials:

- (a) If requested by the Contract Administrator, the Contractor shall submit in writing an account for all materials supplied by the City, showing in detail all materials drawn from the City's stores, quantities used at each work location, and materials on hand.
- (b) The City will issue the Contractor a "float" quantity of the above noted City-supplied materials, for the purpose of expediting the daily work progress.
- (c) The Contractor shall be obliged to requisition and withdraw those items which are City supplied Material on the basis of the estimated quantity needed for a particular job.
- (d) The Contractor shall account for the quantities of materials drawn to the satisfaction of the City. Any overdraw of materials in excess of required quantities shall be credited or returned to the City. At the end of the Contract, all surplus materials shall be returned to the City.

E39. ANCHOR BOLT PROJECTIONS FOR EARLY OPEN CONCRETE BASES

E39.1 Further to Section 3.7 of CW 3620 Concrete Bases Type A, Type G and Type J Bases shall have an anchor bolt projection as specified below:

E39.2 The following bolt projections shall override what has been specified on SD-310, SD-313 and SD-314.

Concrete Base Type	Anchor Bolt Projection (mm)
Signal Pole Base Early Open – Type A (SD-310)	50.8 (+5, -0)
Signal Pole Base Early Open – Type G (SD-313)	90.0 (+5, -0)
Signal Pole Base Early Open – Type J (SD-314)	150 (+5, -0)

E40. SERVICE BOX PRE-CAST

DESCRIPTION

E40.1 This Specification covers the use and installation of a service box pre-cast (SD-322 Rev 2) 431.8 mm (seventeen (17) inches) by seven hundred sixty-two (762) mm (thirty (30) inches) by 457.2 mm (eighteen (18) inches) and 330.2 mm (thirteen (13) inches) by 609.6 mm (twenty-four (24) inches) x 457.2 mm (eighteen (18) inches).

MATERIALS

E40.2 Materials shall be as per section 2 of CW 3620.

CONSTRUCTION METHOD

E40.3 Install Pre-Cast Service Box in grass boulevards/medians, and hard surfaced medians or as shown on the Drawings or as directed by the Contract Administrator.

E40.4 Fill bottom of excavation with compacted limestone base course Material to set precast service box to grade.

E40.5 Install Pre-Cast Service Box on top of the compacted granular fill Material to pavement, sidewalk or boulevard finish grade.

E40.6 All conduits must be bundled into a group in the centre of the Pre-Cast Service Box. Install plastic plugs prior to back fill.

E40.7 Backfill around Pre-Cast Service Box exterior. Back fill shall conform to requirements of SD-342.

E40.8 Pre-Cast Service box shall meet the grade of the sidewalk or boulevard given provided by Contract Administrator.

MEASUREMENT AND PAYMENT

E40.9 Installation of Service Boxes shall be measured on a unit basis and paid for at the Contract Unit Price per unit for "Items of Work" listed below. The number of units to be paid for shall be the total number of Service Boxes installed in accordance with this Specification, accepted and measured by the Contract Administrator.

(a) Service Box Pre-Cast.

E41. INSTALLATION OF EARLY OPEN CONCRETE BASES

DESCRIPTION

E41.1 This Specification shall cover the installation of Early Open Concrete Bases.

MATERIALS

E41.2 Supply concrete for bases in accordance with CW 2160, Table CW 2160.1 Design Requirements for Concrete Used for Underground Structures, for Type A Structures (monolithic sewers and reinforced structures).

E41.3 Further to E41.2, the supplied concrete shall achieve a minimum compressive strength of twenty-two (22) MPa at forty-eight (48) hours.

E41.4 City Supplied Materials shall be as per Section 2.10 of CW 3620 and E38.

CONSTRUCTION METHODS

E41.5 Construction Methods for the installation of Early Open Concrete Bases shall be as per Section 3.7 of CW 3620.

MEASUREMENT AND PAYMENT

E41.6 Installation of Concrete Bases shall be measured on a unit basis and paid for at the Contract Unit Price per unit for "Items of Work" listed below. The number of units to be paid for shall be the total number of concrete bases installed in accordance with this Specification, accepted and measured by the Contract Administrator.

(a) Items of Work:

- (i) Signal Pole Base Early Open – Type A;
- (ii) Signal Pole Base Early Open – Type OD;
- (iii) Signal Pole Base Early Open – Type G; and
- (iv) Signal Pole Base Early Open – Type J.

E41.7 Payment for the Items of Work in this Section includes the supply and installation of ready mix or mixed concrete on Site.

E41.8 Payment for the Items of Work listed above includes the supply and installation of grounding rods (electrodes) installed with the concrete bases.

E41.9 Payment for the Items of Work listed above includes boring.

E41.10 Payment for the Items of Work listed above includes top ring forms.

E42. INSTALLATION OF PRE-CAST TYPE PM BASES

E42.1 Pre-cast Type PM concrete bases shall be supplied by The Contractor including anchor bolts.

- E42.2 Fabrication and installation shall be in accordance with SD-315.A.
- E42.3 Payment of Pre-cast Type PM bases shall be per base installed.
- E42.4 No measurement or payment will be made for the supply of associated Material or equipment associated with this Specification.

E43. TREE AND STUMP REMOVAL

DESCRIPTION

- E43.1 This Specification shall amend the City of Winnipeg Standard Construction Specification CW 3010 "Clearing and Grubbing", and shall cover the removal of trees as specified on the Contract Drawings. The City of Winnipeg, Forestry Branch must be contacted prior to removing any trees.

MATERIALS

- E43.2 General
 - (a) The grinding of stumps specified by the Contract Administrator shall be done with the use of a mechanical stump grinder.

CONSTRUCTION METHODS

- E43.3 Remove only trees marked and confirmed for removal in the field by the Contract Administrator.
- E43.4 Remove trees in accordance with CW 3010.
- E43.5 The Contractor shall arrange for any Elmwood to be disposed of by the City of Winnipeg.
- E43.6 Stump Removal:
 - (a) stumps will be ground a minimum depth of three hundred (300) mm from top of finished median and the Material removed from the specified areas as marked and confirmed by the Contract Administrator;
 - (b) the Contractor shall take all precautions to prevent damage to traffic, structures, pole lines, adjacent properties and to trees and shrubs designated to be saved; and
 - (c) remove and dispose of Material as per CW 3010 Clause 9.

MEASUREMENT AND PAYMENT

- E43.7 Removal of trees and stumps will be measured on a unit basis and paid for at the Contract Unit Price per unit item of "Tree Removal". The number to be paid for will be the total number of trees removed and stumps ground in accordance with this Specification and accepted by the Contract Administrator.

E44. STRUCTURAL SOIL CELLS

DESCRIPTION

- E44.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of structural soil cells and all related Work.

SUBMITTALS

- E44.2 Product Data: For each type of product, submit manufacturer's product literature with technical data sufficient to demonstrate that the product meets these Specifications.
- E44.3 Shop Drawings: Submit manufacturer supplied Shop Drawings for structural soil cell system.

E44.4 Submit product samples of root barrier, geogrid, and geotextile.

E44.5 Delivery, Storage and Handling

- (a) Deliver materials in manufacturer's original, unopened, undamaged palletized units with identification numbers intact.
- (b) Bulk Materials:
 - (i) Do not deliver or place backfill, soils and soil amendments in frozen, wet, or muddy conditions.
 - (ii) Do not dump or store bulk materials near structures, utilities, sidewalks, pavements, and other facilities, or on existing turf areas or plants.
 - (iii) Provide protection including tarps, plastic and or matting between bulk materials and finished surfaces sufficient to protect the finish Material.
- (c) Provide erosion-control measures to prevent erosion or displacement of bulk materials and discharge of soil-bearing water runoff or airborne dust to adjacent properties, water conveyance systems, and walkways. Provide additional sediment control to retain excavated Material, backfill, soil amendments and planting mix within the project limits as needed.
- (d) Protect structural cells from damage during delivery, storage and handling.
 - (i) Store under tarp to protect from sunlight when time from delivery to installation exceeds one week. Storage should occur on smooth surfaces, free from dirt, mud and debris.
 - (ii) Handling is to be performed with equipment appropriate to the size (height) of cells and Site conditions, and may include, hand, handcart, forklifts, extension lifts, small cranes, etc., with care given to minimize damage to structural cell components.
- (e) Be responsible for the supply, safe storage and handling of all materials.

MATERIALS

E44.6 Structural Cell System:

- (a) 3X silva cell system, one (1) base, six (6) 3X posts and one (1) deck.
- (b) DeepRoot tree root barrier.
- (c) DeepRoot impervious liner.
- (d) Water and Air Vent - Rootball: Water and air system 01, cast aluminum body, stainless steel grate.
- (e) Geogrid: Net-shaped woven polyester fabric with PVC coating uniaxial or biaxial geogrid, inert to biological degradation, resistant to naturally occurring chemicals, alkalis, and acids; used to provide a stabilizing force within soil structure as the fill interlocks with the grid. Acceptable products: Stratagrid SG 150, Miragrid 2XT, Fortac 35 Geogrid, SF 20 Biaxial Geogrid, or approved equal.
- (f) Geotextile per CW3120.
- (g) Galvanized anchoring spikes.
- (h) Manufactured by DeepRoot Green Infrastructure, LLC ph. 1.800.458.7668.

E44.7 Granular drainage Material in accordance with Specification CW3120 – Installation of Sub Drains.

E44.8 Drainage pipe: one hundred fifty (150) mm diameter perforated PVC pipe.

E44.9 Geotextile to CW3130.

E44.10 Base course and backfill Material around soil cells to be granular A base granite Material only to CW 3110.

E44.11 Base course under sidewalks and unit pavers in concrete blockouts around soil cells to be granular A base granite Material only to CW 3110. This includes the entire area of the three (3) islands on the north side of Goulet and the entire sidewalk area at the southeast corner of Goulet and Traverse.

E44.12 Compacted planting medium mound and planting medium to planting medium and finished grading Specification.

CONSTRUCTION METHOD

E44.13 Silva cell modules must be transported and stored on manufacturers pallets with pallet wrap intact until ready for installation. Pallets should be positioned on firm level base, so as not to impede traffic or workflow.

E44.14 Prior to the start of work layout and stake the limits of excavation and horizontal and vertical control points sufficient to install the structural cells and required drainage features in the correct locations.

E44.15 The Contractor must ensure that all buried utilities and services are located and if necessary, protected and exposed prior to any excavation in accordance with Specification CW1120.

E44.16 Excavate and confirm to the dimensions and depth shown on the Drawings, including provision for drainage and base course layer, allowing two hundred (200) mm (eight (8) inches) additional clearance in length and width. Side walls of excavated pit to be clean, straight, and within fifteen (15) degrees of vertical. Soft dig/day lighting process to be used in area of existing underground utilities. Ensure subgrade slopes to sub drain trench toward perforated drainage pipe system (min two percent (2.0%) slope).

E44.17 Clear excavation of all construction debris, trash, rubble and any foreign Material. Excavate and remove oil spills and other soil contamination sufficiently to remove the harmful Material. Fill over excavations with approved fill and compact to the required subgrade compaction.

E44.18 All excavated Material shall be disposed of off-Site in accordance with Specification CW1130.

E44.19 Compact sub-grade in accordance with Specification CW3110.

E44.20 Install geotextile fabric for aggregate sub base in accordance with CW3130.

E44.21 Install aggregate sub-base below structural cell system to the depths indicated in the Drawings and compact to a minimum of ninety-five percent (95%) of maximum dry density at optimum moisture content, in accordance with ASTM D 698 Standard Proctor Method.

E44.22 Install planting medium, geogrid, root barrier and backfill. These three (3) materials must be installed and compacted together in alternating operations in two hundred (200) mm lifts to top of silva cells to achieve correct compaction relationships within the structural cell system.

E44.23 Obtain final approval from Contract Administrator of planting medium and backfill installation prior to installation of structural cell deck and geotextile.

E44.24 Place geotextile over top of silva cell system, four hundred fifty (450) mm overlap past excavation.

E44.25 Install root barrier directly adjacent to concrete edge restraint.

E44.26 Assemble and install structural cell system in accordance with manufacturer's Specifications.

E44.27 Protection

- (a) Maintain a minimum of one hundred (100) mm of aggregate sub-base over the geotextile Material during construction. Use only low-pressure tire or low impact track vehicles with a maximum surface pressure under vehicle of four (4) pounds per square inch, on top of structural cells prior to the installation of final paving.

- (b) When vehicle must cross structural cells that does not have final paving surfaces installed, use plates or mats to distribute vehicle loads to levels that would be expected at deck surface once final paving has been installed. Use low-pressure tire or low impact track vehicles.
- (c) Ensure that all construction traffic is kept away from limits of structural cells until final surface materials are in place. No vehicles shall drive directly on the structural cell deck.

MEASUREMENT AND PAYMENT

- E44.28 The construction of structural cell system shall be measured on a lump sum basis as accepted by the Contract Administrator for "Structural Soil Cell System" inclusive of excavation, sub grade compaction, aggregate sub base, granular A base granite backfill Material, silva cells, root barrier, water and air vent, geogrid, geotextile, and anchor spikes. Price shall be payment in full for supplying materials and for performing the Work in accordance with this Specification and accepted and measured by the Contract Administrator.
- E44.29 Drainage Pipe shall be measured on a length basis and paid for at the Contract Unit Price per metre for "Drainage Pipe – Soil Cells", which per price shall be paid in full for supplying materials and performing all operations herein described and all other items incidental to the Work included in this Specification, accepted and measured by the Contract Administrator.
- E44.30 Granular A base granite Material under sidewalks and unit paving in blockouts shall be considered incidental to the Work and no additional measurement payments will be made for Work described in this Specification.
- E44.31 Base course under sidewalks and unit pavers around soil cells to be granular A base granite Material only to CW 3110. This includes the entire area of the three islands on the north side of Goulet and the entire sidewalk area at the southeast corner of Goulet and Traverse.

E45. PLANTING MEDIUM AND FINISHED GRADING

DESCRIPTION

- E45.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of planting medium for structural soil cells, tree planting beds and rain gardens.
- E45.2 References
 - (a) Agriculture and Agri-Food Canada
 - (i) The Canadian System of Soil Classification, Third Edition, 1998.
 - (b) Canadian Council of Ministers of the Environment (CCME) Guidelines.
 - (c) The City of Winnipeg Standard Construction Specifications:
 - (i) CW 1130 – Site Requirements;
 - (ii) CW 3110 – Sub-Grade, Sub-Base and Base Course Construction;
 - (iii) CW 3120 – Installation of Subdrains; and
 - (iv) CW 3540 – Topsoil and Finish Grading for Establishment of Turf Areas.
 - (d) The City of Winnipeg Details:
 - (i) AP-009 – Beehive Manhole Cover;
 - (ii) SD-023 – Standard Pre-Cast Concrete Catch Pit in Pavement; and
 - (iii) SD-025 – Standard Pre-Cast Concrete Catch Pit In Boulevard.

SUBMITTALS

- E45.3 Submit 0.5 kilogram sample of planting medium to National Testing Laboratory, or approved alternate, and indicate present use and intended use. Prepare and ship sample in accordance with Provincial regulations and testing laboratory requirements. Submit samples for:
 - (a) Clay-rich planting medium for structural soil cells and tree planting beds.

(b) Planting medium for rain gardens.

- E45.4 Submit two (2) copies of soil analysis and recommendations for corrections to Contract Administrator.
- E45.5 Submit two (2) litre sample of compost to Contract Administrator with manufacturers literature and Material certification that the product meets the CCME guidelines.

QUALITY ASSURANCE

- E45.6 Inform Contract Administrator of proposed source of materials to be supplied and provide a sample for review by Contract Administrator prior to installation.
- E45.7 Testing of clay-rich planting medium and planting medium to be carried out and paid for by Contractor. Prepare and ship planting medium samples to approved laboratory in accordance with Provincial regulations and laboratory requirements, indicating intended use on each sample.
- E45.8 Test clay-rich planting medium and planting medium for nutrients N, P, K, micronutrients, soluble salt content, pH value and OM (organic matter).
- E45.9 Acceptance of clay-rich planting medium and planting medium is subject to an inspection of Material and confirmation of test results. Do not commence soft landscaping work until Contract Administrator has accepted planting medium.
- E45.10 Delivery, Storage and Handling
- (a) Store materials in a dry area, protected from freezing, sedimentation and contamination.
 - (b) Deliver and store fertilizer in waterproof bags labeled with weight, analysis and name of manufacturer.

MATERIALS

- E45.11 Black Topsoil: In accordance with CW 3540 for topsoil except organic matter to be in the range of five (5) to ten percent (10%).
- E45.12 Peatmoss: deliver from partially decomposed fibrous or cellular stems and leaves of species of sphagnum mosses. Elastic and homogeneous, brown in colour. Free of wood and deleterious Material that could prohibit growth. Shredded particle minimum size: five (5) mm.
- E45.13 Compost:
- (a) Mixture of soil, decomposing organic matter used as fertilizer, mulch or soil conditioner.
 - (b) Dark brown in colour, no objectionable odour.
 - (c) Processed organic matter containing forty percent (40%) or more organic matter as determined by Walkley-Black or Lost On Ignition (LOI) test.
 - (d) Must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below 25:1) and contain no toxic or growth inhibiting contaminates.
 - (e) Composed bio solids to: CCME Guidelines for Compost Quality, Category A.
- E45.14 Sand: hard fine silica sand, well washed and free of impurities, chemical or organic matter. Coarse texture, and to the following gradation:

<u>Particle Size (mm)</u>	<u>% Passing through Screen</u>
2.0	100%
1.0	95 to 100%
0.5	80 to 100%
0.25	0 to 30%
0.15	0 to 8%
0.075	0 to 1%

E45.15 Fertilizer: Synthetic start-up slow release fertilizer with a N-P-K analysis of 12-36-15 ratio at a rate of four (4) kilograms per one hundred (100) square metres which is eight (8) pounds per one hundred (100) square feet.

E45.16 Clay-Rich Planting Medium for Structural Soil Cells Tree Planting Beds: shall be a blend of black topsoil, compost, and course sand mixed to the following proportion:

<u>Material</u>	<u>% by Volume</u>
Black Topsoil	70%
Compost	15 %
Coarse Sand	15%

E45.17 Planting Medium – Rain Garden: shall be a blend of black topsoil, compost, and course sand mixed to the following proportion:

<u>Material</u>	<u>% by Volume</u>
Coarse Sand	50%
Black Topsoil	35%
Compost	15%

E45.17.1 The rain garden planting medium shall meet the following parameters:

(a) Soil Particle Size Distribution:

Sand (0.05 – 2 mm)	75-90%	65-75%
Silt (0.002 – 0.05 mm)	7-22%	13-30%
Clay (<0.002 mm)	3-15%	3-15%
Gravel (2.0 – 64 mm)	less than or equal to 10%	

(b) Chemical Analysis pH: 6.0 – 8.0

(c) Plant Available Nutrient Levels (ppm):

Phosphorous	10 – 40
Potassium	80 – 250
Calcium	<5,000
Magnesium	100-300

(d) Percent organic matter 3 – 10%

(e) Hydraulic conductivity, saturated 0.0021 – 0.0083 cm/s 6.9 x 10-4-0.0021 cm/s

(f) Sample compacted to 75 – 85% (75 – 300 mm/h) (25 – 75 mm/h)

(g) Maximum dry density

(h) Cation exchange capacity >10 meq/100 g >10 meq/100 g

E45.18 Clean-Washed Drainage Material – Rain Garden: to CW 3120.

E45.19 Geotextile fabric – Rain Garden: Non-woven geotextile fabric to CW 3120.

CONSTRUCTION METHOD

E45.20 Excavation

(a) Excavate by hand or using approved soft digging technology unless otherwise directed by Contract Administrator. Dispose of all rock, clay soils and other deleterious materials off Site.

(b) Protect bottom of excavations against freezing.

(c) Remove water that has entered the excavation prior to planting. Notify Contract Administrator if water source is groundwater.

(d) Verify and obtain approval by Contract Administrator of excavations prior to placement of compacted soil mound and planting medium placement for structural soil cells and tree planting beds and clean washed drainage Material and non-geotextile for rain gardens.

E45.21 Clean Washed Drainage Material, Geotextile and Planting Medium Placement – Rain Gardens

- (a) Compact sub-grade in accordance with Specification CW 3110.
- (b) Install geotextile fabric in accordance with CW 3130.
- (c) Place planting medium – rain garden in uniform layers over approved, unfrozen sub-grade, to the depth indicated on the Drawings.
- (d) Eliminate rough spots and low areas, Prepare a loose, friable bed, boot firm and level.

E45.22 Planting Medium Placement

- (a) Planting medium placement for soil cells – refer to Structural Soil Cells Specification.
- (b) Planting medium placement for tree planting beds - place planting medium in uniform layers over approved, unfrozen sub-grade, to the depth indicated on the Drawings.
- (c) Eliminate rough spots and low areas, Prepare a loose, friable bed, boot firm and level.

E45.23 Beehive Grate – Rain Garden

- (a) Install beehive grate over catch basin or catch pit to AP-009, SD-023 and SD-025.

E45.24 Soil Amendments

- (a) Apply lime, sulphur, or other soil amendment at a rate determined and recommended from planting medium sample test.
- (b) Mix soil amendment well into full depth topsoil prior to application of fertilizer.

E45.25 Finished Grading and Rolling

- (a) Per CW 3540.
- (b) Fine grade entire soil area to elevations as indicated on the Drawings. Eliminate rough spots and low areas. Leave surfaces smooth, uniform and firm against foot printing with a fine loose texture.

E45.26 Surplus Material

- (a) Dispose of unused planting medium off Site in accordance with CW 1130.

E45.27 Cleaning

- (a) Perform cleaning to remove accumulated environmental dirt from all paved surfaces of building faces. Remove surplus materials, rubbish, tools and equipment barriers.

MEASUREMENT AND PAYMENT

- E45.28 The supply and installation of beehive grates shall be measured on a unit basis and be paid for at the Contract Unit Price per unit for installed “Beehive Grate – Rain Garden” as accepted and measured in the field by the Contract Administrator.
- E45.29 Supply and placement of clean washed drainage Material for rain gardens shall be measured on a volume basis and paid for at the Contract Unit Price per cubic metre as “Clean-Washed Drainage Material Incl. Non-Woven Geotextile Fabric – Rain Garden”. The volume to be paid for shall be the total cubic metre volume installed in accordance with this Specification, accepted and measured by the Contract Administrator. The supply and installation of non-woven geotextile fabric shall be considered incidental to the Work and no additional measurement payments will be made for Work described in this Specification.
- E45.30 Supply and placement of planting medium mix for soil cells and tree planting beds shall be measured on a volume basis and paid for at the Contract Unit Price per cubic metre as “Clay-Rich Planting Medium”. The volume to be paid for shall be the total cubic metre volume installed in accordance with this Specification, accepted and measured by the Contract Administrator.
- E45.31 Supply and placement of planting medium mix for rain gardens shall be measured on a volume basis and paid for at the Contract Unit Price per cubic metre as “Planting Medium – Rain

Garden". The volume to be paid for shall be the total cubic metre volume installed in accordance with this Specification, accepted and measured by the Contract Administrator.

E46. SODDING

DESCRIPTION

- E46.1 This Specification shall amend and supplement City of Winnipeg Standard Construction Specification CW 3510 "Sodding", and covers all operations relating sod supply and installation, including preparation of finish grade, watering and rolling, and thirty (30) day maintenance.
- E46.2 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 Works as hereinafter specified.
- E46.3 References
- (a) City of Winnipeg Standard Construction Specifications:
 - (i) CW 3510 – Sodding; and
 - (ii) CW 3540 – Topsoil and Finished Grading.
 - (b) City of Winnipeg Standard Details:
 - (i) SD-243 – Sodding Details.

MATERIALS

- E46.4 General
- (a) The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification. All materials supplied under this Specification shall be subject to inspection and acceptance by the Contract Administrator.
- E46.5 Turf Grass Sod
- (a) Turf grass sod shall conform to CW 3510.
 - (b) Sod shall be a mixture of ninety-five percent (95%) Kentucky bluegrass, using equal proportions of any three (3) Class 2 cultivars, and five percent (5%) Creeping Red fescue.
 - (c) Soil and fine grading shall conform to CW 3540 and Planting Medium and Finish Grading Specification.

CONSTRUCTION METHODS

- E46.6 Installation of Topsoil and Finish Grading, Preparation of Finish Grade, Placement of Sod, Watering, Rolling and Thirty (30) Day Maintenance:
- (a) Install seventy-five (75) mm topsoil in accordance with CW 3540.
 - (b) Sod placement, watering and rolling and thirty (30) day maintenance shall conform to CW 3510-R9 and SD-243.

MEASUREMENT AND PAYMENT

- E46.7 Turf Grass Sod will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Sodding". The area to be paid shall be the total square metre area in accordance with this Specification, accepted and measured by the Contract Administrator.

E47. TREE PLANTING

DESCRIPTION

E47.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of trees and perennials.

E47.2 References

- (a) Agriculture and Agri-Food Canada (AAFC):
 - (i) Plant Hardiness Zones in Canada-2000.
- (b) Canadian Nursery Landscape Association (CNLA):
 - (i) Plant Canadian Standards for Nursery Stock-2001.
- (c) Department of Justice Canada (JUS):
 - (i) Plant Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - (ii) Transport of Dangerous Goods Act (TDGA), 1992, c.34.
- (d) Health Canada / Workplace Hazardous Materials Information System (WHMIS):
 - (i) Materials Safety Data Sheets (MSDS).

SUBMITTALS

E47.3 Submit product data for:

- (a) Fertilizer.

SOURCE QUALITY CONTROL

E47.4 Obtain approval from Contract Administrator of plant Material at source.

E47.5 Notify Contract Administrator of source of Material at least seven (7) days in advance of shipment. No work under this Section is to proceed without approval.

E47.6 Acceptance of plant Material at source does not prevent rejection on Site prior to or after planting operations.

E47.7 Plant Material imported from other nations will not be accepted.

E47.8 Bare root plant Material will not be accepted.

E47.9 Storage and Protection

E47.9.1 Coordinate the shipping of plants and excavation of tree vaults to ensure minimum time laps between digging and planting.

E47.9.2 Protect plant Material from frost, excessive heat, wind and sun during delivery.

E47.9.3 Protect plant Material from damage during transportation:

- (a) When delivery distance is less than thirty (30) kilometres (km) and vehicle travels at speeds under eighty (80) kilometres per hour (km/h), tie tarpaulins around plants or over vehicle box.
- (b) When delivery distance exceeds thirty (30) km or vehicle travels at speeds over eighty (80) km/h, use enclosed vehicle where practical.
- (c) Protect foliage and rootballs using anti-desiccants and tarpaulins, where use of enclosed vehicle is impractical due to size and weight of plant Material.

E47.9.4 Protect stored plant Material from frost, wind and sun as follows:

- (a) For balled and burlapped and wire basket rootballs, place to protect branches from damage. Maintain moisture level in root zones.

E47.9.5 Remove broken and damaged roots with sharp pruning shears. Make clean cut and cover cuts over twenty (20) mm (3/4 inch) diameter with wound dressing.

E47.9.6 Keep roots moist and protect from sun and wind. Heel-in trees that cannot be planted immediately in shaded areas and water well.

E47.10 Scheduling

E47.10.1 Order plant Material as soon as possible after award of Contract to ensure plant availability. Request substitutes as required.

E47.10.2 Provide Contract Administrator a written schedule fourteen (14) days in advance of shipment of plant Material. Schedule to include: quantity and type of plant Material, shipping dates, arrival dates on Site, and planting dates.

E47.11 Warranty of Nursery Stock

E47.11.1 For all plant Material a two (2) year warranty period is required.

E47.11.2 During the warranty period, upon written notification from the Contract Administrator, the Contractor warrants to replace and replant any nursery stock found dead and/or in poor condition as soon as possible thereafter, without cost to The City. "Poor Condition" shall be interpreted as meaning nursery stock on which branches are dead or dying, or have not shown satisfactory growth in leaves. Exempted is nursery stock damaged by accidental causes or vandalism, which stock shall be replaced at the cost of The City.

E47.11.3 At the end of the two (2) year warranty period an inspection will be conducted by Contract Administrator.

E47.11.4 Contact Administrator reserves the right to extend Contractor's warranty responsibilities for an additional one (1) year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

E47.12 Replacements

E47.12.1 During warranty period, remove and replace any plant Material that has died or failed to grow satisfactorily, at no cost to the City, as directed by the Contract Administrator.

E47.12.2 A two (2) year warranty period shall be required on all replacement plant Material.

E47.12.3 All replacement plant Material shall be the same size and species as specified, and shall be supplied and planted in accordance with the original Drawings and Specifications.

E47.12.4 Should the replaced plant Material not survive, the Contractor will be responsible for a third replacement and a two (2) year warranty period shall be required.

E47.13 Plant Material

E47.13.1 Type of root preparation, sizing, grading and quality shall comply to the Canadian Standards for Nursery Stock.

E47.13.2 Source of plant Material: grown in Zone 3 only in accordance with Plant Hardiness Zones in Canada. Plant Material must be planted in zone indicated as appropriate for its species.

E47.13.3 Plant Material free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.

E47.13.4 Substitutions to plant Material as indicated on planting plan are not permitted unless written approval has been obtained as to type, variety and size. Plant substitutions must be of similar species and of equal size as those originally specified.

E47.13.5 Refer to Plant Specification List on the Drawings and the Drawings for species, quantities, size and quality of plant materials.

E47.14 Water

- E47.14.1 Water free of impurities that would hinder plant growth. The Contractor shall provide water, so that all costs to provide water for the watering operation and all associated costs shall be borne by the Contractor. These costs may include hydrant permit and meter rental fees.
- E47.14.2 Further to clause 3.7 of CW 1120, the Contractor shall pay for all costs associated with obtaining water in accordance with the Waterworks By-law. Sewer charges will not be assessed for water obtained from a hydrant.
- E47.15 Planting Medium: backfill with planting medium as specified in Planting Medium Specification.
- E47.16 Tree Tie: biodegradable or polyethylene fabric strapping min. thirty (30) mm wide.
- E47.17 Tree Stakes: seventy-six (76) mm diameter by two thousand four hundred forty (2,440) mm height wooden stakes.
- E47.18 Fertilizer: synthetic start-up slow release fertilizer with a N-P-K analysis of 12-36-15 ratio at a rate of four (4) kilograms per one hundred (100) square metres which is eight (8) pounds per one hundred (100) square feet.
- E47.19 Granite Mulch: granite mulch, black in colour.
- E47.20 Wood Mulch – Rain Garden: Wood Chip Mulch, varying in size from fifty (50) to seventy-five (75) mm and five (5) to twenty (20) mm thick, free of bark. Wood chip shall be mulched locally within one hundred (100) km of the Site.
- E47.21 Impervious Liner – Tree Planting at Gas Line: Deeproot impervious liner manufactured by DeepRoot Green Infrastructure, LLC ph. 1.800.458.7668.
- E47.22 Pre-Planting Preparation
- E47.22.1 Obtain approval from Contract Administrator of finish grading, and planting medium installation prior to commencing Work in this section.
- E47.22.2 Ensure plant Material is acceptable to the Contract Administrator.
- E47.22.3 Remove damaged roots and branches from plant Material with sharp clean equipment treating wounds as necessary to maintain plant health.
- E47.22.4 Apply anti-desiccant to deciduous trees in leaf in accordance with manufacturer's instructions.
- E47.23 Plant Material Layout
- E47.23.1 Prepare planting areas. Refer to Planting Medium Specification.
- E47.23.2 For individual trees:
- (a) Excavate tree pits to depths and widths indicated on the Drawings.
 - (b) Remove rocks, roots, debris and toxic Material from the tree pit.
- E47.23.3 For perennials and grasses:
- (a) Layout plants per Drawings carefully ensuring spacing specified on the Drawings.
 - (b) Obtain Contract Administrator approval of plant layouts and make any necessary adjustments on Site.
- E47.23.4 Remove water that has entered the excavated tree pit prior to planting. Notify Contract Administrator if water source is groundwater.
- E47.24 Planting
- E47.24.1 For jute burlap rootballs, cut away top one third of wrapping and wire basket without damaging rootball. Do not pull burlap or rope from under rootball.

- E47.24.2 For container stock or rootballs in non-degradable wrapping, remove entire container or wrapping without damaging rootball. Loosen rootball to encourage bonding with planting medium and subgrade.
- E47.24.3 For trees remove excess soil build up over root flair until the first fibrous roots at trunk are present and position at top of mulch/finished grade.
- E47.24.4 Plant vertically in locations as indicated. Orient plant Material to give best appearance in relation to structure, roads and walks.
- E47.24.5 Set plants and trees at elevations indicated on the Drawings with no more than fifty (50) mm of soil above the root flair. Review with City Forestry representative and Contract Administrator when trees are on Site, prior to installation.
- E47.24.6 For trees:
- (a) Prepare compacted soil mound below tree root ball. Ensure top of mound is set to suit the depth of rootball.
 - (b) Backfill soil in one hundred fifty (150) mm (six (6) inches) lifts. Tamp each lift to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has penetrated into soil, backfill to finish grade.
- E47.24.7 For perennials and grasses backfill soil evenly to finished grade and tamp to eliminate air pockets.
- E47.24.8 Water plant Material thoroughly. Report extreme ponding in planters indicative of malfunctioning drains to the Contract Administrator immediately.
- E47.24.9 After soil settlement has occurred, fill with soil to finish grade.
- E47.24.10 Dispose of burlap, wire and container Material off Site.
- E47.25 Tree Supports
- E47.25.1 Install tree supports and tree protection cloth as indicated on the Drawings taking care not to damage or puncture underground utilities.
- E47.25.2 Use double stake tree support for deciduous trees:
- (a) Place first stake on prevailing wind side of tree trunk.
 - (b) Drive stakes minimum one hundred fifty (150) mm into undisturbed soil beneath bottom of roots. Ensure stakes are secure, vertical and unsplit.
 - (c) Install tree tie one thousand five hundred (1,500) mm above grade.
 - (d) Install tree protection cloth and fasten to tree stakes. Burry bottom of cloth one hundred fifty (150) mm into planting medium.
- E47.26 Pruning
- E47.26.1 Undertake corrective pruning after planting to eliminate torn and broken branches. Do not damage lead branches or remove smaller twigs along main branches. Do not prune to compensate for root loss.
- E47.27 Maintenance
- E47.27.1 Maintain plant Material from date of planting to the end of the two (2) year warranty period. Refer to Landscape Maintenance Specification.

MEASUREMENT AND PAYMENT

- E47.28 Supply and installation of trees and perennials shall be measured on a unit basis, and be paid for at the Contract Unit Price per unit for installed trees, as accepted and measured in the field by the Contract Administrator, for the following Items of Work, which price shall be payment in

full for performing all operations herein described and all other items incidental to the Work included in this Specification.

E47.29 Items of Work:

(a) Trees:

- (i) Silver Maple;
- (ii) Hackberry;
- (iii) Triumph Elm;
- (iv) Tufted Hairgrass;
- (v) Joe Pye Weed;
- (vi) Meadow Blazing Star;
- (vii) Blue Eyed Grass;
- (viii) Blue Vervain; and
- (ix) Golden Alexander.

E47.30 Black granite mulch will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Granite Mulch". The area to be paid shall be the total square metre area in accordance with this Specification, accepted and measured by the Contract Administrator.

E47.31 Wood mulch will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Wood Mulch – Rain Garden". The area to be paid shall be the total square metre area in accordance with this Specification, accepted and measured by the Contract Administrator.

E47.32 Impervious liner will be measured on a lineal metre basis and paid for at the Contract Unit Price for "Impervious Liner". The item to be paid shall be the total length in accordance with this Specification, accepted and measured by the Contract Administrator.

E48. SITE FURNISHINGS

DESCRIPTION

E48.1 Provide all labour, materials, methods, equipment and accessories for the supply and install of trench grate with frame.

SUBMITTALS

E48.2 Submit product data for trench grate with frame and tree grate. Indicate sizes, assembly, and installation details.

E48.3 Submit Shop Drawings for trench grate with frame.

MATERIALS

E48.4 Trench Grate c/w Frame and Tamper Proof Bolts:

- (a) Trench Grate: two hundred three (203) by four hundred fifty-seven (457) trench grate 'tidal wave' grey iron, standard raw finish.
- (b) Trench Grate Frame: +/- 203.2 mm (eight (8) inches) wide frame, mild steel, standard raw finish, light vehicular load classification, embedded into concrete sidewalk.
- (c) Grate to Frame Fastening: fasten grates to frame with tamperproof screws type and size as recommended by manufacturer.
- (d) Available from Parkworks by MAKR, contact: Brennan Fedak 1-431-334-9627, or approved equal.

CONSTRUCTION METHODS

- E48.5 All Work is to be located and installed in accordance with the Drawings and manufacturers Specifications.
- E48.6 All furnishings to be installed plumb and true to correct elevations and location, as directed by the Contract Administrator. The Contractor shall confirm proposed locations of all Site furnishings with Contract Administrator prior to installation.
- E48.7 All furnishings to be carefully handled so that no parts will be bent, broken, or otherwise damaged. Contractor is responsible for replacing any damaged furnishings, prior to installation, at no cost to the City.

MEASUREMENT AND PAYMENT

- E48.8 The supply and installation of trench grates c/w frame & tamper proof bolts will be measured on a lineal metre basis and paid for at the Contract Unit Price for "Trench Grate c/w Frame and Tamper Proof Bolts". The item to be paid shall be the total length in accordance with this Specification, accepted and measured by the Contract Administrator.

E49. LANDSCAPE MAINTENANCE

DESCRIPTION

- E49.1 Provide all labour, materials, methods, equipment and accessories for the maintenance of trees and perennials following acceptance of the plant Material to start warranty.
- E49.2 In general, the Work shall include:
- (a) fertilizing;
 - (b) watering;
 - (c) weed control;
 - (d) pest and disease control; and
 - (e) winter preparation.
- E49.3 Maintenance shall be performed on a bi-weekly basis at a minimum.
- E49.4 Maintenance and Warranty Period
- E49.4.1 Thirty (30) days after the planting installation has been completed, the Contract Administrator shall perform an inspection of the plant Material to determine if the plant Material is acceptable to start warranty.
- E49.4.2 The maintenance and warranty period shall begin following acceptance of plant Material by Contract Administrator and shall be for a period of two (2) years.

SUBMITTALS

- E49.5 Submit maintenance log to Contract Administrator indicating date, times, employee, start time, stop time and maintenance activities.
- E49.6 Payment will not be processed without receipt of maintenance logs.

MATERIALS AND EQUIPMENT

- E49.7 Materials shall conform to the requirements of related Specification sections.
- E49.8 Provide all equipment to properly execute Work. Maintain such equipment in a workable, safe condition while in use during this project.
- E49.9 Contract Administrator shall review equipment to be used to execute Work prior to execution.

METHOD

E49.10 General

- (a) Provide watering service within twenty-four (24) hours, weeding services within forty-eight (48) hours of the request by the Contract Administrator. Monitor the Site and advise the Contract Administrator of conditions that might void the Contractor's warranty responsibilities.
- (b) Provide maintenance schedule to Contract Administrator prior for the two (2) year maintenance period.
- (c) Contractor shall notify Contract Administrator of the exact time Contractor proposes to commence each application.
- (d) Schedule operations in accordance with growth, health, weather conditions, and use of Site.
- (e) Perform each operation continuously and completely within a reasonable time period.
- (f) Store equipment and materials off Site.
- (g) Collect and dispose of debris or excess Material on the day the maintenance is undertaken.

E49.11 Maintenance of Trees and Perennials

- (a) Fertilizing: Apply fertilizer only at frequency, ratio and rates as recommended by manufacturer. Water immediately after fertilizing. Apply fertilizer no later than May 30 of each maintenance year.
- (b) Watering: Apply water as required to supplement rainfall and to maintain optimum growing conditions. In general, water once a week to achieve rates as indicated. Allow soil to adequately dry between watering to prevent over saturation without creating water stress. Subject to the above-noted requirements, the Contractor must water at least once a week between May 1 and October 15 inclusive. A complete record is to be kept of each series of watering's for all planted trees noting location and date of watering. This record is to be given to the Contract Administrator when requested. Apply forty (40) litres of water per twenty-five (25) mm calliper per application using a deep root feeder or low pressure open flow nozzle and hose. The water stream must not gouge the soil.
- (c) Weed Control: Inspect and undertake weed control weekly during the first year of maintenance and monthly during the second year. By hand, remove all weeds with their roots from tree pits and tree beds and dispose of off Site. When weeding operation is complete, replace and rake displaced soil to its original condition.
- (d) Pests and Diseases: Obtain written approval of Contract Administrator prior to using any pesticide. Control pests and disease through pruning or application of pesticides. Use species specific pesticides where possible. Use only pesticides of low mammalian toxicity. Strictly follow manufacturer's written instructions.
- (e) Pruning: The Contractor shall provide a person with a Manitoba Arborists Certificate for each work crew or Work Site. Prune as required to remove dead, broken or damaged limbs. Prune back to healthy growth while maintaining balanced crown shape. Employ clean sharp tools. Make cuts smooth and flush with outer edge of branch collar near the main stem or branch. Cuts must be smooth and sloping to prevent accumulation of water on cut. Do not leave little stumps ("horns") on trunks or main branches. Prune according to accepted horticultural practices as outline in "The Pruning Manual", Publication No. 1505-1977 by Agriculture Canada.
- (f) Winter Preparation: Ensure adequate moisture in tree root zones prior to freeze-up.

MEASUREMENT AND PAYMENT

- E49.12 Landscape maintenance shall be paid for on a lump sum basis for the items of Work listed below and shall be payment in full for supplying all Material and performing all operations herein

described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E49.13 Items of Work:

- (a) year one (1) Landscape Maintenance; and
- (b) year two (2) Landscape Maintenance.

E50. INSTALLATION OF STREET LIGHTING AND ASSOCIATED WORK

E50.1 Definitions

- (a) **LIMITS OF APPROACH** means the shortest distance that is permissible between live high voltage (> seven hundred fifty (750) volts) conductors or apparatus and any part of a worker's body, Material or tools being handled, or equipment operated.
- (b) **MANITOBA HYDRO CENTRAL STORES** means Manitoba Hydro's Waverley Service and Reclaim Centre – 1840 Chevrier Boulevard – Winnipeg, Manitoba.
- (c) **OVERHEAD FEED** means an electrical supply via an overhead conductor connected between streetlight standards. Typically strung between standards on a temporary basis.
- (d) **OVERHEAD SOURCE** means an electrical supply from Manitoba Hydro's system. (Typically an overhead conductor from a wooden distribution pole or a DIP/RISER located on a wooden distribution pole).
- (e) **RECLAIM Material** means existing Material that has been removed from Manitoba Hydro's system and to be returned to Manitoba Hydro.
- (f) **SCRAP Material** means existing Material that has been removed from Manitoba Hydro's system and to be recycled/disposed of by the Contractor.
- (g) **SURPLUS Material** means new Material that has been requisitioned by the Contractor and not incorporated into the Work at the end of the Contract.
- (h) **WORK CLEARANCE** means an **ELECTRICAL AND/OR NATURAL GAS FACILITIES LOCATE** form (use **SAMPLE ONLY** included in Appendix 'H') issued by each of Manitoba Hydro's Customer Service Centre (CSC) affected to permit Work to commence (Permit to Work).

DESCRIPTION

E50.2 The Work shall consist of the supply of all supervision, labour, Materials (except as indicated under **MATERIAL SUPPLIED BY MANITOBA HYDRO** below) insurance, tools, backfill and equipment (and their maintenance), transportation, fuel, oil, meals and lodging, mobilization and de-mobilization, and warranty of workmanship as required to install and remove temporary Overhead Feeds, remove existing street light poles as required, install new street light poles and associated underground cables/conduits, all in accordance with the requirements specified in the Tender documents.

E50.3 Work Locations

E50.3.1 The proposed street light installation and removals are shown on construction Drawings and are as follows:
(a) Goulet St from Traverse to Youville.

E50.4 Coordination of Work

E50.4.1 The Contractor shall provide a minimum of ten (10) Working Days' notice to Manitoba Hydro prior to the start of construction. The Work shall be conducted and coordinated with Manitoba Hydro in a manner to ensure street lighting is maintained at all times for the duration of the Work. The construction Drawings provide the Proposed Sequence of Construction.

E50.4.2 The Contractor shall obtain Work Clearance from Manitoba Hydro's CSC affected prior to the Work commencing. No additional compensation shall be paid to the Contractor for delays obtaining Work Clearance for any reason.

E50.4.3 Manitoba Hydro's CSC will provide the Limits of Approach applicable to the Contractor on the Work Clearance form.

E50.5 Orientation

E50.5.1 Prior to the commencement of the proposed Work, the Contractor's crew foremen, electricians, and other key personnel shall attend one (1) day of orientation provided by Manitoba Hydro for various operations such as cable handling, cable splicing/termination, installation of street light poles, concrete bases, luminaires and various other construction standards and procedures. The Contractor will be responsible for all costs associated with personnel salaries, travel, sustenance and overheads, etc., during training.

E50.6 Pre-Construction Meeting

E50.6.1 Prior to the commencement of the Work, the Contractor shall attend a pre-construction meeting with Manitoba Hydro. The agenda for this meeting shall include but not be limited to the following:

- (a) reference the Contractor's Safe Work Procedures;
- (b) Prime Contractor;
- (c) materials;
- (d) sequence of construction;
- (e) communication plan;
- (f) any training requirements and qualifications;
- (g) Drawing and Project review;
- (h) a review of the Contractor's proposed Work schedule; and
- (i) any and all other topics of clarification that the Contractor and the Contract Administrator may wish to discuss.

E50.6.2 The Contractor's cost to attend this pre-construction meeting shall be incorporated into the unit prices for the Work.

E50.7 Qualifications and Certification

E50.7.1 The Contractor's Crew Foreman, installers and other key Contractor's Personnel shall possess the necessary certification, licensing, training, experience and familiarity with safety rules, procedures and hazards relating to the Work. Journeyman Power Line Technician (PLT), Journeyman Lineman, Journeyman Cableman or Journeyman Electricians shall be required to perform portions of this Work.

E50.7.2 Journeyman PLT, Journeyman Cableman and Journeyman Lineman are also required to possess a "Limited Specialized Trade Licence – 'M-P' Licence – Power Line" issued by the Province of Manitoba.

E50.7.3 Office of the Fire Commissioner Bulletin OFC 18 – 002 dated May 23, 2018 regarding Electrician Licenses discusses the requirements for a "Limited Specialized Trade Licence – 'M-P' Licence – Power Line".

For more information contact:
Office of the Fire Commissioner
500-401 York Avenue
Winnipeg, Manitoba R3C 0P8
Tel. (204) 945-3373
Fax 204-948-2089

Toll Free: 1-800-282-8069

firecomm@gov.mb.ca

E50.7.4 Licensed Journeyman Electricians or Journeyman PLT or Journeyman Cableman or Journeyman Lineman ARE REQUIRED for all cable handling operations included but not limited to: disconnecting cables in the handhole, installation and removal of temporary overhead feeds, installation and connection of ground rods, streetlight cable splices, termination of streetlight cables in handholds and at luminaires. The Contractor shall employ sufficient qualified personnel on its crews to conform to the Electrician's Licensing Act. The Contractor shall be prepared to provide proof of licences to Manitoba Hydro upon request.

E50.7.5 The Contractor shall assess the hazards associated with the Work and have documented Safe Work Procedures to perform the Work. It is the Contractor's responsibility to train employees on these procedures. The Contractor shall be prepared to provide proof of training to Manitoba Hydro upon request.

E50.8 Referenced Standard Construction Specifications

E50.8.1 In addition to these Specifications, the Work to be performed by the Contractor relative to the installation and/or replacement of street lighting poles, concrete bases and associated cabling shall be in accordance with the following:

- (a) Manitoba Hydro sixty-six (66) kV and Below Standards;
- (b) CSA C22.3 No. 7 (latest edition);
- (c) Canadian Electrical Code (CEC) Part 1 (latest edition);
- (d) any other applicable codes; and
- (e) collectively, the "Standards".

E50.8.2 Revisions and updates to the Manitoba Hydro sixty-six (66) kV and Below Standards are issued periodically and the latest issued version of the Standard will apply. For the convenience of the Contractor for Bidding purposes, excerpts of the Manitoba Hydro sixty-six (66) kV and Below Standards have been included as Appendix 'I'.

E50.8.3 In some cases, Municipal, Provincial or Federal laws or this Technical Specification may be more stringent than the CSA Standards. Whenever conflict exists, the Contractor shall comply with the most stringent requirements applicable at the place of the Work.

E50.9 Tools, Equipment and Materials

E50.9.1 The Contractor shall be required to provide all tools and equipment required for performing the specified tasks. Equipment shall be in good operating condition, shall be properly maintained using original equipment manufacturer replacement parts and shall be provided with letters of testing/inspection from the manufacturer when requested. Where the equipment is provided as a kit with multiple parts and tools, the kit shall be complete with all parts required to perform the designed task. Contractor fabricated tools or equipment will not be accepted for use.

E50.9.2 The Contractor shall obtain the following specific Electrical Equipment including but not limited to:

- (a) Compression tool or tools and associated dies to perform compressions to a maximum size of 1/0 Al (MD-6 compression tools shall not be used).
- (b) Approved compression tools are:

Manufacture	Type	Model No.	Range
Burndy	In-line, battery	PATMD68-14V	350 Kcmil AL
Cembre	In-line, battery	B54Y (06V081E)	4/0 AWG AL
Burndy	Pistol, battery	BUR PAT60018V	350 Kcmil AL

- E50.9.3 Dies shall be of the type shown in Standard CD210-21 and CD 210-24 only, must have identical markings, and compression tool die must match die number stamped on connector.
- (a) Modiewark Model #4444 or Fluke 1AC-II Volt Alert potential Indicator;
 - (b) Voltage meter – Fluke model #T3C; and
 - (c) Insulated wire cutters – used for cutting cable ends square.
- E50.9.4 Alternative equipment manufacturers may be considered upon request by the Contractor and shall be approved for use by Manitoba Hydro prior to use.
- E50.9.5 Manitoba Hydro may reject any tools or equipment that do not appear to be in good condition or fail to successfully provide the required function.
- E50.10 Material Supplied by Manitoba Hydro
- E50.10.1 Manitoba Hydro shall supply all street light poles, concrete bases, breakaway bases, luminaires, street light arms, ground rods, compression sleeves, grommets, nuts, electrical cables, conduits, relays, cable guards, Gel-caps and all other Materials noted in the Standards. The Contractor shall sign receipts indicating the location on which the Materials are to be used. The Material shall be picked up by the Contractor from the following locations:
- (a) Manitoba Hydro Central Stores (contact personnel will be provided to the successful Contractor).
- E50.10.2 Materials requested will be supplied to the Contractor by Manitoba Hydro upon presentation of Manitoba Hydro's Stores Material Order Form. The Contractor shall assume all responsibilities for the loading, unloading, transportation, proper handling, secure storage and working of the Materials and shall make replacements at its own expense in case any Material is damaged, stolen or lost due to improper handling, storage or poor workmanship.
- E50.10.3 The Contractor shall, at the time of Materials release, check and confirm the quantity of Materials. Shortages, discrepancies, or damages to Materials shall be immediately reported in writing to Manitoba Hydro.
- E50.10.4 After commencing performance of the Work, the Contractor shall continually monitor all Material required for the timely completion of the Work and shall report additional Material requirements to Manitoba Hydro a minimum of seventy-two (72) hours prior to Materials being required to perform the Work. No additional compensation shall be paid as a result of delays due to Material shortages where additional Material requirements were not reported a minimum of seventy-two (72) hours prior to being required for the Work on an active project.
- E50.11 Material Supplied by Contractor
- E50.11.1 The Contractor shall be responsible to furnish gravel, sand, 19.05 mm ($\frac{3}{4}$ inch) down limestone, 6.35 mm ($\frac{1}{4}$ inch) down limestone, protective hose (i.e. typically 50.8 mm (two (2) inch) fire hose), duct seal and pit-run Material for backfilling around street light poles and around cables as per the Standards. The cost of furnishing the above listed Materials shall be incorporated into the unit prices for the Work.
- E50.12 Surplus, Reclaim and Scrap Material
- E50.12.1 Upon completion of the Work, the Contractor shall, at its own expense, deliver to Manitoba Hydro Central Stores, all Surplus Materials furnished by Manitoba Hydro and not used in the Work, regardless of the location of said Material at that time.
- E50.12.2 In addition, the Contractor shall, at its own expense, deliver to Manitoba Hydro Central Stores all Reclaim Materials from the Work specifically HPS luminaires. Manitoba Hydro shall be responsible for the proper disposal of Reclaim HPS luminaires. The HPS bulb

shall remain installed and unbroken in the Reclaim luminaire. The Contractor shall handle the Reclaim luminaires with care and shall avoid breaking the bulb or refractor.

E50.12.3 Manitoba Hydro's preference is to recycle as much Scrap Material as practicable. The Contractor is responsible to remove the Scrap Material, transport to the recycler or Manitoba Hydro approved disposal Site, pay for any disposal fees and may retain any recycling value.

E50.13 De-Energization and Lockout

E50.13.1 **Manitoba Hydro** – Where a standard is supplied from an Overhead Source, Manitoba Hydro's staff shall be responsible to disconnect and isolate the street light standard or standards between the standard and Overhead Source. Some street light standards may be temporarily fed from an Overhead Source. This Overhead Source shall be disconnected and removed by Manitoba Hydro staff prior to commencing with the Work. The streetlight circuits will not be Locked Out by Manitoba Hydro.

E50.13.2 **The Contractor** – The Contractor shall assess the hazards associated with the Work and employ its own Safe Work Procedure for the Work to be performed. The Contractor's Safe Work Procedure shall include provisions that the street light circuits will not be Locked Out by Manitoba Hydro. The Contractor's Safe Work Procedure shall achieve Lock Out or techniques equivalent to Lock Out.

E50.13.3 The Contractor shall complete a job planning form (an example is included as Appendix 'J') on a daily basis before any Work commences and provide Manitoba Hydro with copies of the job plans if requested.

E50.14 Temporary Overhead Feeds

E50.14.1 Manitoba Hydro in consultation with the Contractor will determine if temporary lighting will be provided by the existing street lights or from the new street lights.

E50.14.2 When using the existing poles for temporary lighting, Manitoba Hydro shall remove an Overhead Source in accordance with DE-ENERGIZATION AND LOCKOUT section above, prior to the Contractor installing a #4 duplex overhead conductor between the existing poles. The #4 duplex overhead conductor will normally be attached to the tenon of the davit arm near the luminaire with a pre-form grip. Older poles may require a spool insulator be attached to the pole using a pre-form grip to support the #4 duplex overhead conductor. A short length of 2C/#12 copper conductor is connected to the terminals of the luminaire brought out and connected to the #4 duplex overhead conductor. The final span to the Overhead Source shall be installed by Manitoba Hydro.

E50.14.3 When using the new poles for temporary lighting, the Contractor shall install the new bases, poles and #4 duplex overhead conductor. The #4 duplex overhead conductor will be attached to the tenon of the davit arm near the luminaire with a pre-form grip. A short length of 2C/#12 copper conductor is connected to the terminals of the luminaire brought out and connected to the #4 duplex overhead conductor. The final span to the Overhead Source shall be installed by Manitoba Hydro.

E50.14.4 All Material used to provide the temporary overhead feed shall be returned to Manitoba Hydro. Care shall be taken to coil and tag Reclaim conductor for reuse. If used, insulators shall be handled carefully to prevent breakage.

E50.15 Safe Excavation

E50.15.1 The Work shall be performed in accordance with the requirements of Manitoba Hydro's Safe Excavation and Safety Watch Guidelines (latest revision) included as Appendix 'F' and Manitoba Workplace Safety and Health Regulation 217 latest revision.

E50.16 Safe Handling

E50.16.1 The Contractor shall apply handling techniques in accordance with Manitoba Workplace Health and Safety Regulation 217 (latest revision).

E50.17 Electrical Cables and Conduits

- (a) The Contractor shall use diligent care and proper equipment in handling of all cables, so as not to injure the jacket and avoid gouging, kinking, scratching or abrading the cables. If any Material is damaged to any extent, the Contractor shall repair the damages at its own expense, in a manner approved by Manitoba Hydro or will be charged the full cost of the damaged items.
- (b) Cable reels shall not be dropped and must be handled and placed/stored in an upright position at all times and shall not be laid flat for any purpose or reason. Cable reels shall be adequately supported on hard surface to prevent the reel from sinking into the ground that can cause undue stress on the cables. Cable reels should be inspected for damages prior to use. If a cable reel is found to be defective, such defect shall be reported immediately to Manitoba Hydro.
- (c) The Contractor shall place all Material and string the cables in such a manner as to cause the least interference with normal use of the land, street or roadway. All Material shall be unloaded in a manner to preserve its condition, prevent loss and/or theft and permit easy access for Manitoba Hydro's inspection.
- (d) The Contractor shall provide Manitoba Hydro's inspector sufficient opportunity, in the sole discretion of Manitoba Hydro, to inspect the Work.

E50.18 Precast Concrete Bases

- E50.18.1 The Contractor shall handle, store, transport and unload the precast concrete bases in a manner to prevent damage to the threaded bolts and conduit casing.
- E50.18.2 Precast Concrete Bases are extremely heavy. Approximate weight of pre-cast concrete bases are found in the Standards. The Contractor shall only use equipment rated for such weight.

E50.19 Street Light Poles and Arms

- E50.19.1 The Contractor shall handle, store, transport, and provide proper load securement for the poles and arms in a manner to prevent damage.

E50.20 Luminaires

- E50.20.1 The Contractor shall handle, store, transport and unload the luminaires in their original packaging and in a manner to prevent damage.

E50.21 Small Material

- E50.21.1 Photo electric cells, shorting caps, shims, nut covers and associated supplies shall be kept in a suitable warehouse provided by the Contractor at its own expense. Photo electric cells shall be transported and stored in such a manner as to prevent breakage.

E50.22 Care of Materials

- E50.22.1 The Contractor shall assume all responsibilities of all the Materials and shall replace, at its own expense, any Materials damaged, stolen or lost due to improper handling or poor workmanship.

E50.23 Wire and Cable Reel Storage

- E50.23.1 Cable reels shall be stored with the flanges upright and resting on a hard surface. At temporary storage Sites where the soil may be soft, preservative-treated plywood sheets may be used to keep the flanges from sinking into the ground.
- E50.23.2 If cable reels must be pancaked or stored on their side in vertical racks, do not lift the reel by the top flange. Spacers (two (2) 2 x 4s placed wide side up) should be placed under the bottom flange and between the reels in order to create a space to insert the forks and lift the reels without damaging the cable.

E50.24 Reel Handling

- E50.24.1 When off-loading reels from a truck, reels shall be lowered using a hydraulic gate, hoist or forklift truck. When a reel is rolled from one (1) point to another, care must be taken to see that the reel does not straddle objects such as rocks, pipes, curbs or wooden blocks which could damage the cable or protective covering. A reel should always be rolled on hard surfaces to avoid sinkage and in the opposite direction to the cable wraps to ensure that the reel is rolled in such a direction as to tighten the cable on the reel.
- E50.24.2 When using a hoist, install a mandrel through the reel arbour hole and attach a sling. Use a spreader bar approximately 152.4 mm (six (6) inches) longer than the overall reel width placed between the sling ends just above the reel flanges. This will prevent bending of the reel flanges and damage to the cable.
- E50.24.3 If a forklift is used to move a reel, the reel is to be approached from the flange side. Position the forks such that the reel is lifted by both reel flanges. The lift forks shall not contact the cable.
- E50.24.4 Returnable reels shall be returned promptly to Manitoba Hydro Central Stores and in no case later than three (3) days after the completion of the Work unless otherwise mutually agreed between the Contractor and Manitoba Hydro.
- E50.25 Pressurized Water/Vacuum Excavation
- E50.25.1 Pressurized water/vacuum excavation (PW/VE) shall be used to daylight all buried utilities and structures where excavation by other mechanical means would be expected to provide a physical risk to that utility or structure.
- E50.25.2 The Work shall be performed in accordance with the requirements of Manitoba Hydro's Safe Excavation and Safety Watch Guidelines (latest revision) included as Appendix 'F'.
- E50.26 Removal Street Light Pole from Existing Base
- E50.26.1 This shall include all Work required to remove a street light pole from an existing base as set forth in this Technical Specification. The pole may be on an existing precast concrete base, steel power installed screw base or poured in place concrete base.
- E50.26.2 The Contractor shall furnish all labour, supplies and Materials (except as indicated in the Section "MATERIAL SUPPLIED BY MANITOBA HYDRO") necessary for the removal of the street light pole from the existing base. Care shall be taken to preserve the luminaire. The luminaire shall be reinstalled on the new street light pole or returned to Manitoba Hydro's stores as instructed by the Manitoba Hydro.
- E50.26.3 The Contractor shall be responsible to transport all Surplus and Reclaim Materials to Manitoba Hydro Central Stores and transport and dispose of all Scrap Material as set forth in this Specification.
- E50.27 Removal of Base and Direct Buried Street Light Pole
- E50.27.1 This shall include all excavation, whether by auger, pressurized water/vacuum excavation, by hand, or by other methods which may be necessary to remove a base or direct buried street light pole. The base may be poured in place concrete, steel power installed or precast concrete.
- E50.27.2 The Contractor shall be responsible to transport all Surplus and Reclaim Materials to Manitoba Hydro Central Stores and transport and dispose of all Scrap Material as set forth in this Specification.
- E50.27.3 The Contractor is responsible to supply all backfill Material as specified in the Standards and carry out all backfill, compacting and leveling of all excavations and voids for removed bases and direct buried street light poles so as to be ready for top soil and seed or sod or as directed by Manitoba Hydro.
- E50.28 Installation of Foundation – Concrete Base

- E50.28.1 This shall include all excavation, whether by auger, pressurized water/vacuum excavation, by hand, or by other methods which may be necessary to replace or install a concrete base as set forth in this Specification.
- E50.28.2 The Contractor shall furnish all labour, supplies and Material (except as indicated in the Section "Material Supplied by Manitoba Hydro") necessary to install a new or replace a concrete base. Excavation for the precast concrete base shall be to a diameter and depth specified in Standard CD 300-6. All excess Material is to be removed by the Contractor.
- E50.28.3 The concrete base shall be set on a bed of 19.05 mm ($\frac{3}{4}$ inch) down limestone. The concrete base backfill Material shall be compacted in lifts no more than one hundred fifty (150) mm. Backfill Material shall be 19.05 mm ($\frac{3}{4}$ inch) down limestone. Compacting of backfill Material shall be done using a hydraulic tamper. Alternative tamping methods shall be approved by Manitoba Hydro. Underground cables entering the concrete base shall be protected by a length of protective hose supplied by the Contractor and a layer of sand surrounding the cables to protect it from the limestone. The concrete base shall be installed level in all four (4) directions. Final grade must be established prior to installing the concrete bases.
- E50.28.4 The completed backfill shall be at least equal in compaction to undisturbed soil, as required by the Municipal authorities or elsewhere in this Specification. The Contractor shall level all excavations.
- E50.28.5 Should settlement occur in the excavation and cause a depression in the surface, the Contractor shall repair the surface. Placing of additional backfill Material due to settlement shall be at the Contractor's expense.
- E50.28.6 The concrete base shall be oriented in the proper direction to allow the easy entrance of the underground cables into the plastic pipe preinstalled in the concrete base. Care shall be taken to prevent damage to the insulation or jacket of the conductors. The cable shall be left long enough to extend one (1) m beyond the top of the hand hole.
- E50.29 Base Mounted Street Light Poles
- E50.29.1 This shall include all Work required to install the street light pole on the concrete base as set forth in this Specification.
- E50.29.2 The Contractor shall furnish all labour, supplies and Material (except as indicated in the Section "Material Supplied by Manitoba Hydro") necessary for the installation of the pole (straight shaft or davit) on the concrete base.
- E50.29.3 Unless otherwise specified on the construction Drawings, the Contractor shall orient the poles so that the hand hole is on the left side of the pole when viewed from the road. A worker should be able to see oncoming traffic when working in the hand hole.
- E50.29.4 The Contractor shall level the street light pole in all four (4) directions. Leveling shims may be used.
- E50.29.5 Tightening of bolts shall be performed in a manner that brings the surfaces up evenly. All nuts shall be tightened and torqued in accordance with Standard CD 300-9. The Contractor shall install the nut covers included with the pole.
- E50.29.6 Unless otherwise specified, excess underground cable and 2C-12 wire shall be left inside the hand hole with the hand hole cover loosely installed.
- E50.29.7 Existing street light poles may have street signs attached. The Contractor shall remove the signs from the existing pole and temporarily reattach the signs to the new pole. The Contractor shall notify Manitoba Hydro of the location where the signs have been removed.
- E50.30 Luminaires and Associated Wiring
- E50.30.1 The Contractor shall furnish labour, supplies and Material (except as indicated in the Section "Material Supplied by Manitoba Hydro") necessary to install the luminaire and associated wiring. Unless otherwise specified, the luminaire shall be installed with a tilt of zero (0) degrees. The Contractor shall install a length of two (2) conductor No. 12 gauge

(2C-12) wire from the terminals of the luminaire, through the arm (if applicable), down the pole to the hand hole. One (1) m of 2C-12 wire shall be left at the hand hole. Impact equipment (air or electric) shall not be used to tighten luminaire mounting bolts. The Contractor shall be liable for damage due to over tightening.

E50.30.2 The Contractor shall verify the luminaire voltage matches the source voltage as shown on the construction Drawings. If luminaire voltage does not match the source voltage, the Contractor shall re-wire the luminaire in accordance with the wiring diagram provided. Note: Not applicable for LED luminaires.

E50.30.3 As specified on the construction Drawings, the luminaire will require either a photo electric cell (PEC) or shorting cap installed. When installing the PEC the eye shall be oriented north. The Contractor shall also install the appropriate wattage bulb in the luminaire. Note: Bulb installation not applicable for LED luminaires.

E50.31 Break Away Bases

E50.31.1 Break away bases shall be installed in accordance with Standard CD 300-10. The height of the concrete base above grade shall not exceed fifty (50) mm. The surface of the concrete base shall be flat and level. A reaction plate shall be installed between the concrete base and the break-away base.

E50.31.2 The Contractor shall torque the couplers in accordance with Standard CD 300-10. Impact tools shall not be used to tighten or torque couplers or nuts associated with a break away base.

E50.32 Splicing/Connection Cables

E50.32.1 The electric cable shall be spliced/terminated as per Standards CD 215-12, CD 215-13, CD 310-1, CD 310-4, CD 310-9 and CD 310-10 with the exception that the Contractor will use a GELCAP-SL-2/0 splice kit (See Appendix 'K'). Termination in the hand hole may include the installation of an inline fuse holder.

E50.32.2 The Contractor shall furnish all labour, supplies and Material (except as indicated in the Section "Material Supplied by Manitoba Hydro") necessary to splice/terminate the street light conductor(s).

E50.33 Excavation

E50.33.1 The Contractor shall furnish all labour, supplies and Material (except as indicated in the Section "Material Supplied by Manitoba Hydro") necessary for the completion and maintenance of grade and line of the street light cables and conduit including water control if found to be necessary. The trench shall be graded to conform to the street light cables and conduit so that the street light cables and conduit rest firmly on a smooth surface throughout its length. All stones or other objects which, in the opinion of Manitoba Hydro might damage the street light cable jacket and conduit shall be removed. Where the presence of rock or other condition prevent a satisfactory bed for the cables, one hundred fifty (150) mm of well-tamped, clean soil or 6.35 mm (¼ inch) down crushed limestone shall be placed in the bottom of the trench. In this case, the spoil bank from trenching operations shall not be allowed to fall into the trench or mix with the soil to be used in backfilling the trench. Loose debris or foreign matter and the spoil bank shall be placed so as not to hinder drainage, damage property, or obstruct traffic.

E50.33.2 Trenches shall be dug to such a depth that will provide a minimum cover of six hundred (600) mm from final grade in sodded areas and one thousand (1,000) mm in roadways in accordance with Standard CD 305-1.

E50.34 Laying Cables

E50.34.1 Cables are to be lowered in the trench in an orderly fashion so as to maintain a consistent path and straight alignment. All cables shall be lowered in a continuous run (NO SPLICING) and in accordance with the construction Drawings; and shall maintain the necessary separation, where required. All cables shall be of continuous runs and capped

and sealed if they are not being installed in the pole at that time. Cables shall not be dragged over paved surfaces.

E50.34.2 Once a cable is cut its ends must be sealed immediately with an approved and appropriately sized, heat shrink or cold shrink sealing cap to prevent moisture ingress unless the cable is being installed in the pole at that time.

E50.34.3 During the removal of the cable, the reels shall be placed on jacks, stands or trailers with a bar through the arbour holes which will allow the reel to be turned easily, and the cable to be paid out. Cables can be paid out from the bottom or the top of the reel. Cable in coils shall be handled in a similar manner. This can be achieved by supporting the coil in a vertical plane and rotating it by hand as the cable is carefully uncoiled. The cable shall never be pulled over the flange of a reel, or pulled off the side of a coil, since this will introduce a twist in the cable.

E50.34.4 During installation, under no circumstance is the cable to be subjected to a bending radius tighter than that detailed in the Standards.

E50.34.5 Where specified in the Standards or on the construction Drawings, the Contractor shall install the street light cable in a conduit.

E50.35 Installing Conduit and Cable by Boring (Horizontal Directional Drilling)

E50.35.1 The Contractor shall dig the approaches and openings necessary to install boring equipment, and the boring equipment used shall be of such a nature as to minimize the opening size required. The boring equipment shall produce a straight hole without unnecessary dips or bends. The bore hole shall be only slightly larger than the outside diameter of the conduits or cables to minimize possible settlement. Cables and conduits shall be pulled in with pulling eyes or using a kelling grip in a manner so as to guard against damage.

E50.35.2 During construction as the drill bit crosses each existing facility a lookout shall be assigned by the Contractor to visually confirm the drill bit is maintaining a minimum three hundred (300) mm clearance from the existing facility all in accordance with Manitoba Hydro Safe Excavation and Safety Watch Guidelines (latest revision) included as Appendix 'F'. Maximum pulling tensions on any streetlight cable shall be limited to 2.9 kN/0.65 kips.

E50.35.3 Drilling fluids and associated waste Materials shall be disposed of in a manner that minimizes environmental effects.

E50.35.4 The Contractor shall properly compact the backfill Material and will be responsible for placing additional Material should settlement occur for the duration of the warranty period.

E50.36 Buried Utility Crossings

E50.36.1 All buried obstructions are not necessarily shown on the reference Drawings and the locations of those indicated are approximate only.

E50.36.2 The Contractor shall determine the location of all buried obstructions and shall notify the appropriate authorities and obtain all necessary permits prior to excavation, trenching and directional drilling near or across such obstructions. All buried obstructions where the new buried cable route crosses other utilities including but not limited to gas, water, sewer, telephone and electric lines shall be exposed as per each utilities guidelines by the Contractor, including the use of PW/VE where necessary. Should any damage occur to such lines during the course of the Work, the Contractor shall be responsible for the damage and the costs of repairs to buried obstructions caused by its operations and shall fully indemnify the City of Winnipeg and Manitoba Hydro from and against all claims arising out of such damage. Manitoba Hydro Safe Excavation and Safety Watch Guidelines (latest revision) included as Appendix 'F' shall be followed when crossing natural gas pipelines and electrical cables by the directional boring method.

E50.36.3 The PW/VE technique, used to expose underground plant in certain conditions, must be performed in accordance with each utility's requirements, including but not limited to

Manitoba Hydro, Manitoba Telecom Services, Shaw Cable, etc. PW/VE costs that the Contractor will incur during the Work must be factored into the Contractor's Bid prices. The Contractor shall not be entitled to extra compensation for the use of PW/VE on the Work.

E50.36.4 The Contractor shall be responsible to supply all backfill Material and carry out all backfill, compacting and leveling of all excavations so as to be ready for topsoil and seed or sod or as directed by Manitoba Hydro.

E50.37 Bending Cable/Conduits and Installation into Standards

E50.37.1 It is desired to reduce to a minimum the required number of bends and to lay the cables/conduits to conform to the contour of the ground and maintain a normal covering. This shall be accomplished by cutting the trench slightly deeper in approaches to road crossings and drainage ditches. It is intended that the Contractor shall eliminate unnecessary bending by operating the trenching machine at various depths rather than by finishing grading the trench by hand whenever practical.

E50.37.2 Sharp bends of the cables/conduits shall be avoided at all times. All bends shall meet the requirements set out in this Specification. If excessive bending was exerted on any cable, the cable shall be replaced at the Contractor's cost. During installation, under no circumstance is the cable to be subjected to a bending radius tighter than that detailed in the Standards. At street light poles the Contractor shall install the ends of the cables into the plastic pipe preinstalled in the concrete base. Care shall be taken to prevent damage to the insulation or jacket of the conductors. Underground cables entering the concrete base shall be protected by a length of protective hose supplied by the Contractor and by a layer of sand surrounding the cables to protect it from the limestone. The cable shall be left long enough to extend one (1) m beyond the hand hole. The street light cable in the trench shall be installed in conduit for mechanical protection and the ends sealed with duct seal supplied by the Contractor. Care shall be taken to prevent damaging the cable where it exits the conduit. The conduit shall only be installed into the concrete base if conduit sizes make it practicable.

E50.37.3 Unless otherwise directed, excess underground cable and 2C-12 wire shall be left inside the hand hole with the hand hole cover loosely installed.

E50.38 Backfill

E50.38.1 All backfilling Material within three hundred (300) mm of the cables/conduits shall be clean, free of sod, vegetation, organic Material, stones or other debris, and of a consistency as to not create significant voids or air spaces around the cables/conduits. Other backfilling Material shall be free of stones greater than one hundred fifty (150) mm on their maximum dimension. Where cinders or very acid soil are encountered or where gravel or incompressible fill is required by Municipal authorities, 6.35 mm ($\frac{1}{4}$ inch) down crushed limestone shall be placed all around the cables for a depth of at least three hundred (300) mm. The completed backfill shall be at least equal in compaction to undisturbed soil or as directed by Manitoba Hydro. Backfill Material is to be placed and compacted in lifts not exceeding three hundred (300) mm. All excess Material is to be removed by the Contractor.

E50.38.2 Tamping or flushing methods must be used where necessary to give the required compaction. Where tamping is used, hand tampers shall be used to at least three hundred (300) mm above the cable before machine tamping may be used. The Contractor shall level all excavations so as to be ready for topsoil and seed or sod or as directed by the Manitoba Hydro. Should settlement occur in the excavation and cause a depression in the surface, the Contractor shall repair the surface to the satisfaction of the Manitoba Hydro at the Contractor's cost.

E50.38.3 Excavations remaining where poles have been removed shall be backfilled with spoil, pit run gravel or 19.05 mm ($\frac{3}{4}$ inch) down limestone and compacted in lifts of one hundred fifty (150) mm as directed by Manitoba Hydro. The top three hundred (300) mm of the excavation shall be backfilled with topsoil.

- E50.38.4 Excavations remaining where utility crossings have been exposed shall be backfilled with sand or clean spoil and compacted in lifts of one hundred fifty (150) mm. The top three hundred (300) mm of the excavation shall be backfilled with topsoil.
- E50.38.5 Backfill of all excavations shall be in accordance with City of Winnipeg Standard Construction Specification CW 2030 (latest revision), to the satisfaction of the authority having jurisdiction and Manitoba Hydro.
- E50.39 Defective Work and Warranty
- E50.39.1 If any portion of the Work fails to comply with the requirements of this Specification, fails within the Warranty period, or if the final tests prove or indicate the existence of any fault or defect in the Work, or any part thereof, Manitoba Hydro may forthwith re-execute or make good the faulty or defective Work or alter the same to make it comply with requirements of the Specification at the Contractor's expense. Manitoba Hydro shall give the Contractor notice together with particulars of such failure, fault or defect, Manitoba Hydro's cost to re-execute or make good the faulty or defective Work and the Cost shall be deducted from the Contract.
- E50.39.2 At the completion of the Work for each location, Manitoba Hydro shall prepare and issue a Network Commissioning Report, a sample of which is included as Appendix 'L', to the Contractor. The Network Commissioning Report shall be dated indicating the commencement of the Warranty period for the Work performed at the location.
- E50.40 As-built Drawing
- E50.40.1 The Contractor shall provide an as-built Drawing or mark-up Drawing to Manitoba Hydro which accurately displays the "as built" location of the buried street light cables, conduits and street light poles.

MEASUREMENT AND PAYMENT

- E50.41 Removal of 7.62 m (twenty-five (25) feet) to 10.668 m (thirty-five (35) feet) street light pole and precast, poured in place concrete, steel power installed base or direct buried including davit arm, luminaire and appurtenances.
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Removal of 25'/35' street light pole and precast, poured in place concrete, steel power installed base or direct buried including davit arm, luminaire and appurtenances". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including removal of the pole, base, luminaire, appurtenances, use of pressurized water/vacuum excavation, transportation of Reclaim, Surplus and Scrap Material, payment of associated disposal fees and all other items incidental to the Work included in the Specification.
- E50.42 Removal of 13.716 m (forty-five (45) feet) street light pole and precast, poured in place concrete, steel power installed base or direct buried including davit arm, luminaire and appurtenances.
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Removal of 13.716 m (forty-five (45) ft) street light pole and precast, poured in place concrete, steel power installed base or direct buried including davit arm, luminaire and appurtenances". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including removal of the pole, base, luminaire, appurtenances, use of pressurized water/vacuum excavation, transportation of Reclaim, Surplus and Scrap Material, payment of associated disposal fees and all other items incidental to the Work included in the Specification.
- E50.43 Installation of Conduit and #4 AL C/N or 1/0 AL Triplex Streetlight Cable in Conduit by Open Trench Method.

- (a) This pay item will be measured on a linear metre basis and paid for at the Contract Unit Price per linear metre for "Installation of Conduit and #4 AL C/N or 1/0 AL Triplex streetlight cable in Conduit by open trench method." The number of meters to be paid for at the Contract Unit Price shall be measured and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installation of the conduit, pulling cable into the conduit, backfilling the trench, buried utility crossings, use of pressurized water/vacuum excavation and all other items incidental to the Work included in the Specification.
- E50.44 Installation of fifty (50) mm Conduit by Boring Method complete with Cable Insertion (#4 AL C/N or 1/0 AL Triplex).
- (a) This pay item will be measured on a linear metre basis and paid for at the Contract Unit Price per linear metre for "Installation of fifty (50) mm conduit or conduits by boring method complete with cable insertion (#4 AL C/N or 1/0 AL Triplex)." The number of metres to be paid for at the Contract Unit Price shall be measured and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installation of fifty (50) mm conduit or conduits by boring method, inserting the #4 AL C/N or 1/0 AL Triplex streetlight cable into the conduit(s), buried utility crossings, use of pressurized water/vacuum excavation and all other items incidental to the Work included in the Specification.
- E50.45 Installation of cable (#4 AL C/N or 1/0 AL Triplex) by boring method.
- (a) This pay item will be measured on a linear metre basis and paid for at the Contract Unit Price per linear metre for "Installation of cable(s) (#4 AL C/N or 1/0 AL Triplex) by boring method." The number of meters to be paid for at the Contract Unit Price shall be measured and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installation of the cable or cables by boring method, buried utility crossings, use of pressurized water/vacuum excavation and all other items incidental to the Work included in the Specification.
- E50.46 Installation of 7.62 m (twenty-five (25) feet) to 10.668 m (thirty-five (35) feet) Pole, Davit Arm and Precast Concrete Base Including Luminaire and Appurtenances.
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Installation of 25'/35' pole, davit arm and precast concrete base including luminaire and appurtenances." The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installation of the pole, davit arm, base, luminaire, appurtenances, placing the cable(s) into the base, use of pressurized water/vacuum excavation and all other items incidental to the Work included in the Specification.
- E50.47 Installation of 13.716 m (forty-five (45) feet) Pole, Davit Arm and Precast Concrete Base Including Luminaire and Appurtenances.
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Installation of 13.716 m (forty-five (45) feet) pole, davit arm and precast concrete base including luminaire and appurtenances." The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installation of the pole, davit arm, base, luminaire, appurtenances, placing the cable(s) into the base, use of pressurized water/vacuum excavation and all other items incidental to the Work included in the Specification.
- E50.48 Installation of One (1) 3.048 m (ten (10) feet) Ground Rod at Every Third Street Light, at the End of a Street Light Circuit or Anywhere Else as Shown on the Design Drawings. Trench #4 Ground Wire up to one (1) m From Rod Location to New Street Light and Connect (Hammerlock) to Top of Ground Rod.
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Installation of one (1) ten (10) feet ground rod at every third street light, at the end of a street light circuit or anywhere else as shown on the design Drawings. Trench #4

ground wire up to one (1) m from rod location to new street light and connect (hammerlock) to top of the ground rod.” The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including install one (1) 3.048 m (ten (10) feet) ground rod, trench the #4 ground wire to the new streetlight pole, connect (hammerlock) ground wire to rod and all other items incidental to the Work included in the Specification.

- E50.49 Installation of Lower three (3) m of Cable Guard, Ground Lug, Cable Up Pole, and First three (3) m Section of Ground Rod Per Standard CD 315-5.
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for “Install/lower three (3) m of Cable Guard, ground lug, cable up pole, and first three (3) m section of ground rod per Standard CD 315-5”. The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installing the lower section of cable guard, ground lug, ground rod, coiling cable(s) up the pole and all other items incidental to the Work included in the Specification.
- E50.50 Installation and Connection of Externally-Mounted Relay and PEC Per Standards CD 315-12 and CD 315 13.
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for “Installation and connection of externally-mounted relay and PEC per Standards CD 315-12 and CD 315-13”. The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including mounting the relay, PEC, wiring as per the schematic and all other items incidental to the Work included in the Specification.
- E50.51 Termination of 2/C #12 Copper Conductor to Street Light Cables Per Standard CD310-4, CD310-9 or CD310-10.
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for “Terminate 2/C #12 copper conductor to street light cables per Standard CD310-4, CD310-9 or CD310-10”. The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including connection of the 2/C # 12 copper conductor to the #4 C/N or 1/0 Al Triplex cable(s) using a GELCAP-SL-2/0 splice kit and all other items incidental to the Work included in the Specification.
- E50.52 Splicing #4 AL C/N or two (2) Single Conductor Street Light Cables.
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for “Splicing #4 Al C/N or two (2) single conductor street light cables”. The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including splicing the #4 AL C/N or two (2) single conductor cables in accordance with Standard CD 215-12 and CD 215-13 and all other items incidental to the Work included in the Specification.
- E50.53 Splicing 1/0 AL Triplex Cable or three (3) Single Conductor Street Light Cables.
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for “Splicing 1/0 AL triplex cable or three (3) single conductor street light cables”. The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including splicing the 1/0 Al triplex cable or set of three (3) single conductor cables in accordance with Standard CD 215-12 and CD 215-13 and all other items incidental to the Work included in the Specification.
- E50.54 Installation of Break-Away Base and Reaction Plate on Base-Mounted Poles up to 10.668 m (thirty-five (35) feet).

- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Installation of break-away base and reaction plate on base mounted poles up to 35' ". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installation of the reaction plate, break-away base and all other items incidental to the Work included in the Specification.

E50.55 Installation of Overhead Span of #4 Duplex Between New or Existing Streetlight Poles and Connect Luminaire to Provide Temporary Overhead Feed.

- (a) This pay item will be measured on per span basis and paid for at the Contract Unit Price per span for "Installation of Overhead Span of #4 duplex Between New or Existing Streetlight Poles and Connect Luminaire to Provide Temporary Overhead Feed". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including attachment of the #4 duplex overhead conductor using a perform grip (c/w spool insulator(s) to davit arm if necessary), sagging conductor, connection of luminaire using 2C#12 copper conductor and all other items incidental to the Work included in the Specification.

E50.56 Removal of Overhead Span of #4 Duplex Between New or Existing Streetlight Poles to Remove Temporary Overhead Feed.

- (a) This pay item will be measured on a per span basis and paid for at the Contract Unit Price per span for "Removal of Overhead Span of #4 duplex Between New or Existing Streetlight Poles to Remove Temporary Overhead Feed". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by the Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including removal of the #4 duplex overhead conductor, spool insulator(s) and all other items incidental to the Work included in the Specification.

E50.57 Expose Underground Cable Entrance of Existing Streetlight Pole and Install New Streetlight Cable(s).

- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Expose Underground Cable Entrance of Existing Streetlight Pole and Install New Streetlight Cable(s)". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including excavation and exposure of the underground cable entrance by any means necessary including use of pressurized water/vacuum excavation, installation of the new streetlight cables(s), backfill, compaction and all other items incidental to the Work included in the Specification.