THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 23-2006

KENASTON UNDERPASS PROJECT
KENASTON BOULEVARD RECONSTRUCTION
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS

APEGM
Certificate of Authorization
Stantec Consulting Ltd.
No. 1301 Expiry: April 30, 2006

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PART B - BIDDING PROCEDURES

B1. PROJECT TITLE

B1.1 KENASTON UNDERPASS PROJECT
KENASTON BOULEVARD RECONSTRUCTION
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, March 30, 2006.

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

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

B3. SITE INVESTIGATION

B3.1 Further to GC:3.1, the Contract Administrator or an authorized representative will be available at the Site from 1:30 pm to 3:30 pm on March 21, 2006 to provide Bidders access to the Site. All in attendance shall meet at the parking lot on the northwest corner of Kenaston Boulevard and Taylor Avenue.

B3.2 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.

B4. ENQUIRIES

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

B4.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.

B4.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B4.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.

B5. ADDENDA

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

B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

B5.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at http://www.winnipeg.ca/matmgt.

B5.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Branch internet website for addenda shortly before submitting his Bid.

B5.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B6. SUBSTITUTES

B6.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.

B6.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B6.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.

B6.4 The Bidder shall ensure that any and all requests for approval of a substitute:

(a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;

(b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;

(c) identify any anticipated cost or time savings that may be associated with the substitute;

(d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;

(e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.

B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.

B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.

B6.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.

B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative shall base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B15.

B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B7. BID SUBMISSION

B7.1 The Bid Submission consists of the following components:

(a) Form A: Bid;

(b) Form B: Prices, hard copy;

(c) Form G1: Bid Bond and Agreement to Bond, or
Form G2: Irrevocable Standby Letter of Credit and Undertaking, or
a certified cheque or draft.

B7.2 All components of the Bid Submission shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely in ink, to constitute a responsive Bid.

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

B7.3.1 Samples or other components of the Bid Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder’s Bid Submission.

B7.3.2 A hard copy of Form B: Prices must be submitted with the Bid Submission. If there is any discrepancy between the Adobe PDF version of Form B: Prices and the Microsoft Excel version of Form B: Prices, the PDF version shall take precedence.

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

B7.5 Bid Submissions shall be submitted to:

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

B8. BID

B8.1 The Bidder shall complete Form A: Bid, making all required entries.

B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:

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

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

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

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

B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.

B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

B8.4 Paragraph 12 of Form A: Bid shall be signed in accordance with the following requirements:

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

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

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

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

B8.4.1 The name and official capacity of all individuals signing Form A: Bid shall be printed below such signatures.

B8.4.2 All signatures shall be original and shall be witnessed except where a corporate seal has been affixed.

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

B9. PRICES

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

B9.1.1 For the convenience of Bidders, and pursuant to B7.3.2 and B15.4.2, an electronic spreadsheet Form B: Prices in Microsoft Excel (.xls) format is available along with the Adobe PDF documents for this Bid Opportunity on the Bid Opportunities page at the Materials Management Branch internet website at http://www.winnipeg.ca/matmgt.

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

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

B10. QUALIFICATION

B10.1 The Bidder shall:

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

(b) be responsible and not be suspended, debarred or in default of any obligation to the City;

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

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

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

(f) employ only Subcontractors who:

(i) are responsible and not suspended, debarred or in default of any obligation to the City (a list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at http://www.winnipeg.ca/matmgt); and

(ii) have successfully carried out work similar in nature, scope and value to the portion of the Work proposed to be subcontracted to them, and are fully capable of performing the Work required to be done in accordance with the terms of the Contract;

(g) have a written workplace safety and health program in accordance with The Workplace Safety and Health Act (Manitoba);

B10.2 Further to B10.1(g), the Bidder shall, within three (3) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

(a) a valid COR certification number under the Certificate of Recognition (COR) Program - Option 1 administered by the Manitoba Heavy Construction Association's Safety, Health and Environment Program; or

(b) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association; or

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

B10.3 The Bidder shall be prepared to submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B10.4 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B11. BID SECURITY

B11.1 The Bidder shall provide bid security in the form of:

(a) a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond); or

(b) an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Bid Price, and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form included in the Bid Submission (Form G2: Irrevocable Standby Letter of Credit and Undertaking); or

(c) a certified cheque or draft payable to "The City of Winnipeg", in the amount of at least fifty percent (50%) of the Total Bid Price, drawn on a bank or other financial institution registered to conduct business in Manitoba.

B11.1.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.

B11.2 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly executed by the successful Bidder and the performance security furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B11.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B11.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.

B11.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.

B11.3 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Bid Opportunity.

B12. OPENING OF BIDS AND RELEASE OF INFORMATION

B12.1 Bid Submissions will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Branch, or in such other office as may be designated by the Manager of Materials.

B12.1.1 Bidders or their representatives may attend.

B12.1.2 Bid Submissions determined by the Manager of Materials, or his designate, to not include the bid security specified in B11 will not be read out.

B12.2 After the public opening, the names of the Bidders and their Total Bid Prices as read out (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at http://www.winnipeg.ca/matmgt.

B12.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract Amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at http://www.winnipeg.ca/matmgt.

B12.4 The Bidder is advised that any information contained in any Bid Submission may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B13. IRREVOCABLE BID

B13.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.

B13.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the performance security furnished as

herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid.

B14. WITHDRAWAL OF BIDS

B14.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B14.1.1 Notwithstanding GC:23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.

B14.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid, and only such person, has authority to give notice of withdrawal.

B14.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials shall:

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

(b) open the Bid Submission to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid; and

(c) if the notice has been given by any one of the persons specified in B14.1.3(b), declare the Bid withdrawn.

B14.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B13.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B15. EVALUATION OF BIDS

B15.1 Award of the Contract shall be based on the following bid evaluation criteria:

(a) compliance by the Bidder with the requirements of the Bid Opportunity (pass/fail);

(b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B10 (pass/fail);

(c) Total Bid Price;

(d) economic analysis of any approved alternative pursuant to B6.

B15.2 Further to B15.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid Submission is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements if the interests of the City so require.

B15.3 Further to B15.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid Submission or in other information required to be submitted, that he is responsible and qualified.

B15.4 Further to B15.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.

B15.4.1 If there is any discrepancy between the Total Bid Price written in figures, the Total Bid Price written in words and the sum of the quantities multiplied by the unit prices for each item, the sum of the quantities multiplied by the unit prices for each item shall take precedence.

B15.4.2 The electronic Form B: Prices and the formulas imbedded in that spreadsheet are only provided for the convenience of Bidders. The City makes no representations or warranties as to the correctness of the imbedded formulas. It is the Bidder's responsibility to ensure the extensions of the unit prices and the sum of Total Bid Price performed as a function of the formulas within the electronic Form B: Prices are correct.

B16. FEDERAL/ PROVINCIAL CLAUSES

B16.1 Further to GC:6, the Contractor shall prepare and maintain proper and accurate accounts of records, including invoices, statement, receipts and vouchers, in accordance with generally accepted accounting principles for at least five (5) years from the Total Performance. The Contractor agrees that representative of The Province of Manitoba and the Government of Canada, their Management Committee and their authorized representatives, to the extent possible under the legislation applicable to Manitoba, will have free access to the Site and to any documentation, including accounts and records, relevant for the purpose of audit of the Work.

B16.2 GC 3.2. is herby amended by deleting 3.2 (a) and substituting the following there of:

(a) Does so in good faith and that to the best of his knowledge, no member of the House of Commons or the Senate of Canada will be admitted to any share or part of any contract made pursuant to this Contract, or any benefit arising from it and no member of Council or any officer or employee of the City has any pecuniary interest, direct or indirect, in the Contract.

B17. AWARD OF CONTRACT

B17.1 The City will give notice of the award of the Contract by way of a letter of intent, or will give notice that no award will be made.

B17.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.

B17.2.1 Without limiting the generality of B17.2, the City will have no obligation to award a Contract where:

(a) the prices exceed the available City funds for the Work;

(b) the prices are materially in excess of the prices received for similar work in the past;

(c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;

(d) only one Bid is received; or

(e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.

B17.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid.

PART C - GENERAL CONDITIONS

C1. GENERAL CONDITIONS

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

C1.2 The *General Conditions for Construction Contracts* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at http://www.winnipeg.ca/matmgt.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D1.2 The General Conditions are amended by striking out “The City of Winnipeg Act” wherever it appears in the General Conditions and substituting “The City of Winnipeg Charter”.

D1.3 The General Conditions are amended by striking out “Tender Package” wherever it appears in the General Conditions and substituting “Bid Opportunity”.

D1.4 The General Conditions are amended by striking out “Tender Submission” wherever it appears in the General Conditions and substituting “Bid Submission”.

D1.5 The General Conditions are amended by deleting GC:6.16 and GC:6.17. The City of Winnipeg is now within the jurisdiction of the Manitoba Ombudsman pursuant to The Ombudsman Act.

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of:

(a) Construction of a new Portland Concrete Pavement on Kenaston Boulevard from Kenaston Intermodal Ltd. Access to Taylor Avenue;

(b) Construction of Intersection Improvements at Kenaston Boulevard and Taylor Avenue;

(c) Construction of a new Portland Concrete Pavement and Asphalt Resurfacing on Kenaston Boulevard from Taylor Avenue to North Limit of Contract at Kenaston Boulevard;

(d) Construction of Ramp to Wilkes Avenue from Kenaston Boulevard;

(e) Construction of Lorimer Boulevard from Sterling Lyon Parkway to Wilkes Avenue;

(f) Decommissioning of Kenaston Boulevard Detour;

(g) Decommissioning of CN Rivers Subdivision Rail Mainline Detour;

(h) DND Restoration;

(i) Construction of a LDS on Kenaston Boulevard and Ramp to Wilkes; and

(j) Landscaping of Kenaston Boulevard, Ramp to Wilkes, Lorimer Boulevard and Talyor Avenue.

D2.2 The major components of the Work to be done under the Contract shall consist of:

(a) Construction of a new Portland Concrete Pavement on Kenaston Boulevard from Kenaston Intermodal Ltd. Access to Taylor Avenue.

The major components of the Work are as follows:

(i) Remove existing pavement;

(ii) Excavation;

(iii) Installation of subdrains;

(iv) Compaction of existing sub-grade;

(v) Installation of catchbasins and connection pipe;

(vi) Placement of separation/ reinforcement fabric;

(vii) Placement of sub-base and base course materials;
(viii) Construction of 250mm concrete pavement (plain-dowelled) utilizing slip-form paving equipment;
(ix) Adjustment of existing manholes and catchbasins;
(x) Construction of 180mm barrier curb and splash strip in median and gutter (separate) utilizing slip-form paving equipment;
(xi) Construction of 120mm mountable curb;
(xii) Construction of traffic barrier;
(xiii) Construct concrete sidewalk;
(xiv) Construct multi-use asphalt sidewalk;
(xv) Slope paving;
(xvi) Construction of modular block retaining wall;
(xvii) Electrical;
(xviii) Boulevard grading; and
(xix) Ditch grading and sloping.

(b) Construction of Intersection Improvements at Kenaston Boulevard and Taylor Avenue.

The major components of the Work are as follows:

(i) Remove existing pavement;
(ii) Excavation;
(iii) Installation of subdrains;
(iv) Compaction of existing sub-grade;
(v) Installation of catchbasins and connection pipe;
(vi) Placement of separation/ reinforcement fabric;
(vii) Placement of sub-base and base course materials;
(viii) Construction of 250mm concrete pavement (plain-dowelled);
(ix) Construction of monolithic median slabs;
(x) Planning of existing asphalt pavement;
(xi) Placement of asphalt overlay (average thickness 100mm);
(xii) Adjustment of existing manholes and catchbasins;
(xiii) Complete curb renewal at intersection;
(xiv) Construction of 180mm barrier curb and splash strip in median and gutter (separate) utilizing slip-form paving equipment;
(xv) Construction of curb and gutter utilizing slip form paving equipment (Taylor Avenue West); and
(xvi) Boulevard restoration.

(c) Construction of a new Portland Concrete Pavement and Asphalt Resurfacing on Kenaston Boulevard from Taylor Avenue to North Limit of Contract at Kenaston Boulevard

The major components of the Work are as follows:

(i) Remove existing pavement;
(ii) Excavation;
(iii) Installation of subdrains;
(iv) Compaction of existing sub-grade;
(v) Installation of catchbasins and connection pipe;
(vi) Placement of separation/ reinforcement fabric;

(vii) Placement of sub-base and base course materials;
(viii) Construction of 230mm concrete pavement (plain-dowelled);
(ix) Adjustment of existing manholes and catchbasins;
(x) Construction of 180mm barrier curb and splash strip in median (separate) utilizing slip-form paving equipment;
(xi) Construction of 180mm barrier curb and gutter (separate) with asphalt overlay utilizing slip-form paving equipment;
(xii) Construction of monolithic median slab;
(xiii) Planning of asphalt overlay;
(xiv) Placement asphalt overlay (average thickness 75mm);
(xv) Construct concrete sidewalk; and
(xvi) Boulevard grading.

(d) Construction of Ramp to Wilkes Avenue from Kenaston Boulevard

The major components of the Work are as follows:

(i) Excavation;
(ii) Installation of subdrains;
(iii) Compaction of existing sub-grade;
(iv) Installation of catchbasins and connection pipe;
(v) Placement of separation/ reinforcement fabric;
(vi) Placement of sub-base and base course materials;
(vii) Placement of asphalt pavement (average thickness 125mm);
(viii) Adjustment of existing manholes and catchbasins;
(ix) Placement of asphalt pavement parking lot for Pump Station (average thickness 100mm);
(x) Construction of 180mm barrier curb and gutter (separate) utilizing slip-form paving equipment;
(xi) Boulevard grading; and
(xii) Ditch grading and sloping.

(e) Construction of Lorimer Boulevard from Sterling Lyon Parkway to Wilkes Avenue. (This roadway is constructed of three (3) pavement test sections.)

The major components of the Work are as follows:

(i) Excavation;
(ii) Installation of subdrains;
(iii) Compaction of existing sub-grade;
(iv) Installation of catchbasins and connection pipe;
(v) Placement of separation/ reinforcement fabric;
(vi) Placement of sub-base and base course materials;
(vii) Construction of 200mm concrete pavement (plain-dowelled) utilizing slip-form paving equipment;
(viii) Construction of 200mm concrete pavement (reinforced) utilizing slip-form paving equipment;
(ix) Placement of asphalt pavement (average thickness 125mm);
(x) Adjustment of existing manholes and catchbasins;
(xi) Construction of 180mm modified barrier curb (separate) utilizing slip-form paving equipment;

(xii) Construction of 180mm modified curb and gutter (separate) utilizing slip-form paving equipment;
(xiii) Boulevard grading;
(xiv) Ditch grading and sloping; and

(f) Decommissioning of Kenaston Boulevard Detour.

The major components of the Work are as follows:

(i) Remove existing asphalt pavement;
(ii) Reclaim and reuse existing base and sub-base material from Kenaston Boulevard detour to construct ramp to Wilkes Avenue and Lorimer Boulevard;
(iii) Remove existing separation/ reinforcement fabric;
(iv) Remove temporary installed catchbasisn and abandon connection pipe;
(v) Remove and deliver pre-cast concrete median barrier;
(vi) Remove and deliver existing energite barrels;
(vii) Remove and deliver existing barrier posts;
(viii) Remove and deliver existing barrier rails;
(ix) Restore Kenaston Boulevard detour site;
(x) Ditch grading and sloping; and
(xi) Relocate existing fence from construction easement to property line.

(g) Decommissioning of CN Rivers Subdivision Rail Mainline Detour

The major components of the Work are as follows:

(i) Remove rail and tie plate (by others);
(ii) Remove railway ties (by others);
(iii) Reclaim and reuse existing Ballast;
(iv) Reclaim and reuse existing Sub-Ballast;
(v) Reclaim and reuse existing sub-base material;
(vi) CN mainline detour site restoration;
(vii) Boulevard restoration;
(viii) Ditch grading and sloping; and

(h) DND Restoration

The major components of the Work are as follows:

(i) Excavation;
(ii) Placement of sub-base and base course material;
(iii) Remove existing pavement;
(iv) Remove guard house and gate ramp;
(v) Remove electrical parking rails;
(vi) Installation of catch basin and connection pipe;
(vii) Complete pavement patching;
(viii) Construction of 180mm barrier curb;
(ix) Complete curb renewals;
(x) Placement of asphalt (average thickness 100mm);
(xi) Boulevard restoration; and
(xii) Relocate existing fence.

(i) Construction of a LDS on Kenaston Boulevard and Ramp to Wilkes

The major components of the Work are as follows:

(i) Installation of new land drainage sewer lines on Kenaston Boulevard;
(ii) Connect new land drainage sewer to existing land drainage sewer;
(iii) Installation of new manholes;
(iv) Installation of new catch basins;
(v) Removal, plugging and abandoning existing wastewater sewers;
(vi) Removal, plugging and abandoning existing water mains and feeder mains; and
(vii) Removal of existing manholes and catchbasins.

(j) Landscaping of Kenaston Boulevard, Ramp to Wilkes, Lorimer Boulevard and Talyor Avenue

The major components of the Work are as follows:

(i) Placement of top soil;
(ii) Placement of seed and sod;
(iii) Planting of trees and plants; and
(iv) Maintenance of landscaping.

D3. DEFINITIONS

D3.1 When used in this Bid Opportunity:

(a) "**DND**" means Department of National Defence;

(b) "**CN**" means Canadian National;

(c) "**PPCLI**" means Princess Patricia Canadian Light Infantry;

(d) "**CFB**" means Canadian Forces Base; and

(e) "**MTS Allstream Inc.**" means Manitoba Telecom Services Allstream Inc.

D4. CONTRACT ADMINISTRATOR

D4.1 The Contract Administrator is Stantec Consulting Ltd., represented by:

Vilko Maroti C.E.T.
Project Manager
905 Waverley Street,
Winnipeg, MB R3T 5P4

Telephone No. (204) 928-8834
Facsimile No. (204) 453-9012

D4.2 At the pre-construction meeting, Vilko Maroti will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D5. CONTRACTOR'S SUPERVISOR

D5.1 At the pre-construction meeting, the Contractor shall identify his designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D5.2 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 D5.1 or an alternate can be contacted 24 hours a day to respond to an emergency.

D6. NOTICES

D6.1 Except as provided for in GC:23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.

D6.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D6.3, D6.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the address or facsimile number identified in D4.1.

D6.3 All notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following address or facsimile number:

The City of Winnipeg
Chief Administrative Officer Secretariat
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9

Facsimile No.: (204) 949-1174

D6.4 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following address or facsimile number:

The City of Winnipeg
Corporate Services Department
Legal Services Division
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1

Facsimile No.: (204) 947-9155

D7. FURNISHING OF DOCUMENTS

D7.1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Bid Opportunity. If the Contractor requires additional sets of the Bid Opportunity, they will be supplied to him at cost.

SUBMISSIONS

D8. SAFE WORK PLAN

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

D8.2 The Safe Work Plan 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 Branch internet site at http://www.winnipeg.ca/matmgt.

D9. INSURANCE

D9.1 The City shall provide and maintain the following Project Insurance Coverages:

D9.1.1 Builder's Risk Insurance in the amount of one hundred percent (100%) of the total project cost.

(a) The Contractor shall be responsible for all deductibles.

(b) Deductible limit shall be all perils $25,000.00 per claim; except testing, flood and water damage shall be $50,000.00 per claim and earthquake and collapse shall be $100,000.00 per claim.

D9.1.2 Wrap-Up Liability Insurance in an amount of 25 million dollars ($25,000,000.00).

(a) The Contractor shall be responsible for all deductibles.

(b) Deductible limit shall be $25,000.00 per claim.

D9.1.3 The City of Winnipeg will carry such insurance to cover all parties engaged in the Work in this Contract including The City of Winnipeg, The Province of Manitoba, The Federal Government of Canada and their ministers, officers, employees and agents, The Department of Nation Defence, CN Railway, Group Telecom, and the Contract Administrator as additional insureds.

Provisions of this insurance by the City of Winnipeg is not intended in any way to relieve the Contractor from his obligations under the terms of the Contract. Specifically, losses relating to deductibles for insurance, as well as losses in excess of limits of coverage and any risk of loss that is not covered under the terms of the insurance provided by the City of Winnipeg remains with the Contractor.

D9.2 The Contractor shall provide and maintain the following insurance coverage at all times during the performance of the Work:

D9.2.1 Automobile liability insurance for owned and non-owned automobiles used for or in connection with the Work in the amount of at least two million dollars ($2,000,000.00)

D9.2.2 Deductibles shall be borne by the Contractor.

D9.2.3 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least fifteen (15) Calendar Days prior written notice to the Contract Administrator.

D9.2.4 The Contractor shall provide the Contract Administrator with evidence of insurance of the policy at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than seven (7) Calendar Days from notification of the award of Contract.

D10. PERFORMANCE SECURITY

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

(a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or

(b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or

(c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.

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

D10.2 If the bid security provided in his Bid Submission was not a certified cheque or draft pursuant to B11.1(c), the Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site and in no event later than the date specified in the GC:4.1 for the return of the executed Contract.

D11. SUBCONTRACTOR LIST

D11.1 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 GC:4.1 for the return of the executed Contract.

D12. EQUIPMENT LIST

D12.1 The Contractor shall provide the Contract Administrator with a complete list of the equipment which the Contractor proposes to utilize (Form K: Equipment List) at 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 GC:4.1 for the return of the executed Contract.

D13. DETAILED WORK SCHEDULE

D13.1 The Contractor shall provide the Contract Administrator with a detailed work schedule (Form L: Detailed Work Schedule) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the General Conditions for the return of the executed Contract.

D13.2 The detailed work schedule shall consist of the following:

(a) a Gantt chart for the Work

all acceptable to the Contract Administrator.

D13.3 Further to D13.2(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.

SCHEDULE OF WORK

D14. COMMENCEMENT

D14.1 The Contractor shall not commence any Work until he is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.

D14.2 The Contractor shall not commence any Work on the Site until:

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

(i) evidence that the Contractor is in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba;

(ii) evidence of the workers compensation coverage specified in GC:6.14;

(iii) the twenty-four (24) hour emergency response phone number specified in D5.2.

(iv) the Safe Work Plan specified in D8;

(v) evidence of the insurance specified in D9;

(vi) the performance security specified in D10;

(vii) the subcontractor list specified in D11;

(viii) the equipment list specified in D12; and

(ix) the detailed work schedule specified in D13.

(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.

D14.3 The Contractor shall commence the Work on the Site on May 1, 2006, or within seven (7) Working Days of receipt of the letter of intent.

D14.4 The City expects to award this Contract on or before April 28, 2006.

D15. RESTRICTED WORK HOURS

D15.1 Further to clause 3.10 of CW 1130, the Contractor shall require written permission 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.

D16. WORK BY OTHERS

D16.1 Work by others on or near the Site will include but not necessarily be limited to:

(a) City of Winnipeg Public Works Contract Kenaston Underpass Railway Bridge Construction (Bid Opportunity 601-2005). The bridge construction is scheduled to be complete by the end of May 2006;

(b) City of Winnipeg Public Works Contract Kenaston Underpass Pumping Station Construction (Bid Opportunity 694-2005). The Pump Station is scheduled to be completed by the end of August 2006;

(c) City of Winnipeg Public Works Contract Feedermain and Watermain Relocation (Bid Opportunity 322-2005). The Feedermain and Watermain is scheduled to be complete by the beginning of June 2006;

(d) Placement and construction of ballast and track and signal relocation to CN rail mainline;

(e) Removal of CN rails and ties;

(f) Manitoba Hydro utility relocation and street lighting on Kenaston Boulevard, Lorimer Boulevard, and ramp to Wilkes. Provide power to Pump Station;

(g) MTS Allstream Inc.– Utility relocation, service to Pump Station;

(h) Group Telcom fibre-optic cable relocation to Rail Bridge;

(i) Traffic Service by City of Winnipeg;

(j) New and relocated traffic signals plant by City of Winnipeg; and

(k) Manitoba Hydro gas service to Pump Station.

D17. SEQUENCE OF WORK

D17.1 Further to GC:6.1, the sequence of work shall be as follows:

D17.1.1 The Work shall be divided into Four Phases. Each Phase shall be subdivided into stages. Stages are further subdivided into major items of work.

D17.1.2 **Phase I** – Construction of Kenaston Boulevard from Kenaston Intermodal Ltd. Access to Taylor Avenue, Construction of Kenaston/ Taylor Intersection west of Kenaston centerline, and CN rail detour decommissioning west of Kenaston detour.

(a) **Stage I** – Construction of a new Portland Concrete Pavement on Kenaston Boulevard from Kenaston Intermodal Ltd. Access to Taylor Avenue

(i) Remove existing pavement;
(ii) Excavation;
(iii) Installation of subdrains;
(iv) Installation of new land drainage sewer lines on Kenaston Boulevard;
(v) Connect new land drainage sewer to existing land drainage sewer;
(vi) Installation of new manholes;
(vii) Removal, plugging and abandoning existing wastewater sewers;
(viii) Removal, plugging and abandoning existing water mains and feeder mains;
(ix) Removal of existing manholes and catchbasins;
(x) Compaction of existing sub-grade;
(xi) Installation of catchbasins and connection pipe;
(xii) Placement of separation/ reinforcement fabric;
(xiii) Placement of sub-base and base course materials;
(xiv) Construction of 250mm concrete pavement (plain-dowelled) utilizing slip-form paving equipment;

- Complete the construction of the southbound travel lanes. Construct the Northbound lanes to the northern junction with the Kenaston Boulevard Detour. Construct the right-in turn lane to Kenaston Intermodal Ltd. Access. Contractor must maintain maintenance access to Kenaston Intermodal Ltd. at all times.

(xv) Adjustment of existing manholes and catchbasins;
(xvi) Construction of 180mm barrier curb and splash strip in median and gutter (separate) utilizing slip-form paving equipment;
(xvii) Construction of traffic barrier;
(xviii) Construction of mountable curb;
(xix) Construct concrete and asphalt multi-use sidewalk;
(xx) Slope paving;
(xxi) Construction of retaining wall;
(xxii) Electrical;
(xxiii) Boulevard grading;
(xxiv) Ditch grading and sloping;
(xxv) Remove and salvage fence along Kenaston Boulevard (West).

(b) **Stage II** – CN Rail Detour Decommissioning (West of Kenaston Detour)

(i) Remove rail and tie plate (by others);
(ii) Remove railway ties (by others);
(iii) Remove Ballast;
(iv) Reclaim and reuse existing sub-base material;
(v) CN mainline detour site restoration;
(vi) Boulevard restoration;
(vii) Ditch grading and sloping west along CN and Wilkes Avenue.

(c) **Stage III** – DND Site Removals
(i) Remove guard house and gate ramp; and
(ii) Remove electrical parking rails

(d) **Stage IV** – Construction of a new Portland Concrete Pavement and Asphalt Resurfacing on Kenaston Boulevard from Taylor Avenue to North Limit of Contract at Kenaston Boulevard (Only southbound through lanes.)
(i) Remove existing pavement;
(ii) Excavation;
(iii) Tree removal;
(iv) Installation of subdrains;
(v) Compaction of existing sub-grade;
(vi) Installation of catchbasins and connection pipe;
(vii) Placement of separation/ reinforcement fabric;
(viii) Placement of sub-base and base course materials;
(ix) Construction of 230mm concrete pavement (plain-dowelled) utilizing slip-form paving equipment;
(x) Adjustment of existing manholes and catchbasins;
(xi) Construction of 180mm barrier curb;
(xii) Construction of 180mm barrier curb and splash strip in median and gutter (separate) utilizing slip-form paving equipment;
(xiii) Planning of asphalt overlay;
(xiv) Placement asphalt overlay (average thickness 75mm);
(xv) Construct concrete sidewalk; and
(xvi) Boulevard grading.

(e) **Stage V**– Construction of Intersection Improvements at Kenaston Boulevard and Taylor Avenue. (West of Kenaston Boulevard centerline)
(i) Remove existing pavement;
(ii) Excavation;
(iii) Installation of subdrains;
(iv) Compaction of existing sub-grade;
(v) Installation of catchbasins and connection pipe;
(vi) Placement of separation/ reinforcement fabric;
(vii) Placement of sub-base and base course materials;
(viii) Construction of 250mm concrete pavement (plain-dowelled);
(ix) Construction of monolithic median slabs;
(x) Planning of asphalt overlay;
(xi) Placement of asphalt overlay (average thickness 100mm);
(xii) Adjustment of existing manholes and catchbasins;

(xiii) Complete curb renewal at intersection;

(xiv) Construction of 180mm barrier curb and splash strip in median and gutter (separate) utilizing slip-form paving equipment;

(xv) Construction of curb and gutter utilizing slip form paving equipment (Taylor Avenue West); and

(xvi) Boulevard restoration.

(f) **Stage VI** – Construction of Ramp to Wilkes Avenue

(i) Begin excavation.

(g) **Stage VII –** Remove temporary asphalt overlay and base course material on southbound lanes before switching traffic and continuing to roadwork in Phase II.

D17.1.3 **Phase II** – Kenaston Boulevard Road Work, Construct Ramp to Wilkes, CN Rail Detour Decommissioning, and Decommissioning of Southbound lane of Kenaston Detour.

(a) **Stage I** – Construction of a new Portland Concrete Pavement on Kenaston Boulevard northbound lanes

(i) Complete removal of existing pavement;

(ii) Excavation;

(iii) Installation of subdrains;

(iv) Compaction of existing sub-grade;

(v) Installation of catchbasins and connection pipe;

(vi) Placement of separation/ reinforcement fabric;

(vii) Placement of sub-base and base course materials;

(viii) Placement of sub-base and base course materials (use salvaged material);

(ix) Construction of 250mm concrete pavement (plain-dowelled) utilizing slip-form paving equipment;

(x) Adjustment of existing manholes and catchbasins;

(xi) Construction of 180mm barrier curb and splash strip in median and gutter (separate) utilizing slip-form paving equipment;

(xii) Construct concrete and asphalt multi-use sidewalk;

(xiii) Boulevard grading; and

(xiv) Ditch grading and sloping.

(b) **Stage II** – Decommissioning of Kenaston Boulevard Detour Southbound Lane

(i) Remove existing asphalt pavement;

(ii) Reclaim and reuse existing base and sub-base material from Kenaston Boulevard detour to construct ramp to Wilkes Avenue, Lorimer Boulevard, and Kenaston Boulevard;

(iii) Remove existing separation/ reinforcement fabric; and

(iv) Ditch grading and sloping.

(c) **Stage III**– Begin construction of ramp to Wilkes Avenue (From Kenaston Boulevard to Northbound lane of Kenaston Boulevard Detour)

(i) Excavation;

(ii) Installation of subdrains;

(iii) Connect new land drainage sewer to existing land drainage sewer;

(iv) Installation of new manholes;

(v) Removal, plugging and abandoning existing wastewater sewers;

(vi) Removal, plugging and abandoning existing water mains and feeder mains;

(vii) Removal of existing manholes and catchbasins

(viii) Compaction of existing sub-grade;
(ix) Installation of catchbasins and connection pipe;
(x) Placement of separation/ reinforcement fabric;
(xi) Placement of sub-base and base course materials;
(xii) Placement of sub-base and base course materials (use salvaged material);
(xiii) Adjustment of existing manholes and catchbasins;
(xiv) Construction of 180mm barrier curb and gutter (separate) utilizing slip-form paving equipment;
(xv) Boulevard grading; and
(xvi) Ditch grading and sloping.

(d) **Stage IV** – Construction of Lorimer Boulevard from Sterling Lyon Parkway to Wilkes Avenue.
(i) Excavation;
(ii) Installation of subdrains;
(iii) Compaction of existing sub-grade;
(iv) Installation of catchbasins and connection pipe;
(v) Placement of separation/ reinforcement fabric;
(vi) Placement of sub-base and base course materials (use salvaged material);
(vii) Construction of 200mm concrete pavement (plain-dowelled) utilizing slip-form paving equipment;
(viii) Construction of 200mm concrete pavement (reinforced) utilizing slip-form paving equipment;
(ix) Construction of asphalt pavement (average thickness 125mm);
(x) Adjustment of existing manholes and catchbasins;
(xi) Construction of 180mm barrier curb (separate) utilizing slip-form paving equipment;
(xii) Construction of 180mm modified curb and gutter (separate) utilizing slip-form paving equipment;
(xiii) Boulevard grading and seeding; and
(xiv) Ditch grading and sloping.

(e) **Stage V –** Remove temporary asphalt overlay and base course material before switching traffic on northbound lanes; and continue to roadwork in Phase III.

D17.1.4 **Phase III** – Complete Kenaston Boulevard/ Taylor Avenue Intersection, Complete Ramp to Wilkes, Decommissioning of Kenaston Boulevard Detour Northbound Lane, Complete Decommission and Regrade the CN Rail Detour from Kenaston Boulevard to East End of Contract

(a) **Stage I**– Construction of intersection improvements at Kenaston Boulevard and Taylor Avenue. (East of Centerline)
(i) Remove existing pavement;
(ii) Excavation;
(iii) Installation of subdrains;
(iv) Compaction of existing sub-grade;
(v) Installation of catchbasins and connection pipe;
(vi) Placement of separation/ reinforcement fabric;
(vii) Placement of sub-base and base course materials;
(viii) Construction of 250mm concrete pavement (plain-dowelled);

(ix) Construction of monolithic median slabs;
(x) Planning of asphalt overlay;
(xi) Placement of asphalt overlay (average thickness 100mm);
(xii) Adjustment of existing manholes and catchbasins;
(xiii) Complete curb renewal at intersection;
(xiv) Construction of 180mm barrier curb and splash strip in median and gutter (separate) utilizing slip-form paving equipment; and
(xv) Boulevard restoration.

Upon completion of the above work the contractor must complete the median at the intersection of Kenaston Boulevard and Taylor Avenue.

(b) **Stage II** – Continue and complete construction of a LDS on Ramp to Wilkes
(i) Connect new land drainage sewer to existing land drainage sewer;
(ii) Installation of new manholes;
(iii) Removal, plugging and abandoning existing wastewater sewers;
(iv) Removal, plugging and abandoning existing water mains and feeder mains; and
(v) Removal of existing manholes and catchbasins.

(c) **Stage III** – Construction of Ramp to Wilkes Avenue (Complete Construction East from Phase II)
(i) Excavation;
(ii) Installation of subdrains;
(iii) Compaction of existing sub-grade;
(iv) Installation of catchbasins and connection pipe;
(v) Placement of separation/ reinforcement fabric;
(vi) Placement of sub-base and base course materials;
(vii) Placement of asphalt pavement (average thickness 125mm);
(viii) Adjustment of existing manholes and catchbasins;
(ix) Construction of 180mm barrier curb and gutter (separate) utilizing slip-form paving equipment;
(x) Boulevard grading; and
(xi) Ditch grading and sloping.

(d) **Stage IV** –Construct Asphalt Access Road and Parking Lot for Pump Station

(e) **Stage V**- Complete construction of Lorimer Boulevard from Sterling Lyon Parkway to Wilkes Avenue

(f) **Stage VI** – Decommissioning of Kenaston Boulevard Detour Northbound Lane
(i) Remove existing asphalt pavement;
(ii) Reclaim and reuse existing base and sub-base material from Kenaston Boulevard detour to construct ramp to Wilkes Avenue and Lorimer Boulevard;
(iii) Remove existing separation/ reinforcement fabric;
(iv) Remove temporary installed catchbasins and abandon connection pipe;
(v) Remove pre-cast concrete median barrier
(vi) Remove and deliver existing energite barrels;
(vii) Remove and deliver existing barrier posts and rails;
(viii) Kenaston Boulevard detour site restoration;
(ix) Ditch grading and sloping;

(x) Landscaping; and
(xi) Relocate existing fence.

(g) **Stage VII**– CN Rail Detour Decommissioning (Continue to East Limit)
(i) Remove rail and tie plate (by others)
(ii) Remove railway ties (by others)
(iii) Remove Ballast;
(iv) Reclaim and reuse existing sub-base material;
(v) CN mainline detour site restoration;
(vi) Boulevard restoration;
(vii) Ditch grading and sloping;
(viii) Landscaping;
(ix) Relocate existing fence.

D17.1.5 **Phase IV –** Landscaping
(i) Sodding;
(ii) Seeding; and
(iii) Planting trees and shrubs.

The Contractor shall coordinate with the identified activities and modify the proposal in order to minimize disruptions.

D18. SUBSTANTIAL PERFORMANCE

D18.1 The Contractor shall achieve Substantial Performance by September 29, 2006, excluding landscaping Works to be completed in 2007.

D18.2 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.

D18.3 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.

D19. TOTAL PERFORMANCE

D19.1 The Contractor shall achieve Total Performance by June 29, 2007.

D19.2 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.

D19.3 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.

D20. LIQUIDATED DAMAGES

D20.1 If the Contractor fails to achieve Substantial Performance in accordance with the Contract by the day fixed herein for Substantial Performance, the Contractor shall pay the City Three-thousand five-hundred dollars ($3,500.00) per Calendar Day for each and every Calendar Day following the day fixed herein for Substantial Performance during which such failure continues.

D20.2 The amount specified for liquidated damages in D20.1 is based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve Substantial Performance by the day fixed herein for same.

D20.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D21. SCHEDULED MAINTENANCE

D21.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

(a) Maintenance of plant material, planting beds, sodded and seeded areas as specified in E52;

(b) Reflective crack maintenance during two years warranty period as specified in CW 3250-R6.

D21.2 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

D22. JOB MEETINGS

D22.1 Regular weekly job meetings will be held at Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City, and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City and the Contractor respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.

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

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

D23.1 Further to GC:6.26, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

WARRANTY

D24. WARRANTY

D24.1 Notwithstanding GC:13.2, the warranty period shall begin on the date of Substantial Performance and shall expire two (2) year thereafter unless extended pursuant to GC:13.2.1 or GC:13.2.2, in which case it shall expire when provided for thereunder.

D24.2 Notwithstanding GC:13.2 [or D22] the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Total Performance if:

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

D24.2.1 In such case the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in GC:13.2 for the warranty period to begin.

FORM H1: PERFORMANCE BOND
(See D10)

KNOW ALL MEN BY THESE PRESENTS THAT

_____
(hereinafter called the "Principal"), and

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

_____

_____ dollars ($_____.____)

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

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

_____ day of _____ , 20____ , for:

BID OPPORTUNITY NO. 23-2006

KENASTON UNDERPASS PROJECT
KENASTON BOULEVARD RECONSTRUCTION
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS
which is by reference made part hereof and is hereinafter referred to as the “Contract”.

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

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

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

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

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

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

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

FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)
(See D10)

_____
(Date)

The City of Winnipeg
Corporate Services Department
Legal Services Division
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1

RE: PERFORMANCE SECURITY – BID OPPORTUNITY NO. 23-2006

KENASTON UNDERPASS PROJECT
KENASTON BOULEVARD RECONSTRUCTION
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS

Pursuant to the request of and for the account of our customer,

_____ ,
(Name of Contractor)

_____
(Address of Contractor)

WE HEREBY ESTABLISH in your favour our irrevocable Standby Letter of Credit for a sum not exceeding in the aggregate

_____

_____ Canadian dollars.

This Standby Letter of Credit may be drawn on by you at any time and from time to time upon written demand for payment made upon us by you. It is understood that we are obligated under this Standby Letter of Credit for the payment of monies only and we hereby agree that we shall honour your demand for payment without inquiring whether you have a right as between yourself and our customer to make such demand and without recognizing any claim of our customer or objection by the customer to payment by us.

The amount of this Standby Letter of Credit may be reduced from time to time only by amounts drawn upon it by you or by formal notice in writing given to us by you if you desire such reduction or are willing that it be made.

Partial drawings are permitted.

We engage with you that all demands for payment made within the terms and currency of this Standby Letter of Credit will be duly honoured if presented to us at:

_____
(Address)

and we confirm and hereby undertake to ensure that all demands for payment will be duly honoured by us.

All demands for payment shall specifically state that they are drawn under this Standby Letter of Credit.

Subject to the condition hereinafter set forth, this Standby Letter of Credit will expire on

_____ .
(Date)

It is a condition of this Standby Letter of Credit that it shall be deemed to be automatically extended from year to year without amendment from the present or any future expiry date, unless at least 30 days prior to the present or any future expiry date, we notify you in writing that we elect not to consider this Standby Letter of Credit to be renewable for any additional period.

This Standby Letter of Credit may not be revoked or amended without your prior written approval.

This credit is subject to the Uniform Customs and Practice for Documentary Credit (1993 Revision), International Chamber of Commerce Publication Number 500.

_____
(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

FORM J: SUBCONTRACTOR LIST
(See D11)

KENASTON UNDERPASS PROJECT
KENASTON BOULEVARD RECONSTRUCTION
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS

Portion of the Work	Name	Address
SURFACE WORKS		
Supply of Materials:		
Concrete		
Asphalt		
Base Course & Sub-Base		
Geotextile Materials		
Trees/ Shrubs/ Ground Cover		
Top Soil / Sod/ Seed		
Installation/ Placement:		
Concrete		
Asphalt		
Sub-base & Base Course		
Geotextile Materials		
Landscaping		
UNDERGROUND WORKS		
Supply of Materials:		
Pipes		
Subdrains		
Pre-cast Concrete Catch Basins/ Manholes / Ring Section		
Catch Basins/ Manholes Frames, Covers and Boxes		
Connecting and Sewer Service Pipe		
Installation/ Placement:		
Pipes		
Subdrains		
Pre-cast Concrete Catch Basins/ Manholes / Ring Section		
Catch Basins/ Manholes Frames, Covers and Boxes		

FORM J: SUBCONTRACTOR LIST
(See D11)

KENASTON UNDERPASS PROJECT
KENASTON BOULEVARD RECONSTRUCTION
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS

Portion of the Work	Name	Address
Connecting and Sewer Service Pipe		
OTHERS:		
Excavation		
Landscaping		
Electrical		

FORM K: EQUIPMENT
(See D12)

KENASTON UNDERPASS PROJECT
KENASTON BOULEVARD RECONSTRUCTION
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS

1. Category/type: Removal of Underground Works & Installation of LDS

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

2. Category/type: Earthmoving/ Excavation

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

3. Category/type: Compaction and Grading

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

FORM K: EQUIPMENT
(See D12)

KENASTON UNDERPASS PROJECT
KENASTON BOULEVARD RECONSTRUCTION
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS

4. Category/type: Concrete Paving (Slip Form)

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

5. Category/type: Asphalt Paving

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

6. Category/type: Miscellaneous

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

Registered owner: _____

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

Registered owner: _____

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

Registered owner: _____

FORM L: DETAILED WORK SCHEDULE
(See D13)

KENASTON UNDERPASS PROJECT
KENASTON BOULEVARD RECONSTRUCTION
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS

For each item of Work, indicate the proposed date that each cumulative percentage to be completed will be achieved.					
Items of Work	Percentage of Work Completed				
	Start	25%	50%	75%	100%
Phase I – Construction of Kenaston Boulevard from Kenaston Intermodal Ltd. Access to Taylor Avenue, Construction of Kenaston/ Taylor Intersection west of Kenaston centerline, and CN rail detour decommissioning west of Kenaston detour.					08/28/06
Stage I – DND Site Removals					
Stage II –Installation of a new land drainage sewer and other associate drainage and underground works on Kenaston Boulevard					
Stage III – Construction of a new Portland Concrete Pavement on Kenaston Boulevard from Kenaston Intermodal Ltd. Access to Taylor Avenue					
Stage IV – Construction of Intersection Improvements at Kenaston Boulevard and Taylor Avenue. (West of Kenaston Boulevard centerline)					
Stage V – Construction of a new Portland Concrete Pavement and Asphalt Resurfacing on Kenaston Boulevard from Taylor Avenue to North Limit of Contract at Kenaston Boulevard (Only southbound through lanes.)					
Stage VI – Begin construction of Ramp to Wilkes Avenue					
Stage VII – CN Rail Detour Decommissioning (West of Kenaston Detour)					
Stage VIII – Remove temporary asphalt overlay before switching traffic and continuing to roadwork in Phase II.					
Stage IX – Remove and Reinstall “Quadguard System” Crash Cushions					
Phase II – Kenaston Boulevard Road Work, Construct Ramp to Wilkes, CN Rail Detour Decommissioning, and Decommissioning of Southbound lane of Kenaston Detour.					09/11/06
Stage I –Continuous installation of a new land drainage sewer and other associate drainage and underground works on Kenaston Boulevard					
Stage II –Installation of a new land drainage sewer on Ramp to Wilkes					

FORM L: DETAILED WORK SCHEDULE
(See D13)

KENASTON UNDERPASS PROJECT
KENASTON BOULEVARD RECONSTRUCTION
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS

For each item of Work, indicate the proposed date that each cumulative percentage to be completed will be achieved.					
Items of Work	Percentage of Work Completed				
	Start	25%	50%	75%	100%
Stage III – Catch Basins Installation and connection to existing land drainage sewer on Lorimer Boulevard					
Stage IV – Construction of a new Portland Concrete Pavement on Kenaston Boulevard northbound lanes continuing from limit of Phase I					
Stage V – Decommissioning of Kenaston Boulevard Detour Southbound Lane					
Stage VI– Continue construction of ramp to Wilkes Avenue (From Kenaston Boulevard to Northbound lane of Kenaston Boulevard Detour)					
Stage VII –Begin construction of Lorimer Boulevard from Sterling Lyon Parkway to Wilkes Avenue.					
Phase III – Complete Kenaston Blvd./ Taylor Ave. Intersection, Complete Ramp to Wilkes, Construct access road and parking lot for Pump Station, Complete land drainage sewer on Kenaston Blvd. Decommissioning of Kenaston Blvd. Detour Northbound Lane, Complete Decommission and Regrade the CN Rail Detour from Kenaston Blvd. to East End of Contract					09/29/06
Stage I– Construction of intersection improvements at Kenaston Boulevard and Taylor Avenue. (East of Centerline)					
Stage II – Complete installation of a land drainage sewer on Ramp to Wilkes					
Stage III – Construction of Ramp to Wilkes Avenue (Complete Construction East from Phase II)					
Stage IV –Construct asphalt access road and parking lot for Pump Station					
Stage V –Complete construction of Lorimer Boulevard from Sterling Lyon Parkway to Wilkes Avenue.					
Stage VI – Decommission of Kenaston Boulevard Detour Northbound Lane					
Stage VII– CN Rail Detour Decommissioning (Continue to East Limit)					
Phase IV– Landscaping					06/29/07

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS, STANDARD DETAILS AND DRAWINGS

E1.1 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.

E1.1.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at http://www.winnipeg.ca/matmgt.

E1.1.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.

E1.1.3 Further to GC:2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.2 The following Drawings are applicable to the Work:

Drawing No.	Drawing Name/Title	Drawing (Original) Sheet Size
P-3258-172	Cover & Drawing List	A1
P-3258-173	Site Plan – Limits of Works	A1
P-3258-174	Horizontal Geometry – Overall Drawing & Key Plan	A1
RAMP TO WILKES AVENUE		
P-3258-175	Ramp to Wilkes Avenue - Horizontal Geometry	A1
KENASTON BOULEVARD		
P-3258-176	Kenaston Boulevard - Horizontal Geometry – STA 1+063 to STA 1+375	A1
P-3258-177	Kenaston Boulevard - Horizontal Geometry – STA 1+375 to STA 1+725	A1
P-3258-178	Kenaston Boulevard - Horizontal Geometry – STA 1+725 to STA 1+925	A1
P-3258-179	Kenaston Boulevard - Horizontal Geometry – STA 1+925 to STA 2+125	A1
TAYLOR AVENUE		
P-3258-180	Taylor Avenue - Horizontal Geometry – STA 0+233 to STA 0+436	A1
LORIMER BOULEVARD		
P-3258-181	Lorimer Boulevard - Horizontal Geometry – STA 0+511.029 to STA 0+700	A1
P-3258-182	Lorimer Boulevard - Horizontal Geometry – STA 0+700 to Wilkes Avenue	A1
P-3258-183	Pavement Drawing Key Plan	A1
RAMP TO WILKES AVENUE		
P-3258-184	Ramp to Wilkes Avenue - Horizontal and Vertical Alignment – STA 1+150 to STA 1+425	A1
P-3258-185	Ramp to Wilkes Avenue - Horizontal and Vertical Alignment – STA 1+425 to STA 1+600	A1

Drawing No.	Drawing Name/Title	Drawing (Original) Sheet Size
KENASTON BOULEVARD		
P-3258-186	Kenaston Boulevard - Horizontal & Vertical Alignment – STA 1+063 to STA 1+375	A1
P-3258-187	Kenaston Boulevard North Bound –Horizontal & Vertical Alignment – STA 1+375 to STA 1+725	A1
P-3258-188	Kenaston Boulevard South Bound –Horizontal & Vertical Alignment – STA 1+375 to STA 1+725	A1
P-3258-189	Kenaston Boulevard - Horizontal and Vertical Alignment – STA 1+725 to STA 1+975	A1
P-3258-190	Kenaston Boulevard - Horizontal and Vertical Alignment – STA 1+975 to STA 2+125	A1
TAYLOR AVENUE		
P-3258-191	Kenaston Boulevard / Taylor Avenue - Horizontal and Vertical Alignment – STA 0+232 to STA 0+435	A1
P-3258-192	Kenaston Boulevard at Taylor Avenue – Intersection Pavement Grades & Joint Locations	A1
LORIMER BOULEVARD		A1
P-3258-193	Lorimer Boulevard - Horizontal & Vertical Alignment – Sterling Lyon Parkway to STA 0+700	A1
P-3258-194	Lorimer Boulevard - Horizontal & Vertical Alignment – STA 0+700 to Wilkes Avenue	A1
DETAILS		
P-3258-195	Pavement Cross Sections & Details	A1
P-3258-196	Pavement Cross Sections & Details	A1
P-3258-197	Pavement Cross Sections & Details	A1
P-3258-198	Kenaston Boulevard / DND Property - Surface Works Reconstruction	A1
P-3258-199	Kenaston Boulevard – Road Works Decommissioning	A1
P-3258-200	Kenaston Boulevard – Railway Detour Decommissioning	A1
P-3258-201	Kenaston Boulevard / Road Detour – Traffic Diversion Phase 1,2 & 3	A1
KENASTON BOULEVARD AT BRIDGE		
P-3258-202	Kenaston Boulevard – Concrete Traffic Barrier – Concrete Layout & Details	A1
P-3258-203	Kenaston Boulevard – Concrete Traffic Barrier – Reinforcing Layout &Details	A1
P-3258-204	Railway Bridge – Concrete Slope Paving – Concrete Layout & Details	A1
P-3258-205	Railway Bridge – Concrete Slope Paving – Reinforcing Layout & Details	A1
P-3258-206	Kenaston Boulevard – Retaining Wall – Layout & Details	

Drawing No.	Drawing Name/Title	Drawing (Original) Sheet Size
KENASTON BOULEVARD		
D-8891	Kenaston Boulevard – Underground Services Decommissioning – STA 1+200 to Railway Bridge	A1
D-8892	Kenaston Boulevard – Underground Services Decommissioning – Railway Bridge to Taylor Avenue	A1
LD-3273	Kenaston Boulevard – Land Drainage System – STA 1+200 to STA 1+450	A1
LD-3274	Kenaston Boulevard – Land Drainage System – STA 1+450 to STA 1+700	A1
LD-3275	Kenaston Boulevard – Land Drainage System – STA 1+700 to STA 2+054	A1
LD-3276	Kenaston Boulevard – Land Drainage System – Miscellaneous Underground Details	A1
LD-3277	Kenaston Boulevard – Land Drainage System – Miscellaneous Underground Details	A1
WILKES AVENUE		
D-3278	Wilkes Avenue – West Ditch Regrading – STA 0+254 to STA 0+468	A1
D-3279	CN Rivers Subdivision – North CN Ditching – STA 0+149 to STA 0+450	A1
D-3294	CN Rivers Subdivision – North CN Ditching – STA 0+450 to STA 0+755	A1
P-3258-207	Kenaston Boulevard - Electrical Layout Details	A1
LANDSCAPING		
P-3258-208	Landscaping Plan– Sterling Lyon Parkway to STA 1+220 & Details	A1
P-3258-209	Landscaping Plan –STA 1+220 to Centerline of CN Underpass Bridge	A1
P-3258-210	Planting Bed Enlargements STA 1+580 to STA 1+700	A1
P-3258-211	Landscaping Plan – Centerline of CN Underpass Bridge to STA 1+900	A1
P-3258-212	Planting Bed Enlargements STA 1+580 to STA 1+700	A1
P-3258-213	Landscaping Plan – Kenaston Boulevard STA 1+900 to STA 2+140 – Lorminer Boulevard STA 0+500 to 0+930	A1

E2. GEOTECHNICAL REPORT

E2.1 Further to GC:3.1, 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'.

E3. OFFICE FACILITIES

E3.1 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 25 square meters, a height of 2.4m with two 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 16-18^{o}C or 20-25^{o}C.

(e) The building shall be adequately lighted with fluorescent fixtures, and have a minimum of three wall outlets.

(f) The building shall be furnished with two desks, one drafting table 3m s 1.2m, one stool, one four drawer legal size filing cabinet, and a minimum of 12 chairs.

(g) A portable toilet shall be located near the field office building. The toilet shall have a locking door and be for the exclusive use of the Contract Administrator and other personnel from the City.

(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 he deems it necessary.

E3.2 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.

E3.3 The office facilities will be provided from the date of the commencement of the Work to the date of Total Performance

E4. PROTECTION OF EXISTING TREES

E4.1 The Contractor shall take the following precautionary steps to prevent damage from construction activities to existing boulevard trees within the limits of the construction area:

(a) The Contractor shall not stockpile materials and soil or park vehicles and equipment on boulevards within 2 metres of trees.

(b) Trees identified to be at risk by the Contract Administrator are to be strapped with 25 x 100 x 2400mm wood planks, or suitably protected as approved by the Contract Administrator.

(c) Excavation shall be performed in a manner that minimizes damage to the existing root systems. Where possible, excavation shall be carried out such that the edge of the excavation shall be a minimum of 1.5 times the diameter (measured in inches), with the outcome read in feet, from the closest edge of the trunk. Where roots must be cut to facilitate excavation, they shall be pruned neatly at the face of excavation.

(d) Operation of equipment within the dripline of the trees shall be kept to the minimum required to perform the work required. Equipment shall not be parked, repaired, refuelled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposition on areas where trees are located.

(e) Work on-site shall be carried out in such a manner so as to minimize damage to existing tree branches. Where damage to branches does occur, they shall be neatly pruned.

E4.2 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the City Forester or his designate.

E4.3 No separate measurement or payment will be made for the protection of trees.

E4.4 Elm trees cannot be trimmed between April 1 and July 31, inclusive.

E5. TRAFFIC CONTROL

E5.1 Further to clauses 3.6 and 3.7 of CW 1130-R1:

(a) Where directed, 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. No measurement for payment will be made for this work.

(b) In accordance with the Manual of Temporary Traffic Control, the Contractor ("Agency" in the manual) shall make arrangements with the Traffic Services Section of the City of Winnipeg to place all temporary regulatory signs. The Contractor shall bear all costs associated with the placement of temporary traffic control devices by the Traffic Services Section of the City of Winnipeg in connection with the works undertaken by the Contractor.

E6. TRAFFIC MANAGEMENT

E6.1 Further to clause 3.7 of CW 1130-R1:

E6.1.1 North and South traffic on Kenaston Boulevard shall be maintained during construction to allow for a minimum of two lanes of traffic in each direction during the peak morning and evening hours (Monday to Friday 7.00 to 9.00 and 15.30 to 17.30), and one lane of traffic in each direction during the off peak hours. North and south lanes closures at the intersection shall not be permitted during rush hours and when no Work is being performed in this area.

E6.1.2 Maintain a minimum of one lane of eastbound and westbound traffic during construction at the Kenaston Boulevard and Taylor Avenue intersection.

E6.1.3 No lane closures of eastbound and westbound traffic will be permitted during construction without the written permission of the Contract Administrator.

E6.1.4 The northbound left turn lane at the Kenaston Boulevard/ Taylor Avenue intersection shall remain open at all times, unless directed otherwise by the Contract Administrator.

E6.1.5 The eastbound left turn lane at the Kenaston Boulevard/ Taylor Avenue Intersection will be closed during the construction time of Phase I and II. The westbound left turn movement will be permitted during all Phases of construction.

E6.1.6 The southbound left turn lane at the Kenaston Boulevard/ Taylor Avenue intersection will be closed during Phase III, turning movements will be prohibited.

E6.1.7 The Contractor shall maintain intersecting street and private approach access at all times.

E6.1.8 Should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, he shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.

E6.1.9 Pedestrian and ambulance/emergency vehicle access must be maintained at all times.

E7. TRAFFIC DIVERSION

E7.1 The diversion of south/ northbound traffic on Kenaston Boulevard shall be performed as shown on drawing Kenaston Boulevard / Detour Road – Traffic Diversion Phases 1,2 & 3, Drawing P-3258-201.

E7.2 Construction of the north/ south roadway reconstruction diversion areas shall take place according to the following schedule:

(a) Phase I will start on Monday, May 1, 2006;

(i) Site Access will be permitted from the north through the DND east approach and southbound off the diversion.

(ii) Site Access will be permitted from the south from Kenaston Intermodal Ltd. and from Sterling Lyon Parkway West.

(b) Phase II will start on Monday, August 28, 2006; and

(c) Phase III will start on Monday, September 11, 2006.

E7.3 The Contractor shall be responsible for removal of existing curbs, medians, and median areas as indicated on the drawings. The Contractor shall be responsible for the installation of a minimum of 100 mm of asphalt pavement in the median areas for the switching of traffic.

E7.4 After completion of the diversion, the Contractor shall be responsible for the re-installing the curb, monolithic median and median areas.

E7.5 The Contractor shall be responsible for providing the necessary traffic control and signage to ensure the actual project site is continuously fenced with both barricades on the existing streets and snow fencing along the medians and sidewalks. All costs for the items of Work described including removal and installation of concrete and roadway Works shall be paid at various until price items.

E7.6 All other costs for the diversions including signing and assisting city forces will be paid as “Traffic Diversion: in Form B Prices.

E8. PEDESTRIAN SAFETY

E8.1 During the project a temporary snow fence shall be installed at the Kenaston Boulevard/ Taylor Avenue intersection. 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.

E9. WATER USED BY CONTRACTOR

E9.1 Further to clause 3.7 of CW 1120-R1, 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.

E10. SURFACE RESTORATIONS

E10.1 Further to clause 3.3 of CW 1130-R1, 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.

E11. INFRASTRUCTURE SIGNS

E11.1 The Contractor shall maintain, and relocate as necessary, the six (6) Canada/Province of Manitoba/City of Winnipeg infrastructure signs. The Contractor shall ensure each sign is secured to a rigid backing material approved by the Contract Administrator. The Contractor shall maintain the signs at the six locations directed and approved 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. The maintenance and removal of the six (6) infrastructure signs will be included in the lump sum Contract Unit Price for the "Traffic Diversions".

E12. EXISTING SERVICES AND UTILITES

E12.1 Further to Section 3.3 of CW 1120 of the general Requirements, information shown on the Construction Drawings is supplied by the City of Winnipeg and from Department of Defence (DND) to the best of their knowledge from record information. It is herby expressly understood that the information provided with respect to the type of, or location of services shall be accepted by the Contractor at his own risk, and both the City of Winnipeg and DND shall assume no responsibility for the accuracy or completeness of the information contained therein.

E12.2 Existing municipal infrastructure piping depth, at some locations, are unknown and have been estimated for design purposes. When requested by the Contract Administrator, the Contractor shall expose existing piping at the proposed tie-in locations and any other locations as directed, at the commencement of construction to allow for design grade elevations to be modified.

E12.3 When Working in close proximity to shallow bury utilities, Contractor shall contact the utility and obtain confirmation if site supervision from the utility is required. Requirements for utility supervision, utility coordination and locates, exposing of utility by means of hand or hydro-vac excavation, and similar requirements shall be the responsibility of the Contractor.

E12.4 All costs associated with this Work item shall be included in the unit price bid for installation of gravity sewer piping.

E13. SAFETY PRECAUTIONS

E13.1 Further to Section 3.1 of CW 1130 of the General Requirements, the Contractor shall ensure that any excavation left open or exposed overnight, over a weekend or any length of time unattended shall have full and adequate safety precautions provided. These precautions shall include but not be limited to covering the excavation with timber planks or steel plates and erecting a barricade completely around the excavation complete with signing in accordance with the City of Winnipeg Manual of Temporary Traffic Control.

E14. ENCROACHMENT ON PRIVATE PROPERTY

E14.1 Further to Section 3.11 of CW 1130 of the General Requirements, the Contractor shall confine his Work to the public right-of-ways and construction easements at all times, except if he has received written permission from the property owner. The Contractor shall provide the Contract Administrator with a copy of any written permission he has received to enter onto private property.

E14.2 The Contractor's construction activities shall be confined to the minimum area necessary for undertaking the Work and he shall be responsible for all damage to private property resulting from his Work. Particular care shall be taken to assure no damage is done to buildings, fencing, trees and plants and provision shall be made to maintain full drainage for private properties during construction.

E14.3 All repairs to damaged private property shall be to the satisfaction of the property owner and the Contract Administrator with all costs borne by the Contractor.

E15. DAMAGE TO EXISTING STRUCTURES AND PROPERTY

E15.1 Further to Section 3.13 of CW 1130 of the General Requirements, special care shall be taken to avoid damage to existing adjacent structures and properties during the course of the Work.

E15.2 Any damage caused by the Contractor or his Subcontractors to the adjacent structures or properties shall be promptly repaired by the Contractor at his own expense to the satisfaction of the Contract Administrator.

E16. PROVISIONAL ITEMS

E16.1 The Provisional Items listed in the Schedule of Prices and described by the City of Winnipeg Standard Construction specifications, are a part of the Contract.

E16.2 The Contractor will perform no Work listed under their provisions without prior notification from the Contract Administrator. All Work carried out will be within the construction areas listed in the Specifications.

E16.3 The City reserves the right to diminish all or any portion of the Work listed as Provisional Items and no claim shall be made for damages on ground of loss of anticipated profit or any other ground.

E17. SAWCUTTING PAVEMENT

E17.1 At the limits of excavation, the Contractor shall saw cut the existing pavement to produce a clean straight edge when excavated.

E17.2 For asphaltic concrete pavements, the cost of saw cutting and disposal of any surplus material shall be included in the unit price bid for “Excavation “ for concrete pavements, the cost of saw cutting and disposal of surplus material shall be included in the until price for the various Works.

E18. EXCAVATION

E18.1 Description

E18.1.1 This specification covers all excavation necessary for the construction and preparation of the Work.

E18.1.2 Referenced Standard Construction Specifications:

(a) CW 3110 – Excavation

E18.2 Construction Methods

E18.2.1 Excavation shall be done in accordance with CW 3110.

E18.3 Measurement and Payment

E18.3.1 The excavation will be measured by the Contract Administrator prior to the commencement of Work. The bid- volume includes all excavation work to be completed within the Work area and will be adjusted prior to construction according to the volume of excavation removed for Bid Opportunity #601-2005 – Bridge Works, and Bid Opportunity 644-2005 – Pump Station.

E18.3.2 The Contract Administrator will inform the Contractor of the revised excavation quantity prior to the start of construction.

E18.3.3 The excavation will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for the revised excavation volume identified by the Contract Administrator.

E18.3.4 The volume of excavation will be measured by Cross-Sections in the original position and computed by the method of Average End Areas.

E19. REMOVE TEMPORARY ASPHALT AND BASE ON EXISTING CONCRETE

E19.1 The Contractor shall be responsible for removing the temporary asphalt pavement, existing base material, and geotextile fabric covering the concrete pavement at the following locations, the two southbound lanes from STA 1+050 to STA 1+170 and the two northbound lanes from STA 1+070 to 1+190 as directed by the Contract Administrator. The Contractor shall be responsible for sweeping the area upon completion, as directed by the Contract Administrator.

E19.2 The Contractor will be paid by square meter of asphalt and base removed and approved by the Contract Administrator.

E20. REMOVAL, SALVAGE AND RE-INSTALLATION OF FENCING AND GATES

DESCRIPTION

E20.1 General

E20.1.1 This specification covers the removal, salvaging and re-installation of chain link fencing, and gates.

E20.1.2 Referenced Standard Construction Specifications

(a) CW 3550- Chain Link Fencing

MATERIALS

E20.2 Barbed Wire

E20.2.1 Barbed wire shall be 2 mm diameter galvanized steel wire to ASTM A 121, 4 point barbs with 125 mm spacing.

CONSTRUCTION METHODS

E20.3 Removal and Salvage of Existing Chain Link Fences

E20.3.1 Existing chain link fencing designated for removal shall be carefully removed and salvaged. All chain link fencing components and all hardware shall be salvaged for reuse and stockpiled at locations designated by the Contract Administrator.

E20.3.2 The Contractor shall remove the fence posts and concrete bases. The post holes remaining following the removal of the fencing shall be backfilled and compacted to the satisfaction of the Contract Administrator. All concrete rubble shall be removed and disposed of by the Contractor.

E20.3.3 All chain link-fencing materials judged by the Contract Administrator to be in unsatisfactory condition shall be disposed of by the Contractor and replaced with equivalent new materials.

E20.3.4 In the event of damage to any materials by the Contractor, the Contractor shall immediately notify the Contract Administrator and make all repairs or replacements

necessary, at his own expense, to the satisfaction of the Contract Administrator. In no case shall the Contractor install a damaged component on the chain link fencing.

E20.4 Re-installation of Salvaged Chain Link Fencing

E20.4.1 Re-install chain link fence in accordance with CW 3550.

E20.4.2 Fence posts shall be supplied and installed to match the removed posts.

E20.4.3 Re-install 3-strand barbed wire, on the relocated fence, 0.300 m high on top of the installed fence at the same angle that existing barbed wire was.

E20.5 Remove and Re-Install Gates

E20.5.1 Existing gates designated for removal shall be carefully removed and salvaged. All gates and associated materials shall be salvaged for reuse and stockpiled at locations designated by the Contract Administrator.

E20.5.2 All gate materials judged by the Contract Administrator to be in unsatisfactory condition shall be disposed of by the Contractor and replaced with equivalent new materials.

E20.5.3 In the event of damage to any materials by the Contractor, the Contractor shall immediately notify the Contract Administrator and make all repairs or replacements.

E20.5.4 The gate shall be installed as shown on the Drawings at the southwest corner of Kenaston Boulevard and Taylor Avenue.

MEASUREMENT AND PAYMENT

E20.6 Remove and Salvage Chain Link Fence

E20.6.1 The removal and salvaging of existing chain link fences will be measured on a length basis and paid for at the Contract Unit Price for “Remove & Salvage Chain Link Fence”. The length to be paid for will be the total number of metres of chain link fence removed and salvaged in accordance with this specification, accepted and measured by the Contract Administrator.

E20.6.2 The cost of backfilling post holes and removing and disposing of old fence posts and concrete rubble shall be included in the payment for “Remove and Salvage Chain Link Fence”.

E20.7 Re-install Salvaged Chain Link Fence

E20.7.1 The re-installation of salvaged chain link fences will be measured on a length basis and paid for at the Contract Unit Price for “Install Salvaged Chain Link Fence”. The length to be paid for will be the total number of metres of salvaged chain link fence installed in accordance with this specification, accepted and measured by the Contract Administrator.

E20.7.2 No measurement or payment will be made for new chain link fence materials needed to replace unsatisfactory or damaged chain link fences.

E20.7.3 No measurement or payment will be made for barbed wire. Barbed wire shall be included in payment for installing the salvaged chain link fence.

E20.8 Remove and Re-Install Gates

E20.8.1 The removal and re-installation of gates will be measured on a length basis and paid for at the Contract Unit Price for “Remove and Re-Install Gates”. The length to be paid for will be the total number of metres of salvaged chain link fence installed in accordance with this specification, accepted and measured by the Contract Administrator.

E20.8.2 No measurement or payment will be made for new gate materials needed to replace unsatisfactory or damaged gates.

E21. REMOVE "ENERGITE" BARRELS

DESCRIPTION

E21.1 General

E21.1.1 This specification covers the removal of "Energite" energy attenuating barrels at the locations shown on the Drawings.

REMOVAL METHODS

E21.2 Removal of "Energite" Barrels

E21.2.1 The Contractor shall coordinate removals to minimize disruption to other Work.

E21.2.2 The Contractor shall remove "Energite" barrels, concrete pad, and sand material.

E21.2.3 The Contractor shall clean the site of any loose material.

E21.2.4 "Energite" barrels shall be delivered to the City of Winnipeg, Public Works Department, Bridge Yard, 849 Ravelstone Avenue West. Contact Mike Terleski (Phone: 794-8510) to arrange delivery.

MEASUREMENT AND PAYMENT

E21.3 Removal of "Energite" Barrels

E21.3.1 The Contractor will be paid per barrel removed.

E22. REMOVAL OF EXISTING CULVERTS

DESCRIPTION

E22.1 General

E22.1.1 This specification covers the removal of existing culverts.

E22.1.2 Referenced Standard Construction Specifications

(a) CW 2030- Excavation Bedding and Backfill

CONSTRUCTION METHODS

E22.2 Removal of Existing Culverts

E22.2.1 The Contractor shall remove and salvage existing culverts designated for removal within the limits of the Contract and as shown on the Drawings.

E22.2.2 The excavation for the removal of existing culverts outside of proposed pavements shall be backfilled to Class 4 standards in accordance with CW 2030. The excavation for removal of existing culverts under proposed pavements shall be backfilled to Class 2 standards in accordance with CW 2030.

E22.2.3 The culverts shall be removed so as not to damage the pipe sections. Where culverts are coupled, the sections shall be separated prior to removal.

E22.2.4 Culverts that are deemed unsalvageable by the Contract Administrator shall be removed and disposed of off site.

E22.2.5 Salvaged culverts shall be delivered to the City of Winnipeg, Public Works Department, South West District Yard, 1539 Waverley Street. Contact Tom Lamboo (Phone: 986-3667) (Cell: 794-4070) to arrange delivery.

MEASUREMENT AND PAYMENT

E22.3 Removal of Existing Culverts

E22.3.1 The removal of existing culverts will be measured on a unit basis. The number to be paid for shall be the total number of culverts removed in accordance with this specification, and accepted by the Contract Administrator.

E22.3.2 Removal of existing culverts, backfilling, salvaging and delivery or disposal of the culverts shall be paid for at the Contract Unit Price per unit for "Removal of Existing Culverts," which price shall be payment in full for the supply of all materials and performing all operations required to complete the Work as specified.

E23. REMOVAL OF "QUADGUARD SYSTEM" CRASH CUSHIONS

DESCRIPTION

E23.1 General

E23.1.1 This specification covers the removal of "Quadguard System" crash cushions at the locations shown on the Drawings.

MATERIAL

E23.1.2 "Quadguard" 4-Bay 610mm wide system with tension strut backup and one left 4" offset transition panel (80 km/hr design speed).

REMOVAL METHODS

E23.2 The Contractor shall coordinate removals to minimize disruption to other Work.

E23.2.1 Existing "Quadguard System" crash cushions designated for removal shall be carefully removed and salvage. The Contractor shall remove concrete pad, and sand material and this area shall be backfilled and compacted to satisfaction of the Contract Administrator.

E23.2.2 In the event of damage to any materials by the Contractor, the Contractor shall immediately notify the Contract Administrator and make all repairs or replacements necessary, at his own expense, to the satisfaction of the Contract Administrator. In no case shall the Contractor install a damage component on the "Quadguard System" crash cushions

E23.2.3 Salvaged "Quadguard System" crash cushions shall be delivered to the City of Winnipeg, Public Works Department, Bridge Yard, 849 Ravelstone Avenue West. Contact Mike Terleski (Phone: 794-8510) to arrange delivery.

E23.2.4 The Contractor shall clean the site of any loose material.

MEASUREMENT AND PAYMENT

E23.3 Removal of the "Quadguard System" crash cushions will be measured on a unit basis and paid for at the Contract Unit Price for "Removal of "Quadguard System" crash cushions "

E23.4 The cost of backfilling the holes and removing concrete rubble and any loose material shall be included in the payment of "Removal of "Quadguard System" crash cushions.

E23.5 Salvaging and delivery or disposal of the “Quadguard System” crash cushions shall be included in payment for “Removal of “Quadguard System” crash cushions” and no further payment shall be made.

E24. REINSTALLATION OF “QUADGUARD SYSTEM” CRASH CUSHIONS

DESCRIPTION

E24.1 General

E24.1.1 This specification covers the reinstallation of “Quadguard System” crash cushions at the locations shown on the Drawings.

MATERIAL

E24.1.2 “Quadguard” 4-Bay 610mm wide system with tension strut backup and one left 4” offset transition panel (80 km/hr design speed).

REINSTALLATION METHODS

E24.2 The Contractor shall coordinate reinstallations to minimize disruption to other Work. The reinstallation shall occur at the time of the opening of the southbound lanes.

E24.3 Reinstallation of “Quadguard System” crash cushions

E24.3.1 Existing “Quadguard System” crash cushions designated for reinstallation l shall be carefully removed and install at location shown on the Drawings. The Contractor shall remove concrete pad, and sand material and this area shall be backfilled and compacted to satisfaction of the Contract Administrator.

E24.3.2 In the event of damage to any materials by the Contractor, the Contractor shall immediately notify the Contract Administrator and make all repairs or replacements necessary, at his own expense, to the satisfaction of the Contract Administrator. In no case shall the Contractor install a damage component on the “Quadguard System” crash cushions

E24.3.3 Contractor shall drill in anchors for the Quadgurad into traffic barriers and slab using salvaged unit as the template for anchor locations.

E24.3.4 The Contractor shall clean the site of any loose material.

MEASUREMENT AND PAYMENT

E24.4 The reinstallation of the“Quadguard System” will be measured on a unit basis and paid for at the Contract Unit Price for “Re-installation of “Quad Guard System” crash cushions “.

E25. REMOVE PRE-CAST CONCRETE BARRIERS, AND ALUMINIUM BALANCED BARRIER

DESCRIPTION

E25.1 General

E25.2 This specification covers the removal of existing pre-cast concrete barriers, and aluminium balanced barrier.

CONSTRUCTION METHODS

E25.3 Removal of existing pre-cast concrete barriers and aluminium balanced barrier.

E25.3.1 The Contractor shall remove and salvage existing pre-cast concrete barriers, and aluminium balanced barrier designated for removal within the limits of the Contract and as shown on the Drawings.

E25.3.2 Pre-cast concrete barriers and aluminium-balanced barrier that are deemed unsalvageable by the Contract Administrator shall be removed and disposed of off site.

E25.3.3 Salvaged pre-cast concrete barriers and aluminium-balanced barrier shall be delivered to the City of Winnipeg, Public Works Department, Bridge Yard, 849 Ravelstone Avenue West. Contact Mike Terleski (Phone: 794-8510) to arrange delivery.

MEASUREMENT AND PAYMENT

E25.4 Removal of existing pre-cast concrete barriers and aluminium balanced barrier.

E25.4.1 The removal of existing pre-cast concrete barriers and aluminium-balanced barrier will be measured as a lump sum Contract Unit Price for “Removal of Existing Pre-cast Concrete Barriers, Aluminium Balanced Barrier “.

E25.4.2 Salvaging and delivery or disposal of the existing pre-cast concrete barriers and aluminium-balanced barrier shall be included in payment for “Removal of Existing Pre-cast Concrete Barriers and Aluminium Balanced Barrier and no further payment shall be made.

E26. PATCHING OF EXISTING PAVEMENT

DESCRIPTION

E26.1 General

E26.1.1 This specification covers patching of existing concrete pavement in preparation for an asphalt overlay.

E26.1.2 Referenced Standard Construction Specifications

(a) CW 3110 – Sub-Grade, Sub-Base and Base Course Construction.

(b) CW 3130 – Supply and Installation of Geotextile Fabrics.

(c) CW 3410 – Asphaltic Concrete Pavement Works.

MATERIALS

E26.2 Crushed Sub-Base Material

E26.2.1 Crushed Sub-base material will have a maximum aggregate size of 50 millimetre and be supplied in accordance with Section 2.1 of CW 3110.

E26.3 Geotextile Fabric

E26.3.1 Geotextile fabric will be supplied in accordance with Section 2.0 of CW 3130.

E26.4 Asphalt Material

E26.4.1 Asphalt material will be Type 1A and will be supplied in accordance with Sections 5.0 and 6.0 of CW 3410.

CONSTRUCTION METHODS

E26.5 General

E26.5.1 Remove existing concrete pavement to a minimum width of 1.5 metres at locations as shown on the Drawings or as directed by the Contract Administrator in accordance with Section 3.1 of Specification CW 3110.

E26.5.2 Excavate to a depth of 350 millimetres below the top of the existing pavement.

E26.5.3 Compact existing sub-grade to a minimum of 95% Standard Proctor Density.

E26.5.4 Place separation/reinforcement geotextile fabric in accordance with Specification CW 3130.

E26.5.5 Place and compact crushed sub-base material in accordance with CW 3110 to a 300 millimetres compacted depth. Compact to a minimum of 100% Standard Proctor Density.

E26.5.6 Place and compact asphalt material to a 50 millimetres compacted depth matching the top of the existing concrete pavement. Compact to an average of 95% percent of the 75 Blow Marshall Density of the paving mixture with no individual test being less than 90% percent.

E26.5.7 Each layer must be levelled and accepted by the Contract Administrator before the succeeding layer may be placed.

E26.5.8 Additional excavation and placement of sub-base material beyond the identified pavement structure will be completed in accordance with CW 3110 as directed by the Contract Administrator.

MEASUREMENT AND PAYMENT

E26.6 Pavement Patching

E26.6.1 Pavement patching will be measured on an area basis and paid for at the Contract Unit Price per square metre for “Pavement Patching”. The area to be paid for will be the total number of square metres of pavement patched in accordance with this specification, accepted and measured by the Contract Administrator.

E27. REMOVAL AND SALVAGE OF EXISTING KENASTON BOULEVARD DETOUR BASE AND SUB-BASE, CN RAIL DETOUR BALLAST AND SUB-BALLAST MATERIAL

DESCRIPTION

E27.1 General

E27.1.1 This specification covers the removal and salvage of existing Kenaston Boulevard Detour base and sub-base, CN Rail Detour ballast and sub-ballast material.

E27.1.2 Referenced Standard Construction Specifications

(a) CW 2030 – Excavation Bedding and Backfill

(b) CW 3110 - Sub-Grade, Sub-Base and Base Course Construction

MARETIAL

E27.2 Sub-Base, Base Sub-Ballast and Ballast Material.

E27.2.1 All salvage base, sub-base, ballast and sub-ballast material shall be in accordance with CW 2030 and CW 3110.

CONSTRUCTION METHODS

E27.3 Reuse of Existing Kenaston Boulevard detour Base and Sub-Base, CN Rail Detour Ballast and Sub- Ballast Material

E27.3.1 Once the Kenaston Boulevard Detour pavement is no longer required and the asphalt pavement has been removed, the Contractor shall excavate the sub-base and base course from Kenaston Boulevard Detour and stockpile it for reuse on other portions of the Work as directed by the Contract Administrator.

E27.3.2 Once the CN Rail Detour is no longer required and the railway tracks and ties have been removed, the Contractor will excavate the sub-ballast and ballast material from CN Rail Detour and stockpile it for reuse on other portions of the Work as directed by the Contract Administrator.

E27.3.3 Care must be taken to avoid fouling the material with clay or other deleterious materials

E27.3.4 Any material that is deemed unsalvageable by the Contract Administrator shall be removed and disposed of off site.

E27.3.5 Placement of the sub-base, base, sub-ballast and ballast material at it's new location will be accordance with CW 2030 and CW 3110.

MEASUREMENT AND PAYMENT

E27.4 Reuse of Existing Base, Sub-Base, Ballast and Sub- Ballast Material

E27.4.1 The stockpiling, hauling, placing and compaction of base, sub- base, ballast, and sub-ballast material from Kenaston Boulevard Detour and CN Rail Detour will be measured on volume basis and paid for at the Contract Unit Price for "Reuse of Existing Base, Sub-Base, Ballast and Sub-Ballast Material". The volume to be paid for will be the total number of cubic metres of base, sub-base, ballast and sub-ballast material stockpiled and placed in accordance with the specification, accepted and measured by the Contract Administrator.

E27.4.2 The volume of sub-base, base, sub-ballast and ballast material reused will be measured by cross-sections and computed by the method of Average End Areas.

E27.4.3 No measurement or payment will be made for materials rejected by the Contract Administrator.

E28. COORDINATION OF CONSTRUCTION WITH THE RAILWAY COMPANY

E28.1 General Requirements

(a) The Contractor shall be responsible to meet all Canadian National (CN), constraints, requirements, and safety measures.

E28.2 Description of Work

(a) Prior to the Contractor commencing Work within the railway property, the railway company will have prepared their tracks such that the Contractor will construct the travelled surface of the road and sidewalk to the outer face of the track crossing surfaces. The Contractor shall construct the proposed road and sidewalk to the requirements of the drawing details.

E28.3 Railway Flagging Costs

(a) CN will provide a Protecting Foreman for the protection of the railway's plant and equipment and the cost of such shall be borne by the Contractor. No measurement for payment will be made for performing all operations herein described and all other items included in the Work described.

E28.4 CN Requirements

(a) CN Requirements are included in Appendix B. The Contractor is advised that the requirements are applicable to all of the Contractor's personnel and equipment crossing CN tracks and property.

E29. SEWER MANHOLES

E29.1 Description

(a) This Specification shall amend and supplement Standard Specification CW 2130-R9 and CW 2160-R6.

E29.2 Materials

(a) Standard Manhole Frames and Covers

(b) Manhole frames and covers shall have machined seating surfaces and shall be in accordance with Approved Products AP-004 and AP-005.

(c) Manhole Bases

(i) Manhole bases shall be as per SD-010 and SD-011 with flat top reducers as noted on the construction drawings.

E29.3 Construction Methods

(a) Bedding and Backfill

(b) The manhole base section shall be bedded as specified for coring shafts. This bedding shall be fully compacted and levelled throughout the full trench width to the grade specified so that the base section is uniformly and fully supported and the floor is level.

(c) The contractor shall pay particular attention to backfilling around the manhole to ensure that the required backfill compaction is achieved.

(d) Channelled Floors

(i) The manhole floor shall be channelled and benched in accordance with the Standard Drawings and special details, where applicable, to maintain good flow characteristics within the manhole. The Contractor shall take particular care to provide a smooth transition between influent and effluent lines.

E29.4 Measurement and Payment

(a) Manhole installation including frames, covers, rungs, risers, base and other accessories and appurtenances will be measured for payment on a vertical meter basis for each manhole type and base size and paid for at the Contract Unit Price per vertical metre for the installation of manholes. Length to be paid for will be the total number of vertical metres of manhole supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator

(b) Measurement of manholes will be from the lowest sewer invert to the top of the finished rim elevation.

E30. TRENCHLESS EXCAVATION

E30.1 Selection of excavation equipment for installation of sewers by trenchless methods shall be the responsibility of the Contractor and shall be made on the basis of expected soil conditions outlined in the geotechnical report and as detailed on the soil logs. The Contractor shall make allowances in the choice of equipment to account for reasonable and minor deviations in ground conditions and shall have contingency plans for the removal of boulders and other minor changes in ground conditions.

E30.2 In the event that there is a substantial change in the character or nature of the subsurface conditions or that obstructions are encountered, which adversely impact the Contractor's production or construction procedure, the Contractor shall immediately notify the Contract Administrator. The notice shall provide details of the change in subsurface soil conditions or obstructions encountered, any proposed construction procedure revision that the Contractor intends to undertake, as well as any other relevant supporting information. The Contract Administrator shall review the notice as expeditiously as possible to assess whether the change in conditions and revised construction procedures amount to a Change in Work. In the case of obstructions due to boulders in the silt/till or hardpan strata where that stratum is evident in the soils logs, no consideration will be made for a Change in Work as boulder obstructions can be reasonably anticipated when working in this stratum. Obstructions such as "random boulders" in the clay strata well above the till interface may be considered as a Change in Work dependent on the level of effort required to facilitate their removal.

E31. TRENCHLESS EXCAVATION OBSTRUCTIONS

E31.1 Contingency plans for removal of the obstructions encountered in trenchless excavations must be approved by the Contract Administrator and may consist of but not limited to one of the following:

(a) Drill or excavate a shaft at the location of the obstruction and remove the obstruction.

(b) Remove the obstruction through the jacking head or core hole following drilling, splitting or breaking the obstruction into smaller components as required.

(c) Other removal methods.

E31.2 Where the Contract Administrator deems that the obstruction encountered represents a Change in Work, it shall be valued in accordance with GC: 7.4 (c) and the following supplemental requirements:

(a) The first four (4) hours of handling obstructions for each occurrence shall be the responsibility of the Contractor.

(b) Equipment rates for equipment required in support of the obstruction removal shall be compensated at the MHCA rental rates. Equipment not listed in the MHCA rate schedule shall have their rates established by the Contractor prior to the commencement of Work in accordance with the procedure documented in the MHCA rental guide for establishing equipment rental rates and shall be subject to the approval of the Contract Administrator.

(c) Standby equipment that cannot reasonably be deployed elsewhere during the duration of the obstruction removal shall be compensated at 50% of its established rate.

(d) Labour rates and material costs associated with obstruction removal shall be compensated as per GC: 7.4 (c) and 7.4.1 with the provision that any removal and replacement of pavements shall be compensated at the Contract Unit Price for such Work.

E32. SITE DRAINAGE AND DEWATERING

E32.1 The Contractor shall take control of the Work area during the construction period and shall be responsible for maintaining the Work area in an acceptable condition.

E32.2 Provision of adequate site drainage during the entire construction phase shall be the Contractor's responsibility. The Contractor shall maintain site grading as necessary to provide for proper drainage away from the excavated areas. This water is to be re-directed into ditches or sewers outside of the site. Silt fences shall be properly erected and keyed into the primary ditches to protect fish habitat and prevent clogging of LDS. No extra payment or time extension will be granted as a result of difficulties associated with site access resulting from poor site drainage during any part of the construction phase.

E32.3 The Contractor shall be responsible for keeping the excavated areas dewatered at all times. The Contractor shall prepare and submit a plan to dewater the excavations at the preconstruction meeting. The plan will be reviewed and approved by the Contract Administrator prior to commencement of a construction. If at any time the Contract Administrator deems the dewater efforts to be insufficient, the Contract Administrator may order the Contractor to modify and/or increase efforts at the sole discretion of the Contract Administrator with no additional time or compensation. The Contractor shall maintain dewatering until final completion of the contract.

E32.4 Contractor shall coordinate dewatering procedures with the other contractors on site to prevent conflicts with potential runoff from other work areas. No claim for extra payment shall be made because of conflicts with others work areas drainage issues.

E33. DANGEROUS WORK CONDITIONS

E33.1 Further to Clause GC 6.26 of the General Conditions, the Contractor shall be aware that underground chambers, manholes, and sewers are considered a confined space and shall follow the "Guidelines for Confined Entry Work" as published by the Manitoba Workplace Safety and Health Division.

E33.2 The Contractor shall be aware of the potential hazards that can be encountered in underground chambers, manholes and sewers such as explosive gases, toxic gases and oxygen deficiency.

E33.3 The air in a confined space must be tested before entry and continuously during the time that personnel are inside the space. Equipment for continuous monitoring of gases must be explosion-proof and equipped with a visible and audible alarm. The principal tests are for oxygen deficiency, explosion range and toxic gases. Testing equipment must be calibrated in accordance with manufacturer's specifications.

E33.4 The Contractor shall ventilate all confined spaces including underground chambers, tunnels, pipes and shafts as required and approved by the Manitoba Workplace Safety and Health Act (the “Act”). If no ventilation is supplied, a worker must wear a respirator or supplied air to enter the confined space.

E33.5 Workers must wear a respirator or supplied air at all times when entering an underground chamber, manhole or sewer where live sewage is present.

E33.6 The Contractor shall provide a photoionization detector (PID) on site at all times to monitor potential hydrocarbon vapours in the confined spaces. The gas detector and safety equipment conforming to the Act shall be made available to the Contract Administrator for his use during inspections. In addition, the Contract Administrator shall collect discrete air samples for laboratory analysis.

E33.7 The Contract Administrator may issue a stop work order to the Contractor if the above guidelines are not being followed. The Contractor shall not resume his operations until the Contract Administrator is satisfied the Contractor is following the appropriate procedures. The Contractor shall have no claim for extra time or costs due to the stop work order for not following these safety guidelines.

E34. GRAVITY SEWERS

E34.1 Description

(a) This Specification shall amend and supplement Standard Specification CW2130-R9.

E34.2 Materials

(a) Reinforced Pre-cast Concrete Pipe

(i) Reinforced concrete jacking pipe shall be designed and manufactured in accordance with ASTM Standard C76 and the minimum strength Class noted on the Construction Drawings or as required to withstand all forces imposed on the pipe due to jacking, whichever requirement is greater.

(ii) Where practical, pipe lengths used shall be the longest size manufactured to minimize the number of joints in each section of sewer.

(iii) Notwithstanding the pipe classes noted on the Construction Drawings the Contractor may elect to have the reinforced concrete pipe designed by direct design methods in accordance with the American Society of Civil Engineers (ASCE) Standard Practice for Concrete Pipe Design (SIDD). If direct design methods are employed the following minimum design requirements shall apply:

(i) Arching coefficients and earth pressure distribution shall be based on a Type 2 Standard installation.

(ii) Minimum soil density shall be 1920 kg/m^3 for shafts backfilled in boulevard areas and 2160 kg/m^3 for shafts backfilled in pavement areas.

(iii) Wall thickness shall conform to ASTM C76 for either a wall B or Wall C.

(iv) Concrete strength and reinforcing steel requirements shall be determined for each MH-to-MH section based on the greatest height of cover in that section. The design shall not further be broken down between sections.

(v) Minimum live loading requirements shall be based on the equivalent live load due to an AASHTO HS20 design vehicle.

(vi) Under no circumstances shall the design cross-section be less than required to facilitate installation by jacking methods.

(iv) Where the Contractor elects to have reinforced concrete pipe design carried out by direct design methods, as opposed to the pipe classes noted on the Drawings, the Contractor shall make a Shop Drawing submission (stamped with the seal of a Professional Engineer, Registered in the Province of Manitoba) in accordance with Clause 1.5 of CW1110-R1 summarizing all structural analysis and pipe wall design for each unique design section.

(v) Each direct design pipe shall be clearly marked internally to designate its strength class in a manner approved by the Contract Administrator.

(b) Flowable Cement-Stabilized Fill

(i) Flowable cement-stabilized fill for filling abandoned sewers or other underground voids shall be Concrete Mix Design D) in accordance with clause 2.16 of CW2160-R6.

(c) Ditch Inlet Grate

(i) All steel shall be supplied in accordance with details on the Construction Drawings. All steel shall be hot dip galvanized and all hardware shall be stainless steel. Ditch Inlet Grates shall be Shopost Iron Works MK-A1 or approved equal.

(d) Geotextile Fabric

(i) Geotextile for grouted rip rap pad around ditch inlet grated catchbasins shall be a non-woven geotextile fabric, meeting or exceeding the following properties:

NON-WOVEN PROPERTIES		
ASTM Test Method	**Units**	**Minimum Average Roll Values**

Physical

Grab Tensile Strength	D-4632	N	890
Grab Tensile Elongation	D-4632	%	50
Mullen Burst	D-3786	KPa	2750
Puncture	D-4833	N	575
Trapezoidal Tear	D-4533	N	355
UV Resistance	D-4355	% @ hrs[1]	70/500

HYDRAULIC

Apparent Opening Size	D-4751	mm	0.150
Permittivity	D-4491	sec^{-1}	1.4
Flow Rate	D-4491	$L/sec/m^2$	54

[1] Percent grab tensile retained per hours of UV exposure following conditioning in accordance with ASTM D-4355.

(e) Grouted Stone Rip Rap

(i) Grouted stone rip rap for ditch inlet grated catchbasins shall be in accordance with CW 3615-R2.

E34.3 Construction Methods

(a) Method of Pipe Installation for 750 mm Diameter and Smaller

(i) Land Drainage sewers to be installed by open cut and, where shown on the Construction Drawings, by the coring method wherever possible. Coring shall conform to Clause 3.4 of CW 2130-R9.

(ii) Where field conditions are such that a cored hole cannot be made, the Contractor shall install the pipe in an open trench with the appropriate Class of backfill. No additional payment will be made for pipe required to be installed in shafts.

(b) Bedding and Backfilling Shafts

(i) Backfill of shafts within or partially within existing or proposed pavement areas shall be Class 3 as specified in Section CW 2030-R6.

(ii) Shafts to accommodate a tunnelling or jacking machine shall be constructed with a concrete foundation of sufficient cross-section and trueness to adequately support and align the machine during tunnelling operations. Concrete Mix Design in accordance with Clause 2.16 of CW 2160-R6.

(iii) Bedding for coring shafts shall be supplemented by a foundation of 100 mm of mechanically compacted 20 mm down limestone or a concrete skin coat of cement stabilized fill (conforming to Clause 2.1 of CW 2030-R6) or equal

(c) Submission of Construction Methodology

(i) Contractor shall note that the majority of construction of the sewer along Kenaston Boulevard will be within a narrow 11.4 m wide, median boulevard.

(ii) Land Drainage Sewers in Open Trench installations shall be constructed in a manner such that the trench will be contained within the median boulevard. Trench walls, due to limitations of median boulevard width and proposed roadway pavements, shall be cut using a Trench Box. Bracing and shoring shall be utilized if, in the opinion of the Contractor, it is necessary to prevent the undermining of the proposed roadway pavements. Trench excavation, placement and removal of shoring, bracing, or trench boxes shall be undertaken in a manner that will permit the proper bedding and backfill of Land Drainage Sewers.

(iii) Prior to the commencement of construction, the Contractor will be responsible to prepare a submission on construction method in the affected area for the review and approval of the Contract Administrator. Review and approval of the Contractor's proposed construction method shall in no way relieve the Contractor of responsibility for successful execution of the Work in accordance with the Contract Documents.

(iv) The Contractor's submission on Construction Methodology in the affected area must address the following minimum considerations:

(i) Proposed method of construction.

(ii) Operational controls to prevent encroachment into proposed roadway pavement areas.

(iii) Specialized equipment employed for use.

(iv) Additional design considerations as a result of the Contractor's proposed construction method.

(v) Any design revisions required to accommodate the Contractor's proposed construction method.

(vi) Other concerns that may be raised by the Contract Administrator in response to the Contractor's submission.

(d) No Work shall commence on this portion of the project until review and approval of the Contractor's Submission on construction Methodology.

(e) Connecting to Existing Manholes or Sewers

(i) Connecting to existing manholes or sewers shall be in accordance with Clause 3.16 and 3.17 of Standard Specification CW 2130-R9 and as per the details on the Construction Drawing.

(f) Connecting to Existing 750 LDS 2.4 m West of Pumping Station

(i) Circular Steel Shoring has been left in place by the Pumping Station Contractor at the end of the 750 LDS line approximately 2.4 m west of pumping station. The Contractor shall utilize this shoring to remove plug and make the connection to the existing 750 LDS. Once the connection is complete, the contractor shall remove the steel shoring from the ground and store it in a safe location until the owner is able to retrieve it. The Contractor shall contact the owner of the shoring and make arrangements for pick up and removal from site.

(g) Reinforced Sections for Tunnel Sewer

Where construction is carried out by tunnelling it shall be reinforced at the following locations in accordance with the standard details for reinforcing noted on the Construction Drawings:

(i) At each shaft location for the full extent of the shaft to a distance 1.5 m beyond each shaft face.

(ii) At locations where connections are proposed to be made, for a distance equal to the width of the proposed excavation plus 1.5 m in either direction. The Contractor shall employ suitable means to control the width of excavation during reconnection operations.

(iii) At locations where cave-ins occur.

(h) Design Diameters

(i) Internal diameters shown on the Drawings are the minimum required. The Contractor may elect to increase these diameters to facilitate the use of tunnelling equipment. Prior to proceeding with a larger diameter, the Contractor must obtain written approval for the increased diameter from the Contract Administrator. All costs associated with increasing the diameter shall be borne by the Contractor.

(i) Abandonment of Existing Sewers or Connecting Pipe

(i) Existing sewers or connecting pipe to be abandoned are noted on the Construction Drawings. All sewers and watermains to be abandoned at side slopes shall be plugged 1.0 m into the side slope of the underpass.

(ii) Conduits to be abandoned shall be completely filled with a flowable cement-stabilized fill as per Clause E34.2(b)(i) of this Specification. Abandonment shall include installation of plugs within 1 m of sewer mains or surface of side slope, and blocked with a stiff concrete mixture at the high end as per Clause 3.19 of CW 2130-R9.

(iii) Backfill of disturbed side slope material shall be in accordance with CW 2030-R7, class 4 backfill.

(j) Utilities Relocations

(i) All utility relocations, unless specifically noted otherwise, shall be the sole responsibility of the Contractor.

(k) Ditch Inlet Grates

(i) The Contractor shall be required to supply and install ditch inlet grates on drainage inlets shown on the construction drawings.

(ii) The ditch inlet grate shall be understood to include the supply and installation of all anchor steel, grate steel, and hardware. All concrete material shall be included in the unit price bid for the catchbasin (SD-025).

(iii) The ditch inlet grate shall be securely fastened to the drainage inlets as shown on the construction drawings and as approved by the Contract Administrator.

(iv) Any galvanized surfaces that are damaged shall be coated with a galvanizing compound approved by the Contract Administrator.

(l) Excess Material From Pipe Installations

(i) All excess material left over from trench excavation for LDS installations shall be hauled off Site. No additional payment shall be made for removal and disposal of material off Site.

E34.4 Measurement and Payment

(a) Abandoning Existing Sewers or Connecting Pipe with Flowable Fill

(i) The abandonment of existing sewers or connecting pipe with flowable fill shall be measured on a volume basis based on measurements made by the Contract Administrator.

(ii) Payment shall be made at the Contract Unit Price for “Abandonment of Sewers with Flowable Fill” and shall be considered compensation in full for the supply of all

materials and the performing of all operations required to acceptably abandon each sewer pipe with flowable fill as specified.

(b) Ditch Inlet Grates

(i) The supply and installation of ditch inlet grates will be included in the measurement and payment of drainage inlets with the specified frame and cover.

(c) Connecting to Existing 750 LDS Sewer

(i) Connecting to existing 750 LDS approximately 15 m west of the pumping station shall be measured on a lump sum basis. Price paid shall be compensation in full for all necessary excavation, shoring, bracing, supply of materials, and hard/soft dig requirements, removal of 750 LDS plug and any concrete reinforcement installations, connection to existing 750 LDS pipe, and backfilling with Class 3 backfill material. No additional payment shall be made for removal and storage of existing circular steel shoring. No additional payment shall be made if dewatering of existing excavation is required.

E35. DECOMMISSIONING AND SALVAGING OF EXISTING UNDERGROUND WORKS

E35.1 Description

(a) General

(i) This specification covers the decommissioning, and salvaging of existing underground works.

(ii) Referenced Standard Construction Specifications

(i) CW 2130 R-9 Gravity Sewers

(ii) CW 2110 R-8 Watermains

E35.2 Construction Methods

(a) Removal and Salvage of Existing Hydrant Assemblies

(i) Existing hydrant assemblies designated for removal and salvage shall be carefully removed in such a fashion as not to damage them as they are completely extracted from the ground. All salvaged materials shall be stockpiled for inspection at locations designated by the Contract Administrator.

(ii) The Contractor shall remove the designated appurtenances and the excavations shall be backfilled and compacted to the satisfaction of the Contract Administrator, where directed. Any concrete rubble that may be encountered shall be removed and disposed of offsite by the Contractor and no additional payment shall be made for its removal.

(iii) In the event of damage to any materials by the Contractor, the Contractor shall immediately notify the Contract Administrator and make all repairs or replacements necessary, at his own expense, to the satisfaction of the Contract Administrator.

(b) Removal and Salvage of Existing Feedermain (FM) and Watermain (WM) Appurtenances.

(i) The Contractor shall remove and salvage all valves and fittings as shown on drawings D-8891 and D-8892 and where the Contract Administrator directs the Contractor, the excavations shall be backfilled and compacted to the satisfaction of the Contract Administrator.

(ii) All salvaged appurtenances shall be stockpiled at locations designated by the Contract Administrator to await inspection by Contract Administrator and Water and Waste personnel to determine their condition.

(iii) All appurtenances deemed salvageable shall be loaded and delivered as directed by the Contract Administrator to the Water and Waste Department, Water Services Division Yard located at 552 Plinguet Street. Unload salvaged material as directed

by City personnel. No additional payment shall be made for the salvage and delivery of these materials.

(c) Removal of Abandoned Feedermain and Watermain Piping South of Rail Bridge

(i) All existing 900 mm and 600 mm AC FM piping and 300 WM piping as indicated on drawing D-8891, shall be completely removed and disposed of offsite by the Contractor. Only the abandoned sections as shown on the drawing will be removed. No additional payment shall be made for disposing of excess materials offsite. All encasement pipes on the FM and WM lines shall be removed and salvaged. One section of the 600 FM and one section of the 900 FM pipe shall be salvaged and delivered to the City of Winnipeg Yard for destructive testing by others as per Specification E35.2 (d). No additional payment shall be made for the salvage and delivery of these sections of pipe or for the encasement pipes.

(ii) Transportation and disposal of asbestos based projects within the City of Winnipeg shall be in accordance to the guidelines attached in Appendix D.

(d) Asbestos Cement Pipe Samples and Bedding Samples

(i) Take a bedding sample and remove existing asbestos cement (AC) pipe sample in accordance with the following at each location where the new watermain connects to an existing AC watermain.

(ii) Select a minimum 1.5 meter length of AC pipe that is undamaged and has not been tapped for service connections as approved by the Contract Administrator.

(iii) Expose the AC pipe down to the bedding using manual methods and equipment. Take precautions to not damage the AC pipe when exposing.

(iv) Collect an uncontaminated bedding sample from as close as possible to the existing AC pipe before removing the AC pipe sample. Place the bedding sample into a plastic sample bag provided by the Contract Administrator.

(v) Indicate the top of the AC pipe as it is in place by making a readily visible scratch mark at one end for the sample.

(vi) Cut the ends of the AC pipe sample as square as possible to the axis of the pipe. When cutting AC pipe follow “Work Practices for Asbestos-Cement Pipe No. M16”, published by the American Water Works Association, “Recommended Work Practices for AC Pipe,” 1977, published by the AC Pipe producers Association and all applicable Workplace, Safety and Health regulations.

(vii) Rinse all dirt and cutting debris from the AC pipe sample before removing it from the excavation.

(viii) Immediately wrap the AC pipe sample in at least 2 layers of minimum 6 mil thick clear polyethylene sheeting. While wrapping the pipe sample insert a warming label provided by the Contract Administrator inside the polyethylene sheeting such that it can be easily read through the wrapping.

(ix) Deliver the AC pipe sample to a storage location as directed by the Contract Administrator within 24 hours of removing the sample for the excavation.

(x) Offload the pipe sample as directed.

(xi) No separate measurement or payment shall be made for providing AC pipe samples and bedding samples; or for the delivery of the sample to the City, as directed by the Contract Administrator.

(e) Removal of Existing Valve Chambers on the 300 WM and 600 FM

(i) Upon completion of the removal of all appurtenances from the two valve chambers, the Contractor shall completely remove the remaining structure from the ground to the satisfaction of the Contract Administrator. The contractor shall dispose of the excess material offsite and no additional payment shall be made for the disposal of this material.

(ii) The Contractor shall backfill and compact the excavation to the satisfaction of the Contract Administrator. This excavation will be in close proximity to the top of the slope of the underpass and the Contractor shall be required to meet 95% compaction of the backfilled material to avoid any future slope failures.

(f) Removal of Existing Catch Basins and Manholes.

(i) Removal of existing catchbasins and manholes shall be done as to not damage the structures as they are extracted from the ground. The Contractor shall take care and try to salvage all catchbasins and manholes, as shown on the Construction Drawings, and as directed by the Contract Administrator. Catchbasins and manholes shall be reinstall or deliver, based on the decision of the Contract Administrator, to the Water and Waste Department, Water Services Division Yard located at 552 Plinguet Street. Contractor shall unload salvaged material as directed by City personnel. No additional payment shall be made for the salvage and delivery of these materials.

(ii) Where it is deemed not possible to salvage parts of these structures, the Contract Administrator must be notified immediately. The excess material from manholes and catchbasins that cannot be salvaged shall be disposed of offsite and no additional payment shall be made for disposal of the material.

(g) Removal of Existing Sewer and Water Piping North of Rail Bridge.

(i) Completely remove piping as shown on drawing D-8299 as excavation progresses. Backfill and compact as directed by the Contract Administrator. Remove and dispose of excess material offsite. Abandon existing sewers and watermains that are to remain following CW 2130-R9 and CW 2110-R8 respectively.

(h) Removal of Abandoned 350mm Gas Lines

(i) Removal of abandoned 350mm gas lines will be as shown on the drawings D-8891 and D-8892. This will require cutting and complete removal of the existing piping and disposal offsite of excess materials. The Contractor shall install concrete plugs at the limits of pipe removals. Contractor shall contact Manitoba hydro, Natural Gas Division prior to abandoning gas lines. No additional payment shall be made for the plugging of ends of gas lines.

E35.3 Measurement and Payment

(a) Removal and Salvaging of Existing Hydrant Assemblies

(i) Removal and salvaging of existing hydrant assemblies shall be measured on a unit basis and paid for at the Contract Unit Price for “Removal and Salvage of Existing Hydrant Assemblies”. The number to be paid for shall be the total number of hydrant assemblies removed and salvaged in accordance with this specification, accepted and measured by the Contract Administrator.

(b) Removal and Salvage of Existing FM and WM Appurtenances.

(i) Removal and salvage of existing FM and WM appurtenances shall be included in the price of removal of existing feedermains and watermains. No additional payment shall be made for removal and salvage of these appurtenances.

(ii) Removal of Abandoned FM and WM Piping

(iii) Removal of existing FM and WM piping will be measured on a length basis and paid for at the Contract Unit Price for “Removal of Abandoned 300 Watermain”, “Removal of Abandoned 600 Feedermain Piping”, and “Removal of Abandoned 900 Feedermain Piping”. The length to be paid for will be the total number of lineal metres of FM and WM piping removed in accordance with this specification, accepted and measured by the Contract Administrator.

(c) Removal of Existing Valve Chambers on the 300 WM and 600 FM

(i) Removal of existing valve chambers on the 300 WM and 600 FM shall be measured for on a unit basis and paid for at the Contract Unit Price for "Removal of Existing Valve Chambers". The number to be paid for shall be the total number of valve chambers removed in accordance with this specification, accepted and measured by the Contract Administrator.

(ii) Removal and salvage of existing appurtenances inside the valve chambers shall be included with the removal of the valve chambers. No additional payment shall be made for the removal and salvaging of the appurtenances inside the valve chambers.

(d) Removal of Existing Catchbasins and Manholes

(i) Removal of existing catchbasins and manholes shall be measured on a unit basis and shall be paid for at the Contract Unit Price for "Removal of Existing Manholes" and for the "Removal of Existing Catch Basins". The amount to be paid for shall be the total number of catchbasins or the total number of manholes removed in accordance with this specification, accepted and measured by the Contract Administrator.

(e) Removal of Existing Sewers, Watermains, and Services North of Rail Bridge

(i) Removal of existing sewers and watermains as shown on drawing D-8892 are required to accommodate the new roadway and land drainage sewers. No payment shall be made for removal of existing sewers, watermains, and services north of the rail bridge as shown on the drawings. No additional payment shall be made for the disposal of excess material offsite.

(f) Removal of Abandoned 350 mm Gas Lines

(i) Removal of abandoned 350 mm gas lines shall be measured for payment on a length basis and paid for at the Contract Unit Price for "Removal of Abandoned 350 mm Gas Lines". The length to be paid for shall be the total number of lineal metres of 350 mm gas lines removed in accordance with this specification, accepted and measured by the Contract Administrator. No additional payment will be made for offsite disposal of the pipe removed or the plugging of the ends of pipe left in place.

E36. SUPPLY AND INSTALL PRE-CAST SAG INLET STRUCTURE

E36.1 Description

(a) General

(i) This specification shall cover the supply and installation of the new sag inlet structures on Kenaston Boulevard (at the low points in both the northbound and southbound lanes).

(ii) Reference Standard Construction Specifications

(i) CW 1130 - Site Requirements

(ii) CW 2030 - Excavation, Bedding and Backfill

(iii) CW 2160-R6 - Concrete Underground Structures and Works

E36.2 Materials

(a) Pre-cast Sag Inlet Structure

(i) Supply pre-cast sag inlet structure as shown on the drawing LD-3276.

(b) Miscellaneous Materials

(i) Supply all miscellaneous materials as noted on the Drawings

(ii) Frame and Covers to be AP-008 and AP-009.

(iii) Roof of structure in accordance with CW 2160-R6

(c) Backfill

(i) Backfill shall be in accordance with CW 2030, Class 3 backfill except compaction shall be to a density of 95% of the maximum dry density as determined by the Standard Proctor Compaction Test.

E36.3 Construction Methods

(a) Disposal of Excavated Material

(i) Disposal of excavated material shall be in accordance with CW 1130.

(ii) Install pre-cast inlet structure in accordance with CW 2160-R6

E36.4 Measurement and Payment

(a) Sag Inlet Structure Construction

(i) Supply and install of the pre-cast sag inlet structure will be measured on a lump sum basis and paid for at the Contract Lump Sum Price for the "Items of Work" listed here below. The lump sum price paid shall be for supplying all materials and performing all operations necessary to complete the works including any items included to complete the work in accordance with this specification, accepted by the Contract Administrator.

(i) Items of Work

(ii) Supply of Pre-Cast Sag Inlet Structure

(iii) Install Pre-cast Sag Inlet Structure

(iv) Supply and Install Cast in Place Roof for Structure (unless one complete pre-cast structure)

(v) Frames and Covers

(vi) Connection of Lead Pipes and outfall to Structure

(ii) There shall be no additional measurement or payment for miscellaneous metals for the sag inlet structure. It shall be included in payment for pre-cast sag inlet structure.

(iii) There shall be no measurement or payment for backfill. Backfill shall be included in payment for the pre-cast sag inlet structure.

E37. SUPPLY AND INSTALL GRIT CHAMBER

E37.1 Description

(a) General

(i) This specification covers the supply and installation of the grit chamber shown on the Drawings at approximate Station 1+515 on Kenaston Boulevard.

(ii) Referenced Standard Construction Specifications

(i) CW 2130 - Gravity Sewers

(ii) CW 2030 - Excavation, Bedding and Backfill

E37.2 Materials

(a) Oversized Manhole Base and Riser Sections.

(i) The grit chamber shall have a 2100 mm manhole base with openings pre-cast into the structure to accommodate inlet and outlet pipes as shown on the Drawings.

(b) Standard Manhole Frame and Cover

(i) The grit chamber shall have an AP-004 frame and an AP-005 cover.

E37.3 Construction Methods

(a) General

(i) The grit chamber shall be constructed to the size and dimensions noted on the Drawings.

(ii) The Contractor shall note that the bottom of the chamber may be below normal ground water levels. The Contractor shall dewater the excavation as necessary to complete the required work.

E37.4 Measurement and Payment

(a) Grit Chamber

(i) Supply and installation of the grit chamber including frames, covers, rungs, risers, reducers, adjusting rings, base, benching and other accessories and appurtenances will be measured on a lump sum basis and paid for at the Contract Unit Price for "Supply and Install Grit Chamber". Price paid shall be compensation in full for all necessary excavation, shoring, dewatering, bracing, supply of materials, connections, and backfilling with Class 3 backfill material in accordance with this specification, accepted and measured by the Contract Administrator.

E38. DITCH INLET GRATES

E38.1 Description

(a) General

(i) This Specification covers the supply and installation of ditch inlet grates on catchbasins.

E38.2 Materials

(a) Ditch Inlet Grate

(i) All steel shall be supplied in accordance with details on the Drawings. All steel shall be hot dip galvanized and all hardware shall be stainless steel. Ditch Inlet Grates shall be Shopost Iron Works MK-A1 or approved equal.

E38.3 Construction Methods

(a) Ditch Inlet Grates

(i) The Contractor shall be required to supply and install ditch inlet grates on drainage inlets shown on the Drawings.

(ii) The ditch inlet grate shall be understood to include the supply and installation of all anchor steel, grate steel, and hardware. All concrete material shall be included in the unit price bid for the catchbasins.

(iii) The ditch inlet grate shall be securely fastened to the drainage inlets as shown on the Drawings and as approved by the Contract Administrator.

(iv) Any galvanized surfaces that are damaged shall be coated with a galvanizing compound approved by the Contract Administrator.

E38.4 Measurement and Payment

(a) Ditch Inlet Grates

(i) The supply and installation of ditch inlet grates will not be measured for payment and shall be included in the payment for "Catchbasins SD-025 - c/w Ditch Inlet Grates".

E39. BRIDGE DRAIN CONNECTION PIPE

E39.1 Description

(a) General

(i) This Specification covers the supply and installation of piping to connect the bridge drains to the land drainage sewer system.

E39.2 Materials

(a) Bridge Drain Connection Pipe

(i) Bridge drain connection pipe shall be 150 mm PVC SDR 35

E39.3 Construction Methods

(a) Bridge Drain Connection Pipe

(i) The Contractor shall be required to remove existing plugs, supply and install piping to connect the existing drains on the railway bridge to the catchbasins as shown on the Drawings.

(ii) The bridge drain connection pipe shall be understood to include the supply and installation of all piping and accessories required to connect the existing drains and the catchbasins. All materials required to make these connections shall be included in the unit price bid for the bridge drain connection pipe.

(iii) The piping shall be installed at the grades and locations as shown on the Drawings and as approved by the Contract Administrator.

(iv) Backfilling the connection pipe shall be approved by the Contract Administrator to ensure adequate cover is achieved.

E39.4 Measurement and Payment

(a) Bridge Drain Connection Pipe

(i) Supply and installation of the bridge drain connection pipe and any accessories and appurtenances required to connect to the existing bridge drainpipe and catchbasins will be measured on a length basis and paid for at the Contract Unit Price for "Supply and Install Bridge Drain Connection Pipe". Price paid shall be compensation in full for all necessary excavation, supply of materials, connections, and backfilling with Class 4 backfill material in accordance with this specification, accepted and measured by the Contract Administrator

E40. VALVE PIT DRAIN PIPE

E40.1 Description

(a) General

(i) This Specification covers the supply and installation of piping to connect the existing valve pit drain pipe to the land drainage sewer system.

E40.2 Materials

(a) Valve Pit Drain Pipe

(i) Valve pit drain pipe shall be 150mm PVC SDR 35

E40.3 Construction Methods

(a) Valve Pit Drain Pipe

(i) The Contractor shall be required to supply and install piping to connect the existing valve pit drain to the catchbasin as shown on the Drawings.

(ii) The valve pit drainpipe shall be understood to include the supply and installation of all piping and accessories required to connect the existing drainpipe and the catch basin. All materials required to make these connections shall be included in the unit price bid for the valve pit drainpipe.

(iii) The piping shall be installed at the grades and locations as shown on the Drawings and as approved by the Contract Administrator. This pipe shall be installed by trenchless methods.

E40.4 Measurement and Payment

(a) Valve Pit Drain Pipe

(i) Supply and installation of the valve pit drain pipe and any accessories and appurtenances required to connect to the existing valve pit drain pipe and catch basin will be measured on a length basis and paid for at the Contract Unit Price for "Supply and Install Valve Pit Drain Pipe". Price paid shall be compensation in full for all necessary excavation, supply of materials, connections, and backfilling with Class 2 backfill material in accordance with this specification, accepted and measured by the Contract Administrator.

E41. STRUCTURAL CONCRETE FOR SLOPE PAVING, F-SHAPED TRAFFIC BARRIER, AND QUADGUARD BASE

E41.1 Description

This Specification shall cover the preparation of Portland Cement Concrete for slope paving, F-Shaped traffic barrier, and quadguard base, and all concreting operations related to the construction of Portland Cement Concrete works as specified herein.

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 the satisfactory performance and completion of all work as hereinafter specified.

E41.2 Materials

E41.2.1 General

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

E41.2.2 Handling and Storage

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 CAN/CSA A23.1-2000.

E41.2.3 Testing

All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator by the Testing Laboratory designated by the Contract Administrator. All costs for material testing shall be covered by the Contractor. Testing shall be undertaken by a CSA certified 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.

All materials shall conform to CSA Standard CAN/CSA A23.1-2000.

All testing of materials shall conform to CSA Standard CAN/CSA A23.2-2000.

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 specification detailed herein or are found to be defective in manufacture of 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.

Frequency of tests shall be in accordance with CSA A23.2-2000. A minimum of one slump and air test shall be conducted for each pour complete with one set of cylinders (3) for concrete strength compressive tests.

E41.2.4 Aggregates

The Contractor shall furnish in writing to the Contract Administrator the location of the sources where aggregate will be obtained in order that it may be inspected and tentatively approved by the Contract Administrator. Changes in the source of aggregate supply during the course of the Contract will not be permitted without notification in writing to and the expressed approval of the Contract Administrator.

(a) Fine Aggregate

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 or other deleterious substances. Fine aggregate shall be well graded throughout and shall conform to the following grading requirements.

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

The fineness modulus of fine aggregate shall not be less than 2.2 or more than 3.1 unless otherwise approved by the Contract Administrator.

(b) Course Aggregate Standard

Standard course aggregate shall be used for all the concrete described and required in this Specification.

Standard course aggregate shall consist of natural gravel, crushed stone, or other approved materials of similar characteristics, having clean, hard, strong, durable, uncoated particles, free from injurious amounts of soft, friable, thin, elongated, or laminated pieces, alkali, organic, or other deleterious matter. Course aggregate shall be well graded throughout and shall conform to the grading requirements in the following table.

Sieve Size	Percent Passing
20 mm	100%
14 mm	90% - 100%
10 mm	45% - 75%
5 mm	0% - 15%
2.5 mm	0% - 5%

E41.2.5 Cement

All cement unless hereinafter specifically stated, shall be Type 50 Normal Portland Cement, conforming to requirements of CSA Standard CAN/CSA-A5.

The Contractor shall obtain and furnish to the Contract Administrator a statement signed by an officer or chemist of the cement manufacturer, certifying that the cement furnished does not exceed 0.6 percent alkali equivalent, as measured by the percent of sodium oxide plus 0.658 times the percent of potassium oxide. If requested by the Contract Administrator.

Tests for determining alkali content shall be carried out in accordance with ASTM Standard C114-83A paragraph 17.1 Standard Method of Chemical Analysis of Hydraulic Cement.

E41.2.6 Supplementary Cementing Materials

Use of pozzolans, fly ash or silica fume will be permitted for use in Structural Concrete supplied under this Specification up to a maximum of 15% of cement content.

E41.2.7 Water

Water used for mixing concrete shall be clean and free from injurious amounts of oil, acid, alkali, organic matter or other deleterious substances. It shall be equal to potable water in physical and chemical properties.

E41.2.8 Admixtures

No admixtures, other than Air-Entraining Agent and Water Reducing Agent, as specified below, shall be used without the written authorization of the Contract Administrator, unless otherwise specified in these Specifications. It shall be the Contractor's responsibility that each admixture is compatible with all other constituent materials, with respect to the proper performance of the admixture as well as with respect to the proper performance of the other constituents in the presence of the admixture.

(a) Air-Entraining Agent

The air-entraining agent shall conform to the requirements of ASTM Standard C260 and shall produce a satisfactory air-void system and an air content within the ranges specified in CSA Standard CAN/CSA-A23.1-2000 for each class of concrete.

(b) Water-Reducing Agent

The water reducing agent shall be Type WN and shall conform to the requirements of ASTM Standard C494.

E41.2.9 Styrofoam

Styrofoam shall be high-density expanded polystyrene with a minimum compressive strength of 207 kPa at 10% deformation.

E41.2.10 Patching Mortar

The 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 l part cement to 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 unless patch is located in a painted area. The quantity of mixing water shall be no more than necessary for handling or placing.

E41.2.11 Formwork

Unless otherwise indicated on the Drawings, all formwork shall comply as follows:

Formwork materials shall conform to CSA Standard CAN/CSA-A23.1-2000 and American Concrete Publication SP-4 "Formwork for Concrete".

Form sheeting plywood shall be exterior Douglas Fir, concrete form grade, conforming to CSA 0121, a minimum of 20 mm thick.

Boards used for formwork shall be fully seasoned and free from defects such as knots, warps, cracks, etc., which may mark the concrete surface.

No formwork accessories will normally be allowed to be left in place within 50 mm of the surface following form removal. However, if the Contract Administrator does permit these items to be left in place, they must be made from a non-rusting material or galvanized steel; and they shall not stain, blemish, or spall the concrete surface for the life of the concrete.

Forms for exposed surfaces may be either new plywood or steel as authorized by the Contract Administrator.

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 will be subjected.

All forms are included in these works and must be removed by the Contractor once adequate strength and curing of the concrete has been achieved.

E41.2.12 Waterstop

Waterstops where used shall be as indicated on the Drawings shall be included in the supply and placement of concrete.

E41.2.13 Plain Formliner

Plain formliner shall be Hydroform, or equal as accepted by the Contract Administrator. This formliner shall be used on all exterior exposed formed surfaces.

E41.2.14 Non-Shrink Grout

Where non-shrink grout is used, it shall be Sika 212 Non-Shrink Grout, or equal as accepted by the Contract Administrator. The minimum compressive strength of the grout at 28 days shall be 56 MPa.

E41.2.15 Epoxy Grout

Where epoxy grout is used, it shall be Sika Talygrout 100, or equal as accepted by the Contract Administrator.

E41.2.16 Curing Compound

The curing compound shall be liquid membrane-forming and conform to the requirements of ASTM Standard C309 and the proposed standards ASTM P198. Rate of application shall be the rate required to meet the requirements of ASTM P198 for the texture of concrete the curing compound is to be applied to. The curing compound shall be water

based, resin-based and white pigmented. An accepted product is Sea Height 1100 Clear All-Resin Concrete Curing Compound.

E41.2.17 Flexible Joint Sealant

Flexible joint sealant for all horizontal, vertical, and sloping joints shall be guaranteed non-staining, grey polyurethane, accepted by the Contract Administrator and applied in strict accordance with the details shown on the Drawings and the manufacturer's instructions including appropriate primers if recommended. Accepted products are Vulkem 116 by Mameco, Sonolastic NPI by Sonneborne, RC-1 by Sternson, Sikaflex by Sika or equal as accepted by the Contract Administrator.

E41.2.18 Latex Bonding Agent

Latex bonding agent shall be SCP Concrete Bonding Agent, as supplied by Specialty Construction Products, Surfacrete Concentrate by Sternson, or equal as accepted by the Contract Administrator.

E41.2.19 Form Coating

Form coating shall be "Sternson CRA" or equal as accepted by the Contract Administrator.

E41.2.20 Fibre Joint Filler

Fibre joint filler shall be rot-proof and of the preformed, non-extruding, resilient type made with a bituminous fibre such as Flexcell and shall conform to the requirements of ASTM Standard D1751, or equal as accepted by the Contract Administrator.

E41.2.21 20 Crushed Limestone

20 Crushed Limestone for the slope paving and F-shape traffic barrier shall be in accordance with CW 3110-R7, Base Course Material.

E41.2.22 Grouted Rip Rap

Grouted riprap for the slope paving shall be in accordance with CW 3615-R2, Grouted Stone Riprap.

E41.3 Concrete Design Requirements

E41.3.1 Mix Design Statement

For each type of concrete used, the Contractor shall provide the Contract Administrator with a Mix Design Statement, certifying the constituent materials and mix proportions that will be used in the Portland Cement Concrete. The Contractor shall include, in the certification, the following information:

(a) List the product name and source of all proposed constituent materials of the concrete including cement, coarse aggregate, fine aggregate, water, water reducing agent, and air entraining admixture. A statement is required indicating that the constituent materials proposed for each mix design are compatible with each other, thereby providing concrete with good long-term durability capabilities.

(b) Supply recent records of each mix design for concrete quality control tests including slump, total air content, and 7 and 28-day compressive strengths. The Contractor shall supply reasonable evidence that the mix designs submitted will produce concrete with the specified strength, workability and yield.

When previously satisfactory strength data on the proposed mix is not available, the Contract Administrator may request the preparation of field trial batches in order that the concrete be tested prior to construction. Such field trial batches shall be carried out in similar conditions and using similar equipment, batching, and mixing procedures

as will be used in the actual construction. The number of trial batches required shall be determined by the Contract Administrator and shall depend on the class of concrete materials.

(c) Supply recent test information, on coarse aggregates of water absorption and abrasion.

(d) Supply recent information, if available on coarse aggregate alkali-silica reactivity.

(e) Supply recent information on tests performed on Portland Cement, fly ash and silica fume.

(f) Supply any other information deemed applicable.

E41.3.2 The Contractor shall perform the following tests and submit the results to the Contract Administrator prior to the start of construction.

(a) Determine the gradation of fine and coarse aggregates in accordance with CSA Test Method A23.2-2A. Results shall be within acceptable limits specified herein.

(b) The Contractor shall submit test data showing that the Contractor's proportioning and mixing equipment, procedures and concrete mix constituent materials are capable of producing a satisfactory air-void system in the hardened concrete. Prior to Site mobilization, the Contractor shall prepare and cast representative test specimens of each type of concrete using the same proportioning and mixing equipment and procedures, and the same concrete admixtures as will be employed for the supply and placement of each type of structural concrete.

(c) The air-void system testing program to be carried out by the Contractor prior to Site mobilization must include the following if requested by the Contract Administrator:

(i) Date test specimen cast.

(ii) Air temperature during casting.

(iii) Concrete temperature during placement.

(iv) Air content of the plastic concrete as determined in accordance with CSA Standard Test Method A23.2-4C, "Air Content of Plastic Concrete by the Pressure Method".

(v) Slump of the plastic concrete as determined in accordance with CSA Standard Test Method A23.2-5C, "Slump of Concrete".

(vi) Total air-void content, specific surface, spacing factor, and air-paste ratio of the air-void system in the hardened concrete, as determined in accordance with CSA Standard Test Method A23.2-17C, "Microscopical Determination of Air-Void Content and Parameters of the Air-Void System in Hardened Concrete".

(vii) Density of the hardened concrete.

(viii) Brand and dosage rate of air-entraining and water-reducing admixtures and any other admixtures used in the test specimens.

The test specimen concrete will be considered to have a satisfactory air-void system when the average of all tests shows a spacing factor not exceeding 230 microns with no single test greater than 260 microns.

(d) Determine the water-soluble chloride ion content of the hardened concrete in accordance with CSA Test Method A23.2-4B prior to the start of construction.

(e) All testing shall be carried out by a CSA certified concrete testing laboratory.

(f) The cost for batching, casting, and testing trial batch specimens shall be included in the price of to the Supply and Placement of Structural Concrete. No measurement or separate payment will be made for this Work.

E41.3.3 Concrete Strength and Workability

The Mix Design Statement shall be submitted to the Contract Administrator at least seven (7) days prior to the delivery of any concrete to the job Site. Once accepted by the Contract Administrator, all concrete shall be supplied in accordance with this Statement, which shall be called the Job Mix Formula.

No changes in the Job Mix Formula will be permitted without following the above procedure.

Proportioning of fine aggregate, coarse aggregate, cement, water and air-entraining agent shall be such as to yield concrete having the required properties as follows:

The minimum compressive strength of the cast-in-place concrete shall be 20 MPa before it may be subjected to freezing temperatures.

E41.3.4 Concrete Supply

Unless otherwise specified in these Specifications of the Contract, only the use of a certified ready-mixed concrete plant will be permitted in accordance with Standard Specification CW 3310-R9. Concrete shall be proportioned, mixed and delivered in accordance with the requirements of CSA Standard CAN/CSA-A23.1-2000, "Production of Concrete", except that the transporting of ready-mixed concrete in non-agitating equipment is not permitted without the written permission of the Contract Administrator.

Unless otherwise directed by the Contract Administrator, the discharge of ready-mixed concrete shall be completed within 1½ hours after the introduction of the mixing water to the cement and aggregates.

The Contractor shall maintain all equipment used for handling and transporting the concrete in a clean condition and proper working order.

E41.3.5 Equipment

(a) General

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

The Contractor shall have sufficient standby equipment available on short notice at all times.

(b) Vibrators

The Contractor shall have sufficient numbers of 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.

The Contractor shall have standby vibrators available at all times during the pour.

(c) Miscellaneous Equipment

The Contractor shall provide all miscellaneous equipment as required to properly and thoroughly execute and complete all operations related to the supply and placement of structural concrete.

E41.3.6 Concrete Mix Requirements

Unless indicated otherwise, mix design shall conform to the following:

Structural Component	Agg. Size (mm)	Minimum Concrete Strength MPa (28 days)	Slump (mm)	Cement Type	%Air Entrainment
Slope Paving	20	35	80 ± 20	10	5 – 8
F-Shape Traffic Barrier	20	35	80 ± 20	10	5 – 8
Quadguard Crash Unit Slabs	20	35	80 ± 20	10	5 – 8

E41.4 Construction Methods

E41.4.1 Scope of Work

It is intended that this Specification covers the construction of cast-in-place concrete items, as indicated on the Drawings:

E41.4.2 Formliner

Plain formliner shall be used on all exposed formed surfaces. The installation of the formliner shall be in strict accordance with the manufacturer's recommendations.

E41.4.3 Formwork and Shoring

Formwork shall be designed, erected, braced and maintained to safely support all vertical and lateral loads until such loads can be supported by the concrete all in accordance with CSA Standard CAN/CSA S269.3.

Shoring shall be designed, erected, braced and maintained to safely support all vertical and lateral loads in accordance with CHBDC, until such time that the existing or newly constructed structure has sufficient capacity to support the intended loads. Any temporary shoring proposed to support vehicular traffic shall be designed in accordance to CHBDC.

Forms shall be clean before use. Plywood and other wood surfaces shall be sealed against absorption of moisture from the concrete by a factory-applied liner.

Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be commercially manufactured types. The portion remaining within the concrete shall leave no metal within 50 mm of the surface when the concrete is exposed to view. Spreader cones on ties shall not exceed 25 mm in diameter.

All exposed edges shall be chamfered 25 mm unless otherwise noted on the Drawings.

Brace shores horizontally in two directions and diagonally in the same two vertical planes so that they can safely withstand all dead and moving loads to which they will be subjected.

The loads and lateral pressures outlined in Part 3, Section 102 of "Recommended Practice for Concrete Formwork", (ACI 347) and wind loads as specified by the National Building Code shall be used for design. Additional design considerations concerning factors of

safety for formwork elements and allowable settlements outlined in Section 103 of the above reference shall apply.

Formwork shall be constructed to permit easy dismantling and stripping and such that removal will not damage the concrete. Provision shall be made in the formwork for shores to remain undisturbed during stripping where required.

Forms shall be constructed and maintained so that the completed work is within minus 3 mm or plus 6 mm of the dimensions shown on the Drawings.

Formwork shall be cambered, where necessary to maintain the specified tolerances, to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads.

Forms shall be sufficiently tight to prevent leakage of grout or cement paste.

Form panels shall be constructed so that the contact edges are kept flush and aligned.

Where required by the Contract Administrator, the Contractor shall cast test panels not using less than two panels of representative samples of the forms he proposes for reuse and shall strip them after 48 hours for the Contract Administrator to judge the type of surface produced.

All form lumber, studding, etc., becomes the property of the Contractor when the Work is finished, and it shall be removed from the concrete and the Site by the Contractor after the concrete is set, free of extra charge, and the entire Site left in a neat and clean condition.

It shall be permissible to use the forms over again where possible to a maximum of 3 uses, provided they are thoroughly cleaned and in good condition after being removed from the former portions of the Work. The Contract Administrator shall be the sole judge of their condition and his decision shall be final regarding the use of them again.

E41.4.4 Placing Concrete

The Contract Administrator must be notified at least 48 hours prior to concrete placing so that an adequate inspection may be made of formwork, shoring, reinforcement, and related Works. Concrete placed without required prior notification will be rejected.

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. Pumping of concrete will be allowed only on permission from the Contract Administrator and all equipment and processes are subject to acceptance.

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.

Runways for concrete buggies shall be supported directly by the formwork and not on reinforcement.

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.

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 of "cold joints" within the section. If placing must be interrupted, construction joints shall be located where shown on the Drawing or as accepted by the Contract Administrator, failure to do so will result in rejection and removal of concrete.

Concrete shall be placed as nearly as possible in its final position. Rakes or mechanical vibrators shall not be used to transport concrete.

The maximum drop of free 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.

All concrete, during and immediately after depositing, shall be consolidated by mechanical vibrators so (if recommended by producer) 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 7000 revolutions per minute immersed.

Vibrators shall be inserted systematically into the concrete at intervals such that the zones of influence of the vibrator overlap (generally 300 to 900 mm). Apply the vibrator at any point until the concrete is sufficiently compacted (5 to 15 seconds), but not long enough for segregation to occur. Spare vibrators in working condition shall be kept on the Site during all placing operations.

Concrete shall not be placed during rain or snow unless adequate protection is provided for formwork and concrete surfaces.

E41.4.5 Finishing of Concrete Surfaces

(a) Type 1 Finish – Exterior Exposed Surfaces

All exterior exposed formed surfaces shall be finished by applying a formliner, as outlined within this Specification, to the concrete formwork.

(b) Type 2 Finish - Unformed Surfaces

All unformed concrete surfaces shall be finished as outlined hereinafter.

Screeding of all unformed concrete surfaces shall be performed by the sawing movement of a straightedge along wood or steel strips or from edges that have been accurately set at required elevations.

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.

After screeding, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared. The surface shall then be consolidated with hand floats. Concrete surfaces after floating shall have a uniform, smooth, granular texture.

(c) Type 3 Finish – Unformed Bearing Surfaces

All unformed bearing surfaces and walkways shall be finished as outline hereinafter.

Broom finish of all unformed bearing surfaces to a minimum amplitude of 2 mm and a maximum amplitude of 5 mm.

(d) Type 4 Finish – Remaining Concrete Surfaces

All remaining concrete surfaces, not exposed to view in the completed structure shall be finished as outlined hereinafter.

All remaining concrete surfaces shall have the fins and irregular projections chipped off. Parch honeycomb and fill tie holes with mortar containing approved bonding agent. Mix according to manufacturer’s directions.

(e) Type 5 Finish – Rubbed Finish

Use on formed concrete surfaces. Remove fins and projections, patch honeycomb and fill tie holes as required. Saturate with water and rub with medium coarse

carborundum stone using a small amount of cement-sand mortar. Continue rubbing until a uniform surface with no irregularities is obtained. Do not remove the paste produced by this rubbing. Carry out final rubbing with a fine stone and water. After the surface is dry, remove loose powder by rubbing with burlap. Leave final surface free from unsound patches, paste, powder and objectionable marks.

E41.4.6 General Curing

Refer to E5.4.9 for cold weather curing requirements and E5.4.10 for hot weather curing requirements.

The use of curing compound will not be allowed.

Concrete shall be protected during the curing period 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 five (5) days after casting or concrete strength has reached 20 MPa.

Changes in temperature of the concrete shall be uniform and gradual and shall not exceed 3°C in one hour or 20°C in 24 hours.

Surfaces of concrete which are protected by formwork that is left in place for seven (7) days shall not require any additional curing. Forms will not be permitted to be removed prior to three full days from the time of completion of casting

E41.4.7 Form Removal

The Contract Administrator must be notified at least 24 hours prior to form removal and give approval prior to beginning work.

The concrete forms shall remain in place a minimum of three (3) days, unless otherwise accepted by the Contract Administrator.,

The minimum strength of concrete in place for safe removal of soffit forms for horizontal or inclined members shall be 25 MPa, with the added provision that the member shall be of sufficient strength to safely carry its own weight, together with super-imposed construction loads, and that the forms shall stay in place a minimum of five days unless otherwise accepted by the Contract Administrator.

Field-cured test specimens representative of the cast-in-place concrete being stripped, will be tested as specified in this Specification to verify the concrete strength.

E41.4.8 Patching of Formed Surfaces

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.

All formed concrete surfaces shall have bolts, ties, struts, and all other timber or metal parts not specifically required for construction purposes cut back seventy-five (75) mm from the surface before patching.

Minor surface defects caused by honeycomb, air pockets greater than 5 mm in diameter and voids left by strutting and tie holes shall be repaired by removing the defective concrete to sound concrete acceptable to the Contract Administrator, dampening the area to be patched and then applying patching mortar. A slurry grout consisting of water and cement, shall be well 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 surface and left for one hour before final finishing to permit initial shrinkage of the patching mortar, it shall be touched up until it is satisfactory to the Contract

Administrator. The patch shall be cured as specified in this Specification. The final colour shall match the surrounding concrete.

All objectionable fins, projections, offsets, streaks, or other surface imperfections shall be removed by means acceptable to the Contract Administrator. Cement washes of any kind shall not be used.

Concrete surfaces shall have a normal finish. Concrete shall be cast against forms, which 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, which will impair the texture of concrete surfaces, shall not be used.

E41.4.9 Cold Weather Concreting

The requirements of this section shall be applied to all concreting operations during cold weather; if the mean daily temperature falls below 5°C during placing or curing.

The Contract Administrator will advise the Contractor, in writing, as to the degree of heating of water and aggregates.

Supplementary equipment as required below shall be at the Site if concrete is likely to be placed in cold weather.

Formwork and reinforcing steel shall be heated to at least 10°C before concrete is placed.

The temperature of the concrete shall be maintained at not less than 10°C for 7 days or 15°C for 5 days or 20°C for 3 days after placing. The concrete shall be kept above freezing temperature for at least a period of 5 days or until the concrete reaches a strength of 20 MPa. 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 as determined from compressive strength tests on specimens cured under the same conditions as the concrete Works in question.

The temperature of the concrete at the time of placing in the forms shall be within the range specified in CSA Standard CAN/CSA A23.1-2000 for the thickness of the section being placed.

When the mean daily temperature may fall below 5°C, a complete housing of the Work, together with supplementary heat shall be provided.

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.

When the ambient temperature is below -15°C, the housing shall be constructed so as to allow the concrete to be placed without the housing having to be opened. If the mixing is done outside of the housing, the concrete shall be placed by means of hoppers installed through the housing. The hoppers are to be plugged when not in use.

When the ambient temperature is equal to or above -15°C, the Contractor will be permitted to open small portions of the housing for a limited time to facilitate the placing of the concrete.

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 housing to the specified 20°C at least 12 hours prior to the start of the concrete placing.

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.

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.

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, temperatures above and below the concrete within the enclosure, temperatures of 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 all times, and shall be turned over to the Contract Administrator at the end of concreting operations.

E41.4.10 Hot Weather Concreting

The requirements of this section shall be applied during hot weather, i.e. air temperatures above 25°C during placing.

Concrete shall be placed at as low a temperature as possible, preferably below 15°C but not above 27°C. Aggregate stockpiles may be cooled by water sprays and sun shades.

Ice may be substituted for a portion of the mixing water, providing it has melted by the time mixing is completed.

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 water sprays.

Sun shades and wind breaks shall be used as required during placing and finishing.

Work shall be planned so that concrete can be placed as quickly as possible to eliminate the possibility of "cold joints" from occurring at any location.

The Contract Administrator's acceptance 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.

Curing shall follow immediately after the finishing operation.

When the air temperature is at or above 25°C, or when there is probability of its rising to 25°C 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 below the formwork, reinforcement, and concreting equipment shall be protected from the direct rays of the sun or cooled by fogging and evaporation.

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 - 1	10	27
1.2	5	25

Moderate Drying Conditions:

When surface moisture evaporation exceeds 0.75 kg/m^2/h, windbreaks shall be erected around the sides of the structural element.

Severe Drying Conditions:

When surface moisture evaporation exceeds 1.0 kg/m^2/h, additional measures shall be taken to prevent rapid loss of moisture from the surface of the concrete. Such additional measures shall consist of the following:

(a) Erecting sunshades over the concrete during finishing and placing operations.
(b) Lowering the concrete temperature.
(c) Applying fog spray immediately after placement and before finishing. Care shall be taken to prevent accumulation of water that may reduce the quality of the cement paste.
(d) Beginning the concrete curing immediately after trowelling.

The nomograph, Figure D1, Appendix D of CSA Standard CAN/CSA A23.1-2000 shall be used to estimate surface moisture evaporation rates.

E41.4.11 Construction Joints

Construction joints shall be located only where shown on the Drawings or as otherwise accepted in writing by the Contract Administrator. Construction joints shall be at right angles to the direction of the main reinforcing steel. All reinforcing steel shall be continuous across the joints.

The face of joints shall be cleaned of all laitance and dirt, after which an epoxy adhesive bonding agent shall be applied. Forms shall be re-tightened and all reinforcing steel shall be thoroughly cleaned at the joint prior to concreting.

E41.5 Quality Control

E41.5.1 Inspection

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. The Contractor shall be wholly responsible for the control of all operations included 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.

E41.5.2 Access

The Contract Administrator shall be afforded full access for the inspection and control 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.

E41.5.3 Materials

All materials supplied under this Specification shall be subject to testing and acceptance by the Contract Administrator in accordance with E41.2.3.

E41.5.4 Concrete Quality

Quality control tests will be used to determine the acceptability of the concrete supplied by the Contractor, at the sole expense of the Contractor.

The Contractor shall provide, without charge, the samples of concrete and the constituent materials required for quality control tests and provide such assistance and use of tools and construction equipment as is required.

The frequency and number of concrete quality control tests shall be in accordance with the requirements of CSA Standard CAN/CSA-A23.1-2000.

An outline of the quality tests is as follows:

(a) Slump tests shall be made in accordance with CSA Standard test method CAN/CSA-A23.2-5C, "Slump of Concrete". If the measured slump falls outside the limits specified in E5.3.6, a second test shall be made.

In the event of a second failure, the concrete will be rejected. If the first test fails 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 CAN/CSA-A23.2-4C, "Air Content of Plastic Concrete by the Pressure Method". If the measured air content falls outside the limits specified in E5.3.6, 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 concrete will be rejected. After the first 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 CSA Test Method CAN/CSA A23.1-17C. The spacing factor, as determined on concrete cylinders moulded in accordance with CSA Standard test method CAN/CSA 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 will be carried out by the Contract Administrator. The concrete will be considered to have a satisfactory air-void system when the average of all tests shows a spacing factor not exceeding 230 microns with no single test greater than 260 microns.

(d) Samples of concrete for test specimens shall be taken in accordance with CSA Standard Test Method CAN/CSA-A23.2-1C, "Sampling Plastic Concrete".

(e) Test specimens shall be made and cured in accordance with CSA Standard Test Method CAN/CSA-A23.2-3C, "Making and Curing Concrete Compression and Flexure Test Specimens".

(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 companion standard-cured test specimens shall be determined in accordance with CSA Standard Test Method CAN/CSA-A23.2-9C, "Compressive Strength of Cylindrical Concrete Specimens", and the test result shall be the average of the strengths of the two specimens. A compressive strength test at seven (7) days shall be taken, the strength of which will 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 compressive strength as specified in E5.3.6 and also to check the adequacy of curing and/or cold weather protection. At least two (2) field-cured test specimens will be taken to verify strength of the in-place concrete. For each field-cured strength test, the strength of a single field-cured test specimen shall be determined in accordance with CSA Standard test method CAN/CSA-A23.2-9C, "Compressive Strength of Cylindrical Concrete Specimens", and the test result shall be the strength of the specimen.

E41.5.5 Corrective Action

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 own expense, correct such work or replace such materials found to be defective under this Specification in an approved manner to the satisfaction of the Contract Administrator.

E41.6 Measurement and Payment

E41.6.1 Method Of Measurement

Structural Concrete

The supply and placement of structural concrete shall be measured on a lump sum basis for each category of concrete. No measurement will be made for this work.

E41.6.2 Basis Of Payment

Structural Concrete

The supply and placement of structural concrete will be paid for at the Contract Lump Sum Price for "Structural Concrete" of the various components listed below, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items included in this item of Work.

All formwork materials, accessories, heating and hoarding, 20 crushed limestone and grouted stone riprap, as indicated, are part of the supply and placement of structural concrete and no additional payment shall be made for this Work unless indicated otherwise.

Items of Work

(i) Slope Paving
(ii) F-Shape Traffic Barriers
(iii) Quad Guard Crash Unit Slab

E42. REINFORCING STEEL FOR SLOPE PAVING, F-SHAPED TRAFFIC BARRIER, AND QUADGUARD BASE

E42.1 Description

This Specification shall cover the supply, fabrication, and placement of reinforcing steel for slope paving, F-Shaped traffic barrier, and quadguard base.

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 satisfactory performance and completion of all Work as hereinafter specified.

E42.2 Materials

E42.2.1 General

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

E42.2.2 Handling and Storage of Materials

All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with the requirements of CSA Standard CAN/CSA G30.18, except as otherwise specified herein.

E42.2.3 Reinforcing Steel

Reinforcing steel shall be deemed to include all reinforcing bars, tie-bars, and dowels.

All reinforcing steel shall be supplied in accordance with the reinforcing schedules as shown on the Drawings.

All reinforcing steel shall conform to the requirements of the latest edition of the CSA Standard CAN/CSA G30.18, Grade 400 MPa, Billet-Steel Bars for Concrete Reinforcement. If, in the opinion of the Contract Administrator, any reinforcing steel provided for the concrete works exhibit flaws in the manufacture or fabrication, such material shall be immediately removed from the Site and replaced with acceptable reinforcing steel.

All reinforcing steel shall be straight and free from paint, oil, millscale, and injurious defects. Rust, surface seams, or surface irregularities will not be cause of 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 CSA Standard CAN/CSA G30.18.

E42.2.4 Bar Accessories

Bar accessories shall be of a type acceptable to the Contract Administrator. They shall be made from a non-rusting material or galvanized steel, and they shall not stain, blemish, or spall the concreted surface for the life of the concrete. Bar chairs are to be PVC; galvanized bar chairs are not acceptable.

Bar accessories are not included in the Drawings and shall include bar chairs, spacers, clips, wire ties, wire (18 gauge minimum), or other similar devices and are to be acceptable to the Contract Administrator. The supplying and installation of bar accessories shall be deemed to be included in the supplying and placing of reinforcing steel.

E42.3 Construction Methods

E42.3.1 Fabrication of Reinforcing Steel

Reinforcing steel shall be fabricated in accordance with CSA Standard CAN/CSA G30.18, latest edition, to the lengths and shapes as shown on the Drawings.

E42.3.2 Placing of Reinforcing Steel

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.

Reinforcing steel shall be free from 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.

Splices in reinforcing steel shall be made only where indicated on the Drawings. Prior approval of the Contract Administrator shall be obtained where other splices must be made. Welded splices will not be permitted.

Replacement Reinforcing shall be placed accurately in-line with existing reinforcing. Laps, when required shall be typical Class B splices for reinforcing steel. Drilled and epoxy grouted reinforcing shall be embedded as specified on the drawings, or as indicated by the Contract Administrator and installed as required.

Reinforcing steel shall not be straightened or rebent in a manner that will injure the metal. Bars with bends not shown on the Drawings shall not be used. Heating of reinforcing steel will not be permitted without prior approval of the Contract Administrator. A minimum of twenty-four (24) hours advance notice shall be given to the Contract Administrator prior to the pouring of any concrete to allow for inspection of the reinforcement.

E42.4 Quality Control

E42.4.1 Inspection

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. 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.

E42.4.2 Access

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.

E42.4.3 Quality Testing

Quality control testing will be used to determine the acceptability of the reinforcing steel supplied by the Contractor.

The Contractor shall provide, without charge, the samples of reinforcing steel required for quality control tests and provide such assistance and use of tools and construction equipment as is required.

E42.5 Measurement and Payment

E42.5.1 Method of Measurement

The supplying and placing of reinforcing steel will be measured on a mass basis. The mass to be paid for shall be the total number of kilograms of reinforcing steel installed in accordance with this Specification, accepted by the Contract Administrator, as computed from the approved reinforcing layout shown on the Drawings, excluding the mass of bar accessories.

E42.5.2 Basis Of Payment

The supplying and placing of reinforcing steel shall be paid for at the Contract Unit Price per kilogram for “Reinforcing Steel”, 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.

E43. MODULAR BLOCK RETAINING WALL

E43.1 Description

This specification shall cover all operations related to the supply and installation of modular block retaining walls, as herein specified.

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.

E43.2 Materials

Concrete blocks to be RomanPisa 150 mm (H) x 200 mm (W) x 300 mm (D), natural grey, by RisiStone Retaining Wall Systems available through Barkman Concrete, or approval equal.

Reinforced earth system to be Pisa2 by RisiStone Retaining Wall Systems available through Barkman Concrete, or approved equal.

Base course/granular fill to be to CW3110 or approved equal.

E43.3 Submittals

Contractor to submit sealed design drawings and calculations to Contract Administrator for review no later than 4 weeks prior to wall installation. Retaining wall design to be in accordance with recommendations in Section 6.2 of Appendix A-Geotechnical Report. Details to include:

- *Plan of entire length of wall,*
- *Elevation of wall indicating top and bottom of wall elevations,*
- *Sections through walls,*
- *All vertical and horizontal break points and running dimensions to break points,*
- *Designation of type and size of blocks including caps,*
- *Limits and extent of reinforced fill volume,*
- *Length, size, type and elevation of every layer of geogrid reinforcement,*
- *Running dimension to changes in length of the geogrid reinforcement,*
- *The original and final ground elevations,*
- *Location of drain lines within geogrid reinforcement, and*
- *General notes required for construction.*

Samples of modular concrete blocks and soil reinforcing materials to be submitted 4 weeks prior to wall installation.

E43.4 Construction Methods

Compact subgrade to minimum 95% of standard proctor density prior to placement of wall foundation/base course material.

Granular base to be compacted to thicknesses indicated on the sealed design drawings and specified in CW3110 except that layers shall not exceed 150 mm of compacted thickness. Compact reinforced backfill to 95% of standard proctor density.

Moisture content of backfill material before and during compaction shall be uniformly distributed throughout each layer and shall be within about 3% of optimum.

Only lightweight, hand operated compaction equipment shall be allowed within 600 mm of the face of the concrete units.

Tracked construction equipment shall not be operated directly upon geogrid reinforcing on within 1 m of concrete units. Minimum fill thickness of 150 mm is required prior to operation of tracked vehicles over geogrid. Tracked vehicle turning should be kept to a minimum to prevent tracks from displacing fill and damaging the geogrid.

Any damage to the geogrid reinforcing or other components of the wall caused the Contractor shall be repaired at the Contractor's expense.

Minimize cutting block. Cut exposed block with power driven abrasive cutting disc or diamond cutting wheel for flush-mounted electrical outlets, grilles, pipes, conduit, leaving 3.0 mm maximum clearance.

Caps to be positively secured, with landscaping block adhesive, to prevent removal.

E43.5 Measurement and Payment

E43.5.1 Method of Measurement

Modular block retaining wall is a lump sum item; there is approximately 80 m^2. No measurement will be made for this work.

E43.5.2 Basis of Payment
Modular block retaining wall will be paid for at the Contract Lump Sum Price for "Modular Block Retaining Wall", which price shall be payment in full for supplying all materials and performing all operations herein described and all other items included in the work in this Specification.

E44. TIMBER BUMPER FENCE AND CURB

E44.1 Description
This specification shall cover all operations related to the supply and installation of the timber bumper fence and curb adjacent to the modular block retaining wall and adjacent to the pumping station, as herein specified.

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 the satisfactory performance and completion of all work hereinafter specified.

E44.2 Materials
Timbers to be S.P.F. No. 2 grade or better, pressure treated. Bolts to connect rails to posts shall be ½" dia. galvanized carriage bolts. Concrete curb shall be standard pre-cast acceptable to Contract Administrator.

E44.3 Construction Methods
Install timber bumper fence and curb as indicated on drawings and to good workmanship. Install curbs to lines and as indicated on drawings.

E44.4 Measurement and Payment

E44.4.1 Method of Measurement
Timber bumper fence and curb is a lump sum pay item. Approximate quantity is 65 m for timber bumper fence and curb adjacent to the modular block retaining wall and 5m for timber bumper fence only adjacent to the pumping station. No measurement will be made for this work.

E44.4.2 Basis of Payment
Timber bumper fence and curb will be paid for at the Contract Lump Sum Price for "Timber Bumper Fence and Curb", which price shall be payment in full for supplying all materials and performing all operations herein described and all other items of work included in this Specification.

E45. ELECTRICAL SCOPE OF WORK

E45.1 Description
This Work shall consist of furnishing of al labour, material, equipment and all incidentals required for the electrical site services upgrade. Work shall include but not be limited to:

(a) Disconnect and remove existing parking lot fence, car-block heater receptacles, power distribution panel, etc., as indicated on drawings.

(b) Disconnect and abandon underground power conductors associated with the above noted equipment as indicated.

(c) Installation of new customer metering centre as indicated.

(d) Installation and connection of all required power conductors from new metering centre to existing railway bridge lighting fixtures (installation under previous contract).

E45.2 Materials

E45.2.1 Trenching and Backfilling

(a) Trenching shall be approximately 1000 mm in depth, width to suit proper installation.

(b) Backfill for trenches for all direct buried cables, ducts, conduits, etc., shall consist of fine sand (minimum 100 mm below and above cables, etc.) and firmly compacted.

(c) All direct buried cables, ducts, etc., crossing over each other or over/under other types of underground service shall be in wood planks treated with pentachlorophenol.

(d) Frozen earth, large lumps or boulders shall not be used for backfill material.

(e) Provide pentachlorophenol treated wood planks over all buried cables, etc., under existing or future roads and sidewalks.

(f) Provide conduit sleeves under all parking, concrete and traffic areas for cables.

(g) Where cables enter buildings provide a vertical 100 x 250 mm white sign with black wording ELECTRICAL CABLES securely fastened to the building wall approximately 300 mm above finished grade.

E45.2.2 Cable Protection

(a) Provide identification tape labelled as indicated showing location of direct buried cables.

E45.2.3 Fish Cord

(a) Polypropylene c/w 3 m spare length at each conduit end.

E45.2.4 Low Voltage Wire 1000 Volt and Below

(a) All wire shall have stranded, annealed copper or compact stranded 8000 Series aluminium alloy conductors, 600 volt rating, cross-linked polyethylene (XLPE) insulation, minus 40^0C, 90^0 C maximum conductor temperature, limited flame spread.

(b) The wiring shall be suitable for installation in wet environment and rated RW-90.

(c) For direct buried installations or for installation in direct buried polyethylene pipe, the cable shall be cross linked polyethylene, rated RWU-90.

(d) Minimum conductor size shall be #12 AWG unless otherwise specified. #14 AWG may be used for control wiring, #6 for aluminium.

(e) Use GTF fixture wire, 600 volt, 125 C. flexible copper conductor for all connections between lighting fixtures and outlet boxes.

(f) Color coding of insulated conductors shall conform to the following:

Single Phase Systems

Phase A	Red
Phase B	Black
Neutral	White
Ground	Green

Three Phase Four Wire Systems

Phase A	Red
Phase B	Black
Phase C	Blue
Neutral	White
Ground	Green

(g) Insulated ground conductors forming part of a multi-conductor cable assembly shall have green colour coding.

(h) Cable and wire shall be as manufactured by Alcatel Canada Wire Inc., Phillips Cables Ltd., Pirelli Cables Inc., or Alcan Cable Inc.

E45.2.5 Teck Cable / ACWU90

(a) Conductors:
  (i) Grounding conductor: copper or 8000 series Aluminum
  (ii) Circuit conductors: copper or 8000 series aluminum, size as indicated

(b) Insulation:
  (i) Chemically cross-linked thermosetting polyethylene rated RW90, 600 volt

(c) Inner Jacket: polyvinyl chloride material (Teck cable)

(d) Armor: Interlocking aluminum

(e) Overall covering PVC material, colour black, flame retardant, FT4 rated, AG14.

(f) Fastenings:
  (i) One hole aluminum straps to secure surface cables 50 mm and smaller. Two hole straps for cables larger than 50 mm. All straps to have inert spacers between spacer and concrete.
  (ii) Channel type supports for two or more cables.
  (iii) 3/8” diameter threaded rods to support suspended channels.

(g) Connectors:
  (i) Watertight approved for Teck or ACWU90 cables.

(h) Lugs:
  (i) Dual rated AL7CU or AL9CU and listed by CSA for use with Aluminum or Copper conductors and sized to accept aluminium conductors of the ampacity specified.

E45.2.6 Wiring Accessories

(a) Wire markers, black letters on white background, shall be heat shrink type as manufactured by Critchley,

(b) Cable markers for cables or conductors greater than 13 mm (1/2 inch) diameter, shall be strap-on type rigid PVC, black letters on white background, with PVC covered aluminum straps, as manufactured by Electrovert Cat. No. 510.

(c) Terminal blocks shall be minimum 600 volt rated, modular, sized to accommodate conductor size used, as manufactured by Weidmuller, Phoenix, or Allen-Bradley.

(d) Where screw-type terminals are provided on equipment, field wiring shall be terminated with insulated fork tongue terminals, as manufactured by Thomas & Betts, or Sta-Kon.

(e) Splice connectors for wire sizes #14-10 AWG inclusive, shall be of the waterproof compression spring type, as manufactured by Ideal.

(f) Splice connectors for wire sizes #8 AWG and larger shall be split-bolt type, sized to suit number and size of conductors, as manufactured by Burndy Servit Type KS.

(g) Cable ties shall be nylon, one-piece, self-locking type, as manufactured by Thomas & Betts, Burndy, Electrovert.

(h) Electrical insulating tape as manufactured by 3M Scotch 88.

(i) Cable grips shall be provided for all vertical and catenary cable suspension installations to reduce cable tension at connectors or at cable bends. The cable grips shall be selected to accommodate the type and geometry of cable supported and shall be of the single wave, variable mesh design, as manufactured by Kellerms, Arrow-Hart.

(j) Cable pulling lubricant shall be compatible with cable covering and shall not cause damage and corrosion to conduits or ducts.

E45.2.7 Customer Metering Centre

(a) Enclosure shall be CSA 3R rated, low profile padmount design, free standing.

(b) Metering centre shall be 60A, 347/ 600V, 3Ø, 4W, 25kA I.C, service entrance approved by Manitoba Hydro.

(c) Single outer door with 3 point latching and padlocking provision.

(d) 13 x 25mm copper ground bus;

(e) Stepped bus assembly of tin plated aluminum,

(f) Constructed from 12 gauge minimum steel, welded IAW CWB 47.1 Standards.

(g) Paint finish shall be 2 coats of outdoor UV and rust resistant urethane over zinc based rust inhibitive primer. Colour to be ASA #61 grey.

(h) 2-2 hole NEMA studs for line conductors.

(i) Lug provisions for load conductors.

(j) Cantruss wire support channel for line/load conductors.

(k) Mounting provisions for potential/ current transformers.

(l) Quality assurance standard – ISO 9001/94.

(m) 60 A, 3P service entrance rated main breaker

(n) 2-15A, 1P, 1-5A, 1P circuit breakers

(o) 347V: 120V control transformer

(p) Hand/ Off/ Auto Selector switch.

(q) 2-15A, 120V rated lighting contactors.

(r) Outdoor panel mounted photocell c/w shield.

(s) Acceptable manufacturer shall be JR Stephenson MFG. Ltd.

E45.3 Construction Methods

E45.3.1 Direct Burial of Cables

(a) After specified sand bed is in place, lay cables in trench, maintaining a 75 mm minimum clearance from each side of trench to nearest cable. Do not pull cable into trench.

(b) Provide offsets for thermal action and minor earth movements. Offset cables 150 mm for each 60 M run, maintaining minimum cable separation and bending radius requirements.

(c) Underground cable splices not acceptable.

(d) Minimum permitted radius at cable bends for rubber, plastic or lead covered cables, 8 times diameter of cable; for metallic armoured cables, 12 times diameter of cables or in accordance with manufacturer’s instructions.

(e) Maintain 75 mm minimum separation between cables of different circuits. Maintain 300 mm horizontal separation between low and high voltage cables. When low voltage cables cross high voltage cables maintain 300 mm vertical separation with low voltage cables in upper position. At crossover, maintain 75 mm minimum vertical separation between low voltage cables and 150 mm between high voltage cables. Maintain 300 mm minimum lateral and vertical separation.

(f) After sand protective cover is in place, install continuous row of overlapping 38 x 140 mm pressure treated planks as indicated to cover length of run.

E45.3.2 Underground Cable Quality Control

(a) Perform tests using qualified personnel. Provide necessary instruments and equipment.

(b) Check phase rotation and identify each phase conductor of each feeder.

(c) Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.

(d) Pre-acceptance test.

(i) After installing cable but before terminating, perform insulation resistance test with 1000 V megger on each phase conductor.

(ii) Check insulation resistance after each splice an/or termination to ensure that cable system is ready for acceptance testing.

(e) Provide Contract Administrator with list of test results showing location at which each test was made, circuit tested and result of each test.

(f) Remove and replace entire length of cable if cable fails to meet any of test criteria.

(g) Contractor responsible for making all necessary repairs to installation resulting from improper backfilling, compaction, etc.

E45.3.3 Wire and Cable Installation

(a) Install all wire according to the drawings with a minimum size of #12 AWG unless indicated otherwise.

(b) Pull wire into ducts and conduits in accordance with the manufacturer's recommendations, using patented wire grips suitable for the type of wire or using pulling eyes to be installed directly onto the conductors.

(c) Limit pulling tensions to those recommended by the manufacturer to avoid overstressing wire.

(d) Utilize adequate lubricant when pulling wires through ducts and conduits to minimize wear on cable jackets.

(e) Make connections to equipment "pig-tails" with mechanical, insulated, screw-on connectors for wire sizes #`14-10 AWG. For wire sizes #8 AWG and larger utilize split-bold connectors, taped with three layers minimum of insulating tape. For both copper and aluminium terminations, wire through the conductor, apply joint compound anti-oxidant, and torque to lug manufacturer's recommended torque levels.

(f) No splices shall be permitted in cable or wiring runs without the written permission of the Contract Administrator, and shall only be permitted in junction boxes.,

(g) Neutral conductors shall be identified. Paint or other means of colouring the insulation shall not be used.

(h) Unless otherwise specified, make all wiring taps, splices and terminations with identified compression screw type terminal blocks, securely fastened to avoid loosening under vibration or normal strain. Make connections for interior and exterior

lighting circuits and 120 volt, 15 amp convenience receptacle circuits using screw-on or split-bolt connectors and insulating tape.

(i) Determine the exact length of cable required to avoid splices.

(j) Identify each conductor by specified markers at each termination indicating the circuit designation or wire number.

(k) Identify each cable by attaching a suitable marker, stamped or indelibly marked with the cable number, at each end of the cable and in all junction boxes and pull boxes.

E45.4 Method of Measurement

All electrical Works as specified in the Schedule of Prices and show on the Drawing will be measure on unit basis. The number of each item to be paid for will be the total number placed in accordance with this Specification and accepted by the Contract Administrator, as computed by the Contract Administrator.

E45.5 Basis of Payment

All electrical Works in this Contract will be measured and will be paid for at the lump sum Contract Unit Price for "Electrical Work", which shall be payment in full for supply of all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

(i) Removal of outdoor car-block heater power panel;

(ii) Removal of outdoor car block heater receptacles and wooden fence;

(iii) Installation of pad mounted customer metering centre;

(iv) Underground trenching and cabling from customer metering centre to existing railway bridge lighting system conduit stub;

(v) Installation and connection of all required power conductors to existing railway bridge lighting fixtures (installed under previous contract).

E46. ENVIRONMENTAL PROTECTION PLAN

E46.1 The Contractor shall plan and implement the Work of this Contract strictly in accordance with the requirements of the Environmental Protection Plan as herein specified.

E46.2 The Contractor is advised that at least the following Acts, Regulations and By-laws apply to the Work and are available for viewing online at the applicable websites or at the office of the Contract Administrator.

E46.3 Federal

(a) Canadian Labour Code

(b) Workplace Health and Safety Act

(c) Canada Transportation Act

(d) Canadian Environmental Assessment Act and Regulations

(e) Canadian Environmental Protection Act and Regulations

(f) Migratory Birds Convention Act and Regulations

(g) Species at Risk Act

(h) Railway Safety Act and Notice of Railway Work Regulation

(i) Transportation of Dangerous Goods Act and Regulations

E46.4 Province of Manitoba

(a) The Environment Act
(b) Litter Regulation
(c) Waste Disposal Grounds Regulation
(d) Storage and Handling of Gasoline and Associated Products Regulation
(e) The Dangerous Goods Handling and Transportation Act
(f) Polychlorinated Biphenyl Storage (PCB) Site Regulation
(g) Environmental Accident Reporting Regulations
(h) Generator Registration and Carrier Licensing Regulation
(i) Manifest Regulation
(j) The Fires Prevention Act and Regulation
(k) The Public Health Act
(l) Collection and Disposal of Wastes Regulation
(m) The Ozone Depleting Substances Act and Regulations
(n) The Waste Reduction and Prevention Act and Regulations
(o) The Workplace Safety and Health Act and Regulations
(p) The City of Winnipeg Act
(q) The Contaminated Sites Act
(r) The Heritage Resources Act
(s) The Sustainable Development Act
(t) And current applicable associated regulations (Note: Provincial regulations updated as of September 1999)

E46.5 City of Winnipeg

City of Winnipeg By-Laws (http://Winnipeg.ca/clerks/docs/bylaws/bylaws.stm) application to the Kenaston Underpass Bridge Construction includes the following:

(a) Alarms By-Lay 4676/87
(b) Anti-Litter By-Law 1075/75
(c) Development Fees By-Law No. 6965/97
(d) Electrical Inspections By-Law 7436/99
(e) Encroachment on Streets By-Law 692/74
(f) Fire Prevention By-Law 1322/76
(g) Noise Control By-Law 2480/79
(h) Sewer By-Law 7070/97
(i) Pigeon Control By-Law 978/75
(j) Solid Waste By-Law 1340/76
(k) Waterworks By-Law 504/73
(l) Traffic By-Law 1573/77
(m) City of Winnipeg Noise Policy and Guidelines.

E46.6 The Contractor is advised that the Environmental Approval has been issued for this project.

E46.7 The Contractor is advised that the Environmental Screening Report for the Kenaston Underpass Project, dated March 2005, applies to the Work and is available for viewing at the office of the Contract Administrator. A specific reference of the Environmental Screening Report Table 6.3 and letter of agreement is included in Appendix C and describes the mitigation measures to be adhered to by the Contractor.

E46.8 The Contractor is advised that the following environmental protection measures apply to the Work.

E46.9 Materials Handling and Storage

(a) Storage of construction materials shall be confined to the defined lay down areas as shown on the Contract Drawings.

(b) Construction materials shall not be deposited or stored on or near drainage ditches unless written acceptance from the Contract Administrator is received in advance.

(c) Construction materials and debris shall be prevented from entering the land drainage system. In the event that materials and/or debris inadvertently enter the land drainage system, the Contractor shall be required to remove the material and restore the land drainage system to its original condition.

E46.9.1 Fuel Handling and Storage

(a) The Contractor shall obtain all necessary permits from Manitoba Environment for the handling and storage of fuel products and shall provide copies to the Contract Administrator.

(b) All fuel handling and storage facilities shall comply with The Dangerous Goods and Transportation Act Storage and Handling of Petroleum Products Regulation and any local land use permits.

(c) Fuels, lubricants, and other potentially hazardous materials as defined in The Dangerous Goods and Transportation Act shall be stored and handled within the approved storage areas.

(d) The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage.

(e) Products transferred from the fuel storage area(s) to specific Work Sites shall not exceed the daily usage requirement.

(f) When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheet of suitable material (such as HDPE) and size shall be spread on the ground to catch the fluid in the event of a leak or spill.

(g) Refuelling of mobile equipment and vehicles shall take place at least 100 metres from a watercourse.

(h) The area around storage Sites and fuel lines shall be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.

(i) A sufficient supply of materials, such as absorbent material and plastic oil booms, to clean up minor spills shall be stored nearby on-Site. The Contractor shall ensure that additional material can be made available on short notice.

E46.9.2 Waste Handling and Disposal

(a) The construction area shall be kept clean and orderly at all times during and at completion of construction.

(b) At no time during construction shall personal or construction waste be permitted to accumulate for more than one day at any location on the construction Site, other than at a dedicated storage area as may be approved by the Contract Administrator.

(c) The Contractor shall during and at the completion of construction, clean-up the construction area and all resulting debris shall be deposited at a Waste Disposal Ground operating under the authority of Manitoba Regulation #150/91. Exceptions are liquid industrial and hazardous wastes, which require special disposal methods (refer to Section 30.5.D).

(d) Indiscriminate dumping, littering, or abandonment shall not take place.

(e) No on-Site burning of waste is permitted.

(f) Waste storage areas shall not be located so as to block natural drainage.

(g) Runoff from a waste storage area shall not be allowed to cause siltation of a watercourse.

(h) Waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.

(i) Equipment shall not be cleaned near watercourses; contaminated water from onshore cleaning operations shall not be permitted to enter watercourses.

E46.9.3 Dangerous Goods/Hazardous Waste Handling and Disposal

(a) Dangerous goods/hazardous waste are identified by, and shall be handled according to, The Dangerous Goods Handling and Transportation Act and Regulations.

(b) The Contractor shall be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.

(c) The Contractor shall have on Site staff that is trained and certified in the handling of the dangerous/hazardous goods, when said dangerous/hazardous goods are being utilized on Site for the performance of the Work.

(d) Different waste streams shall not be mixed.

(e) Disposal of dangerous goods/hazardous wastes shall be at approved hazardous waste facilities.

(f) Liquid hydrocarbons shall not be stored or disposed of in earthen pits on Site.

(g) Used oils shall be stored in appropriate drums, or tankage until shipment to waste oil recycling centres, incinerators, or secure disposal facilities approved for such wastes.

(h) Used oil filters shall be drained, placed in suitable storage containers, and buried or incinerated at approved hazardous waste treatment and disposal facilities.

(i) Dangerous goods/hazardous waste storage areas shall not be located so as to block natural drainage.

(j) Runoff from a dangerous goods/hazardous waste storage area shall not be allowed to cause siltation of a watercourse.

(k) Dangerous goods/hazardous waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.

E46.9.4 Emergency Response

(a) The Contractor shall ensure that due care and caution is taken to prevent spills.

(b) The Contractor shall report all major spills of petroleum products or other hazardous substances with significant impact on the environment and threat to human health and safety (as defined in Table 1 below) to Manitoba Environment, immediately after occurrence of the environmental accident, by calling the 24-hour emergency phone number (204) 945-4888.

(c) The Contractor shall designate a qualified supervisor as the on-Site emergency response coordinator for the project. The emergency response coordinator shall have the authority to redirect manpower in order to respond in the event of a spill.

(d) The following actions shall be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on-Site emergency response coordinator:

(i) Notify emergency-response coordinator of the accident:

- identify exact location and time of accident
- indicate injuries, if any
- request assistance as required by magnitude of accident (Manitoba Environment 24-hour Spill Response Line (204) 945-4888, Police, Fire Department, Ambulance, company backup)

(ii) Attend to public safety:

- stop traffic, roadblock/cordon off the immediate danger area
- eliminate ignition sources
- initiate evacuation procedures if necessary

(iii) Assess situation and gather information on the status of the situation, noting:

- personnel on Site
- cause and effect of spill
- estimated extent of damage
- amount and type of material involved
- proximity to waterways, sewers, and manholes

(iv) If safe to do so, try to stop the dispersion or flow of spill material:

- approach from upwind
- stop or reduce leak if safe to do so
- dyke spill material with dry, inert absorbent material or dry clay soil or sand
- prevent spill material from entering waterways and utilities by dyking
- prevent spill material from entering manholes and other openings by covering with rubber spill mats or dyking

(v) Resume any effective action to contain, clean up, or stop the flow of the spilled product.

(e) The emergency response coordinator shall ensure that all environmental accidents involving contaminants shall be documented and reported to Manitoba Environment according to The Dangerous Goods Handling and Transportation Act Environmental Accident Report Regulation 439/87.

(f) When dangerous goods are used on Site, materials for containment and cleanup of spill material (e.g. absorbent materials, plastic oil booms, and oversized recovery drums) shall be available on Site.

(g) Minor spills of such substances that may be contained on land with no significant impact on the environment may be responded to with in-house resources without formal notification to Manitoba Environment.

(h) City emergency response, 9-1-1, shall be used if other means are not available.

Table 1 Spills That Must be Reported to the Manitoba Conservation as Environmental Accidents		
Classification	**Hazard**	**Reportable Quantity/Level**
1	Explosives	All
2.1	Compressed Gas (flammable)	100 L*
2.2	Compressed Gas	100 L*
2.3	Compressed Gas (toxic)	All
2.4	Compressed Gas (corrosive)	All
3	Flammable Liquids	100 L
4	Flammable Solids	1 kg
5.1 PG** I & II	Oxidizer	1 kg or 1 L
PG III	Oxidizer	50 kg or 50 L
5.2	Organic Peroxide	1 kg or 1 L
6.1 PG I	Acute Toxic	1 kg or 1 L
PG II & III	Acute Toxic	5 kg or 5 L
6.2	Infectious	All
7	Radioactive	Any discharge or radiation level exceeding 10 mSv/h at the package surface and 200 uSv/h at 1 m from the package surface
8	Corrosive	5 kg or 5 L
9.1	Miscellaneous (except PCB mixtures)	50 kg
9.1	PCB Mixtures	500 g
9.2	Aquatic Toxic	1 kg or 1 L
9.3	Wastes (chronic toxic)	5 kg or 5 L
*Container capacity (refers to container water capacity) **PG = Packing Group(s)		

E46.9.5 Noise

(a) Noise-generating activities shall be limited to the hours indicated in the City of Winnipeg Noise Bylaw, and the Province of Manitoba Environment Act Licence, unless otherwise accepted in writing, in advance by the Contract Administrator.

(b) The Contractor shall be responsible for scheduling Work to avoid potential noise problems and/or employ noise reduction measures to reduce noise to acceptable limits. The Contractor shall also demonstrate to the Contract Administrator that Works to be preformed during the night-time period, on Sundays, and Holidays as stated in the Licence shall not exceed the approved limit.

E46.9.6 Dust

(a) Dust control practices implemented by the Contractor during construction shall include regular street cleaning and dampening of construction access roads and Work areas with water or approved chemicals at an adequate frequency to prevent the creation of dust.

(b) Only water or chemicals approved by the Contract Administrator shall be used for dust control. The use of waste petroleum or petroleum by-products is not permitted.

(c) The Contractor shall ensure that trucks which are used to haul excavated material and backfill material to and from the Site utilize tarpaulin covers during transport to prevent material from falling onto the street and creating dust.

(d) Stockpiled soils shall be covered with tarpaulin covers to prevent the creation of dust.

E46.9.7 Erosion Control

(a) The Contractor shall develop a sediment control plan prior to beginning construction to the satisfaction of the Contract Administrator.

(b) Sediment control fencing, or other such erosion control structures, shall be employed wherever construction activity increases the potential for runoff to carry sediment into a drainage channel or other watercourse. The Contractor shall inspect all such structures daily during heavy construction activity in the areas of the structures and after a heavy rainfall to ensure their continued integrity.

(c) All areas disturbed during construction shall be landscaped and revegetated with native and/or introduced plant species in order to restore and enhance the Site and to protect against soil erosion unless otherwise indicated.

(d) The disturbed surface shall be revegetated so as to create a dense root system in order to defend against soil erosion on the right-of-way and any other disturbed areas susceptible to erosion.

(e) The loss of topsoil and the creation of excessive dust by wind during construction shall be prevented by the addition of temporary cover crop, water, or tackifier, if conditions so warrant.

E46.9.8 Runoff Control

(a) Measures shall be undertaken to ensure that runoff containing suspended soil particles is minimized from entering the land drainage system to the extent possible to the satisfaction of the Contract Administrator.

(b) Areas that are heavily disturbed and vulnerable to erosion or gullying shall be dyked to redirect surface runoff around the area prior to spring run-off.

(c) Construction activities on erodible slopes shall be avoided during spring run-off and heavy rainfall events.

E46.9.9 Vegetation

(a) Right-of-way clearing shall be restricted to areas identified on the Construction Drawings.

(b) Rare, endangered, or threatened plant species shall be protected as specified in the Environmental Screening Report, if encountered.

(c) Vegetation shall not be disturbed without written permission from the Contract Administrator.

(d) The Contractor shall protect plants or trees, which may be at risk of accidental damage as specified in the Environment Screening Report. Such measures may include protective fencing or signage and shall be approved in advance by the Contract Administrator.

(e) Herbicides and pesticides shall not be used adjacent to any surface watercourses.

(f) Trees or shrubs shall not be felled into watercourses.

(g) Areas where vegetation is removed during clearing, construction, and decommissioning activities, shall be revegetated as soon as possible in accordance with the landscaping plans forming part of the Contract, or as directed by the Contract Administrator.

(h) Trees damaged during construction activities shall be examined by bonded tree care professionals. Viable trees damaged during construction activities shall be pruned according to good practice by bonded tree care professionals.

(i) Damaged trees which are not viable shall be replaced at the expense of the Contractor.

E46.9.10 Landscaping

(a) Construction waste (excluding common construction gravel, sand etc.) shall be removed to a minimum depth of 600 mm below final grade in all areas that are to be backfilled with suitable material and revegetated in accordance with Standard City Practice.

(b) The Contractor shall adhere to the landscaping plan for maintenance of initial stages and development stages of the plant community.

E46.9.11 Heritage Resources

(a) If heritage material is located during the construction and soil removal process, all Work shall cease and the Contractor shall immediately contact the Contract Administrator. The Historic Resources Branch, Manitoba Culture, Heritage and Tourism, or the Project Archaeologist, shall be contacted by the Contract Administrator to determine the nature and extent of the archaeological material and to arrange for its recovery. The archaeological remains shall be recovered by salvage excavation upon authorization by the Contract Administrator, having consulted with the Historic Resources Branch, Manitoba Department of Culture, Heritage and Tourism.

(b) The Contractor shall be prepared to continue his Work elsewhere on the project while the Archaeologist investigates the finding and determines it heritage value.

(c) The Contractor is advised that he may be denied access to such areas of the project until such time as a thorough archaeological investigation is conducted or the find is deemed to have no heritage value.

(d) Construction and excavation Work shall not resume until the Contract Administrator, having consulted with the Historic Resources Branch, Manitoba Culture, Heritage and Tourism, or the project archaeologist, authorizes a resumption of Work.

(e) If human remains are uncovered during the construction and soil removal process, all Work shall cease and the Historic Resources Branch, Manitoba Culture, Heritage and Tourism shall be contacted by the Contract Administrator. The Historic Resources Branch shall contact The City of Winnipeg Police.

(f) If the human remains are not considered forensic, i.e., no foul play suspected, they shall be removed by the Historic Resources Branch, Manitoba Culture, Heritage and Tourism or the project archaeologist and turned over to the Province.

(g) If the human remains are considered forensic, The City of Winnipeg Police shall be responsible for their removal.

(h) Additional information may be obtained by contacting: Archaeological Assessment Services, Historic Resources Branch

E46.9.12 Construction Traffic

(a) Workforce parking shall be limited to the areas designated for such as detailed in the Contract Documents, or as otherwise may be directed by the Contract Administrator.

(b) The Contractor shall adhere to the Standard Provisions of the Standard Construction Specifications, and of the Manual of Temporary Traffic Control in Work Areas on City Streets of The City of Winnipeg, Works & Operations Division.

(c) The Contractor's lay down area, construction Site and access road shall be fenced and gated to secure the Site and materials and to discourage pedestrian entrance to

construction areas and to control any potential hazard to the public, particularly children.

(d) For circumstances where the Contract Administrator has accepted Site access of special equipment or material, the Contractor shall provide adequate flagmen for traffic control in the vicinity of any public buildings.

E46.9.13 Access

(a) The Contractor shall maintain access to affected residential properties.

(b) The Contractor shall provide or maintain general and off-street access to any affected business during construction.

E47. ACCESS TO FORMER PPCLI – CFB WINNIPEG

E47.1 Contractor shall note that municipal and utility relocations are proposed within the former PPCLI – CFB Winnipeg. DND regulations for access to the former PPCLI site include the following:

(i) Contractor is to provide the Contract Administrator a list of personnel who will be entering DND Lands for the purpose of conducting construction activities. Contractor shall supply the list two weeks prior to entering the site. Only the personnel identified shall be permitted to enter the DND site. No special pass or escort will be required by DND, but the Contractor's on-site personnel may be asked by DND staff to present picture identification.

(ii) DND requires a minimum of 10 Working Days notice to complete underground utility locations on DND Lands. The Contractor shall note that the Construction Drawings includes information provided by DND to the best of their knowledge from record information. It is herby expressly understood that the information provided with respect to the type of, or location of services shall be accepted by the Contractor at his own risk, and DND shall assume no responsibility for the accuracy or the completeness of the information contained herein.

(iii) Contact for entering DND Lands is Teresa Rupa, DND Properties Officer, Phone: 833-2500 ext. 6588.

(iv) Contact for existing utility locations on DND Lands is, DND Construction Engineering Operations Director, Phone: 833-2500 ext. 5225.

(v) Contractor must keep east side locked and secure at all times except during working hours.

E48. SODDING

E48.1 Description

(a) This Special Provision shall amend and supplement City of Winnipeg Standard Construction Specification CW 3510-R8 "Sodding", and shall cover all aspects of sod supply and installation, including preparation of finish grade, watering and rolling, and 30-day maintenance.

E48.2 Materials

E48.2.1 Turf grass sod

(a) Turf grass sod shall conform to CW 3510-R8.

(b) Sod shall be a mixture of 95% Kentucky bluegrass, using equal proportions of any three Class 2 cultivars, and 5% Creeping Red fescue.

E48.3 Construction Methods

E48.3.1 Preparation of Finish Grade, Placement of Sod, Watering and Rolling and 30-Day Maintenance

(a) In areas designated “Sod with Over-seeding of Trefoil and Vetch” finish grading, sod placement, watering and rolling and 30-day maintenance shall conform to CW 3510-R8.

(b) Install one sod width, 600mm width, behind all concrete splash strips or other pavement and around all planting beds, following installation of topsoil or completion of soil amendments consistent with the required seed mixes in medians, boulevards and other areas. Sod edging shall be installed prior to seeding or planting.

E48.4 Method of Measurement

E48.4.1 Measure sod areas greater than 600mm width in accordance with CW 3510-R8.

E48.4.2 Measure sod edging, equal to 600mm width on an area basis for the number of square metres of sod supplied and installed in accordance with the Construction Drawings and these Specifications.

E48.5 Basis of Payment

E48.5.1 Payment for supply and installation of sod, greater than 600mm width, including topsoil, fine grading and a 30-day maintenance.

E48.5.2 Payment for sod edging, 600mm wide, will be at the Contract Unit Price for “Sod Edging”, which shall be compensation in full for supplying all materials and performing all operations specified, and all other items included in the work of this specification.

E49. SEEDING

E49.1 Description

(a) This Special Provision shall amend and supplement City of Winnipeg Standard Construction Specification CW 3520-R6 “Seeding”, and shall cover all aspects of supply and installation of seed, including preparation of finish grade, hydro mulching, and maintenance.

E49.2 Materials

E49.2.1 General

(a) Provide the Contract Administrator with Certificates of Analysis and mix compositions for all seed mixes. Include supplier’s name and telephone contact information, and percentages of each species and cultivar in each mix.

(b) Obtain Contract Administrator’s approval for any proposed adjustments to the seed mix species or cultivars prior to seeding.

E49.2.2 Ditch Seed Mix

(a) Ditch Seed Mix shall be a mixture of the following species and cultivars:

(i) 10% Boreal Creeping Red Fescue (*Festuca rubra* ‘Boreal’);

(ii) 15% Sea Link Red fescue (*Festuca rubra* ' Sea Link’*);*

(iii) 15% Arid Tall fescue (*Festuca arundinacea* 'Schreb'');

(iv) 15% Kentucky bluegrass (*Poa pratensis*), use a mix of a least 3, Class 2 cultivars specified in CW 3520-R6, including at least one cultivar from the following list (see (b));

(v) 10% Perennial ryegrass (*Lolium perrenne*), using any one of cultivars specified in CW 3520-R6;

(vi) 10% Altai Wild ryegrass (*Elymus angustus* 'Prairieland');
(vii) 10% Victory Chewings fescue (*Festuca commutata* 'Victory');
(viii) 10% White clover (*Trifolium repens*), and
(ix) 5% Timothy (*Phleum pretense*).

(b) Acceptable cultivars of Kentucky bluegrass include:
(i) Alpine;
(ii) America;
(iii) A34;
(iv) Banff;
(v) Bronco;
(vi) Midnight II;
(vii) Blue Velvet, and
(viii) Award.

E49.2.3 Salt-tolerant Prairie Grass Seed Mix

(a) Salt-tolerant Prairie Grass Seed Mix shall include proportions of 15% to 25%, each, of at least three of the following salt-tolerant native grass species:
(i) Alkalai Cord Grass (*Spartina gracilis*);
(ii) Switch Grass (*Panicum virgatum*);
(iii) Whitetop (*Scolochloa festucacea*);
(iv) Basin Wildrye (*Elymus cinereus*);
(v) Nuttall's Alkali Cordgrass (*Puccinellia nuttali*);

Plus: 10% – 15%, each, of at least three of the following additional native grass species:
(vi) Canada Wildrye (*Elymus canadensis*);
(vii) Blue grama (*Bouteloua gracilis*);
(viii) Side-oats grama (*Bouteloua curtipendula*);
(ix) Awned wheatgrass (*Agropyron trachycaulum var. unilaterate*);
(x) Indian Grass (*Sorghastrum nutans*), and
(xi) Green Needle Grass (*Stipa viridula*).

E49.2.4 Wildflower and Grass Seed Mix

(a) Wildflower and Grass Seed Mix shall be a mix of the following species:
(i) 85% Azay Sheep's fescue (*Festuca saximontana*)
(ii) 15% Wildflowers, including;
- Yarrow (*Achillea millefolium*);
- Prairie Crocus (*Anemone patens*);
- New England Aster (*Aster novae-angliae*)
- Lance-leafed Coreopsis/Tickseed (*Coreopsis lanceolata*);
- Purple Coneflower (*Echinacea angustifolia*);
- Indian Blanketflower (*Gaillardia aristata*);
- Three-flowered Avens (*Geum triflorum*);
- Meadow Blazing Star (*Liatris ligulistylis*)
- White Prairie clover (*Petalostemon candidum*);
- Purple Prairie clover (*Petalostemon purpureum*);

- Prairie Coneflower (*Ratibida columnifera*);
- Black-eyed Susan (*Rudbeckia hirta*), and
- Canada Goldenrod (*Solidago canadensis*).

E49.2.5 Trefoil and Vetch Over-seed Mix

(a) Trefoil and Vetch Over-seed Mix shall be a blend of the 50% Birdsfoot trefoil and 50% Crown vetch.

E49.2.6 Cover Crop (Nurse Crop)

(a) Use Annual ryegrass as a cover crop in all seeded areas.

E49.2.7 Herbicides and Insecticides

(a) Herbicides and insecticides shall be in accordance with CW 3520-R6.

E49.2.8 Hydro Mulch

(a) Mulch, water and tackifier shall be in accordance with CW 3520-R6.

E49.3 Construction Methods

E49.3.1 Ditch Seed Mix: Seeding and Hydro Mulching, and Maintenance

(a) Seed with a Brillion Seeder, or equal, on 50mm compacted depth of imported topsoil, placed over scarified sub-grade in areas designated “Ditch Seed Mix”. Preparation of the seedbed shall be as per CW 3520-R6.

(b) Seeding and hydro mulching, and maintenance of areas designated “Ditch Seed Mix” shall conform to CW 3520-R6:

(i) Sow Ditch Seed Mix at 2.0kg/100 square metres, and

(ii) Sow cover crop at 0.6kg/100 square metres.

E49.3.2 Salt-tolerant Prairie Grass Seed Mix, and Wildflowers and Grass Seed Mix: Soil Amendments, Seeding and Hydro Mulching

(a) Soil amendments shall be as per the “Topsoil, Planting Soil, Soil Amendments and Finish Grading” Specification.

(b) Seeding and hydro mulching shall be in accordance with CW 3520-R6:

(i) Sow Salt-tolerant Prairie Grass Seed Mix, and Wildflowers and Grass Seed Mix at 2.0kg/100 square metres, and

(ii) Sow cover crop at 0.6kg/100 square metres.

(c) Maintenance shall be in accordance with Section 9.5, below.

E49.3.3 Seeding with Trefoil and Vetch Over-seed Mix

(a) Immediately following the 30-day sod maintenance period, over-seed designated sod areas with Trefoil and Vetch Over-seed Mix. Silt seed. Avoid seeding during windy weather.

(i) Over-seed sod with Trefoil and Vetch Over-seed Mix at 0.75kg/100 square metres.

E49.3.4 Maintenance of Areas Seeded with Salt-tolerant Prairie Grass Seed Mix, and Wildflowers and Grass Seed Mix

(a) The Contractor shall water seeded and hydro-mulched areas as required to obtain optimum soil moisture levels for seed germination and continued growth of grasses and wildflowers. Control watering to prevent seed washouts.

(b) The Contractor shall mow Salt-tolerant Prairie Grass Seed Mix areas, and Wildflower and Grass Seed Mix areas once annually, in October, removing cut material that would smother grasses and wildflowers.

(c) Additional mowing, at a height of 100mm, shall be completed upon the direction of the Contract Administrator, as required to remove extensive weed growth and/or to maintain healthy growth of grasses and wildflowers.

E49.3.5 Chemical Weed Control

(a) The Contractor shall use chemical weed control, Roundup, 2-4 D or Diacamba, only as required to spot remove weeds in localized areas. Do not treat large areas seeded with trefoil, vetch, clover, Timothy and wildflowers with chemical weed control agents following seeding operations.

E49.3.6 Termination of Short-term Maintenance Period

(a) The short-term maintenance period shall be terminated after the following criteria have been met:

(i) The certified seed sowed meets the requirements of CW 3520-R6;

(ii) Seeded areas are free of debris, including leaves;

(iii) Seeded areas have firm, uniform and even surfaces;

(iv) Seeded grasses, wildflowers and legumous plants show healthy, vigorous growth;

(v) Seeded areas have less than 10 weeds per 50 square metres;

(vi) Seeded areas have sufficient growth density that bare spots do not exceed 5% of total surface area, and

(vii) Seeded areas are free of damaging insects and disease.

E49.4 Method of Measurement

E49.4.1 Ditch Seed Mix; Salt-tolerant Native Grass Seed Mix, and Wildflowers and Grass Seed Mix

(a) Ditch Seed Mix; Salt-tolerant Prairie Grass Seed Mix, and Wildflowers and Grass Seed Mix shall be measured on an area basis for each type of seed mix. The total area to be paid for each type of seed mix shall be the number of square metres seeded and maintained in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

(b) No measurement shall be made for seed placed outside the limits of placement unless directed by the Contract Administrator.

E49.4.2 Trefoil and Vetch Over-seeding Mix

(a) Over-seeding with trefoil and vetch shall be measured on an area basis for the number of square metres of sod over-seeded with Trefoil and Vetch Over-seed Mix. The total area to be paid for shall be the number of square metres over-seeded and maintained in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

E49.4.3 Nurse or Cover Crop Seeding

(a) There will be no separate measurement for nurse or cover crop seeding. Seeding of a nurse crop will be included in the other seeding operations.

E49.4.4 Herbicides and Insecticides

(a) There will be no separate measurement for materials, equipment and operations related to the use of herbicides and insecticides.

E49.5 Basis of Payment

E49.5.1 Ditch Seed Mix; Salt-tolerant Prairie Grass Seed Mix, and Wildflowers and Grass Seed Mix

(a) Supply, placement and maintenance of ditch seed and native grass and wildflower seed mixes will be paid for at the Contract Unit Prices for “Ditch Seed Mix”; “Salt-tolerant Prairie Grass Seed Mix”, and “Wildflower and Grass Seed Mix”, which prices shall be payment in full for supplying all materials and performing all operations herein specified, and all other items included in the work in accordance with this Specification.

E49.5.2 Trefoil and Vetch Over-seeding

(a) Supply and over-seeding with trefoil and vetch over-seed mixture will be paid for at the Contract Unit Price for “Trefoil and Vetch Over-seeding”, which price shall be payment in full for supplying all materials and performing all operations herein specified, and all other items included in the work of this Specification.

E50. TOPSOIL, PLANTING SOIL, SOIL AMENDMENTS AND FINISH GRADING

E50.1 Description

(a) This Special Provision shall amend and supplement City of Winnipeg Standard Construction Specification CW 3540-R4 “Topsoil and Finish Grading for Establishment of Turf Areas”, and shall cover supply, preparation and placement of imported topsoil, planting soil and soil amendments, including preparation of existing grade, finish grading and fertilizer application.

E50.2 Materials

E50.2.1 Topsoil

(a) Imported topsoil shall conform to CW 3540-R4.

E50.2.2 Peatmoss

(a) Peat moss shall be decomposed plant material, fairly elastic and homogenous, free of colloidal residue, wood, sulphur and iron; containing a minimum of 60% organic material by weight, with moisture content not exceeding 15%. Shredded particles shall not exceed 6 mm in size. Minimum pH value of peat shall be 4.5; maximum, 6.0.

E50.2.3 Sand

(a) Sand shall be hard, granular, sharp sand, well -washed and free of impurities, chemicals and organic matter.

E50.2.4 Bonemeal

(a) Bonemeal shall be raw, finely ground with a minimum chemical analysis of 3% nitrogen and 20% phosphoric acid.

E50.2.5 Wood Chip Mulch

(a) Wood chip mulch shall be chipped ash, maple, poplar, birch and other deciduous trees. Mulch shall be chipped to sizes ranging from 50mm to 100mm. Mulch may contain stringy twigs and seed, free of non-organic material, wood preservatives or diseased wood. The mulch shall contain no more than 5% of the following materials in total: soil, sawdust, peatmoss, coniferous wood and needles.

(b) The Contractor shall supply a wood chip mulch sample to the Contract Administrator for approval prior to installation.

E50.2.6 Fertilizer

(a) Chemical fertilizers shall have N-P-K compositions as recommended by an agricultural soil-testing laboratory approved by the Contract Administrator provided for each of the following:

(i) Sod (City Specification) with 75mm imported topsoil;

(ii) Ditch Seed Mix (City Specification) with 50mm imported topsoil;

(iii) Horticultural trees and shrubs with planting soil mix;

(iv) Native Salt-tolerant Prairie Grass Seed Mix with soil amendment, and

(v) Wildflower and Grass Seed Mix with soil amendment.

E50.2.7 Chemical Application

(a) Roundup or similar chemical herbicides approved by Agriculture Canada shall be used only with the approval of the Contract Administrator.

E50.2.8 Erosion Control Blankets

(a) Erosion control blankets shall be North American Green C350 Reinforced Composite Mat, or equal: 100% coconut fibre matrix with three-dimensional UV-stabilized polypropylene netting structure. All nets shall have coloured thread stitched along both outer edges (50 to 125 mm from the edge) as an overlap guide to adjacent mats. Roll width: 2.0 m; length: 16.9 m. Roll weight; 16.8 kg.

E50.2.9 U-Staples

(a) Use U staples to anchor the reinforced composite mat to slopes.

E50.2.10 Black Plastic Edging

(a) Use 125mm depth heavy-duty black plastic edging with rolled top.

(b) Provide sample of plastic edging to the Contract Administrator for approval prior to installation

E50.2.11 Straw Wattle

(a) Use Stenlog or other biodegradable straw wattle.

E50.3 Construction Methods

E50.3.1 Imported Topsoil and Finish Grading

(a) Prior to installation of topsoil and fine grading the Contract Administrator will inspect the sub-grade to determine the need for touch-up grading. Touch-up grading shall be completed in accordance with CW 3170-R3.

(b) Installation of imported topsoil in areas to receive sod or Ditch Seed Mix shall be in accordance with City of Winnipeg Standard Construction Specifications, including preparation of existing grade, placing topsoil, applying fertilizer and finish grading shall conform to CW 3540-R4, except that topsoil depths shall be as follows:

(i) In sod areas: 75mm, and

(ii) In Ditch Seed Mix areas: 50mm.

E50.3.2 Soil Amendment for Salt-tolerant Prairie Grass Seed Mix, and Wildflowers and Grass Seed Mix

(a) Soil amendment for Salt-tolerant Prairie Grass Seed Mix and Wildflowers and Grass Seed Mix shall consist of a mix of 60% peat moss and 40% sand, loose by volume.

(b) Cross-cultivate the entire area of soil base (clay) that is to receive soil amendments, to a depth of 150mm. Redo areas where equipment used for hauling and spreading has re-compacted sub-grade

(c) Spread 30mm of peat moss and 20mm sand over the area of soil amendments.

(d) Rototill or disc the peat moss and sand into the top 100mm of base material and mechanically roll to obtain a level surface.

(e) Grade to eliminate rough spots and low spots and to maintain positive drainage.

(f) Consolidate seedbed to required bulk density using equipment approved by the Contract Administrator. Leave surfaces smooth, uniform and firm against deep foot printing.

E50.3.3 Planting Soil Mixture for Trees, Shrubs and Vines

(a) Planting soil mixture shall be a mix of 75% topsoil and 20% peat moss, loose by volume. Incorporate 5% sand, or sand in an amount as required, to improve soil texture. Incorporate bone meal at 3kg/cubic metre of planting soil mixture.

E50.3.4 Construction of Planting Beds

(a) Excavate planting beds to a depth of 300mm.

(b) Install planting soil mixture, loosely compacted, 300mm deep in planting beds with a smooth top surface to match surrounding contours. Level planting soil mixture by hand around existing and newly planted trees, shrubs and/or vines.

(c) In level areas, with slopes of 2% or less, install planting soil mixture on the existing rough base grade to create 300mm raised planting beds.

(d) Install 50mm wood chip mulch in all beds following planting operations.

E50.3.5 Erosion Control Blanket

(a) Install erosion control blanket in accordance with the CW 3130-R1 and the Construction Drawings in all areas where slopes exceed 3.5:1.

E50.3.6 Black Plastic Edging

(a) Install black plastic edging around all planting beds unless they are otherwise contained in solid planters.

E50.3.7 Straw Wattle

(a) Install 300mm Stenlog or other straw wattle sediment control material in accordance with the manufacturer's specifications around all riprap areas related to drainage inlets and outlets, and catch basins within seeded areas.

(b) Install straw wattles so that no gaps exist between the soil and the bottom of the wattle, and the ends of adjacent wattles are overlapped 150mm minimum to prevent water and sediment passing. Achieve a tight seal between the wattle segments.

(c) Dogleg terminal ends of straw wattle up the slope to prevent channeling of sedimentation.

(d) Use 300mm wooden stakes to fasten straw wattle to the soil. Place stakes on each side of the straw wattle, lying across the natural fibre twine, spaced 1200mm on centre. Leave 30 to 50mm of wood stake exposed above the wattle.

(e) Avoid damage to wattles. Damaged areas of wattles should be cut and tied off, then treated as terminal ends.

E50.4 Method of Measurement

E50.4.1 Touch-up Grading

(a) Touch-up grading will be measured on an area basis for the number of square metres of sub-base re-graded in accordance with the Construction Drawings and this

Specification, and accepted by the Contract Administrator, as computed by the Contract Administrator.

E50.4.2 Imported Topsoil and Fine Grading

(a) Supply and installation of imported topsoil and finish grading for Ditch Seed Mix, as described in this Specification, shall be measured in accordance with CW 3540-R4, although with the topsoil depth requirement for Ditch Seed Mix shall be 50mm as per Section 9.1.

E50.4.3 Soil Amendments for Salt-tolerant Prairie Grass Seed Mix, and Wildflowers and Grass Seed Mix

(a) Soil amendments for areas designated for Salt-tolerant Prairie Grass Seed Mix, and Wildflowers and Grass Seed Mix shall be measured on an area basis for the number of square metres of soil base incorporating peat moss and sand in accordance with the Construction Drawings and this Specification, and accepted by the Contract Administrator, as computed by the Contract Administrator.

E50.4.4 Planting Soil Mixture

(a) Construction of planting beds, and supply and installation of planting soil mixture shall be measured on an area basis for the number of square metres of 300 mm depth planting bed constructed, complete with 300 mm depth planting soil mixture, all in accordance with the Construction Drawings and this Specification, and accepted by the Contract Administrator, as computed by the Contract Administrator.

(b) There will be no separate measurement for planting soil mixture that is used in planting individual trees and shrubs that are not planted in beds.

E50.4.5 Wood Chip Mulch

(a) Supply and installation of wood chip mulch shall be measured on an area basis for the number of square metres of 65 mm wood chip mulch installed in planting beds in accordance with the Construction Drawings and this Specification, and accepted by the Contract Administrator, as computed by the Contract Administrator.

(b) There will be no separate measurement for wood chip mulch used in individual trees saucers.

E50.4.6 Chemical Application

(a) The application of Roundup to topsoil shall be measured on an area basis for the number of square metres of topsoil treated in accordance with the Construction Drawings and this Specification, and accepted by the Contract Administrator, as computed by the Contract Administrator.

(b) Do not seed areas treated with Roundup until at least one week after chemical treatment.

E50.4.7 Erosion Control Blanket

(a) Erosion control blanket will be measured on an area basis for the number of square metres of area covered by erosion control blanket in accordance with the Construction Drawings and this Specification, and accepted by the Contract Administrator, as computed by the Contract Administrator.

E50.4.8 Black Plastic Edging

(a) Black plastic edging will be measured on a length basis for the number of linear metres of plastic edging installed in accordance with the Construction Drawings and this Specification, and accepted by the Contract Administrator, as computed by the Contract Administrator.

E50.4.9 Straw Wattle

(a) Straw wattle will be measured on a length basis for the number of linear metres of wattle installed in accordance with the Construction Drawings and this Specification, and accepted by the Contract Administrator, as computed by the Contract Administrator.

E50.5 Basis of Payment

E50.5.1 Touch-up Grading

Minor re-grading of sub-base areas will be paid for at the Contract Unit Price for “Touch-up Grading”, which price shall be payment in full for supplying all labour, equipment and materials and performing all operations as herein specified, and all other work incidental to the work of this Specification.

E50.5.2 Imported Topsoil and Fine Grading

(a) Imported topsoil will be paid for at the Contract Unit Price for "Imported Topsoil for Ditch Seed Mix", which price shall be payment in full for supplying all labour, equipment and materials and performing all operations as herein specified, including finish grading, and all other work incidental to the work of this Specification.

Specification shall be measured on an area basis for 50mm depth of topsoil, as per Section E50.3.1.

E50.5.3 Soil Amendments for Salt-tolerant Prairie Grass Seed Mix, and Wildflowers and Grass Seed Mix

(a) Soil amendments for native seed mixes will be paid for at the Contract Unit Price for “Soil Amendments”, which price shall be payment in full for supplying all materials and performing all operations herein specified, and all other items incidental to the work of this Specification.

E50.5.4 Planting Soil Mixture

(a) Construction of planting beds and supply and installation of planting soil mixture will be paid for at the Contract Unit Price for “Planting Beds with Planting Soil Mixture”, which price shall be payment in full for supplying all materials and performing all operations herein specified, and all other items incidental to the work of this Specification.

E50.5.5 Wood Chip Mulch

(a) Supply and installation of wood chip mulch will be paid for at the Contract Unit Price for “Wood Chip Mulch”, which price shall be payment in full for supplying all materials and performing all operations as determined herein specified, and all other items incidental to the work of this Specification.

E50.5.6 Chemical Application

(a) Chemical application of herbicide shall be paid for at the Contract Unit Price bid per square metre for "Chemical Application of Herbicide”, which payment shall be considered compensation in full for the supply of all materials and the performing of all operations necessary to complete the work as specified including any items incidental to the work of this Specification.

E50.5.7 Erosion Control Blanket

(a) Erosion control blanket will be paid for the number at the Contract Unit Price for “Erosion Control Blanket”, which price shall be payment in full for supplying all materials and performing all operations herein specified, and all other items incidental to the work of this Specification.

E50.5.8 Black Plastic Edging

(a) Black plastic edging will be paid for at the Contract Unit Price for “Black Plastic Edging”, which price shall be payment in full for supplying all materials and performing all operations herein specified, and all other items incidental to the work of this Specification.

E50.5.9 Straw Wattle

(a) Straw wattle will be paid for at the Contract Unit Price for “Straw Wattle”, which price shall be payment in full for supplying all materials and performing all operations herein specified, and all other items incidental to the work of this Specification.

E51. TREES, SHRUBS AND VINES

E51.1 Description

E51.1.1 This Specification shall deal with the supply and installation of nursery-grown trees, shrubs and vines in areas indicated on the Construction Drawings, including: preparation, digging, transport and planting, and maintenance.

E51.2 General

E51.2.1 Nomenclature

(a) Nomenclature of specified nursery stock shall conform to the International Code of Nomenclature for Cultivated Plants and shall be in accordance with the approved scientific names given in the latest edition of Standardized Plant Names. The names of varieties not named therein are generally in conformity with the names accepted in the nursery trade.

E51.2.2 Source Quality Control

(a) The Contractor shall notify Contract Administrator of source of plant material at least 7 days in advance of shipment.

(b) Acceptance of plant material at source does not prevent rejection of same plant material on site prior to or after planting operations.

E51.2.3 Shipment and Pre Planting Care

(a) Coordinate shipping of plants and excavation of holes to ensure minimum time lapse between digging and planting.

(b) Tie branches of trees and shrubs securely and protect plant material against abrasion, exposure and extreme temperature change during transit. Avoid binding of planting stock with rope or wire, which would damage bark, break branches or destroy natural shape of plant. Give full support to root balls, especially of large trees, during lifting.

(c) Cover plant foliage with tarpaulin, and protect bare roots by means of dampened straw, peat, saw dust or other acceptable material to prevent loss of moisture during transit and storage.

(d) Remove broken and damaged roots with sharp pruning shears. Make clean cut and cover cuts over 50 mm in diameter with wound dressing.

(e) Keep roots moist and protect from sun and wind. Heel-in trees and shrubs that cannot be planted immediately in shaded areas; water well.

E51.2.4 Replacement

(a) During the first two years following completion of planting operations, remove from site any plants that have died or failed to grow satisfactorily, as determined by the

Contract Administrator: for example, plant material installed in 2006 that has failed to grow satisfactorily and has not been replaced by October 31, 2008 would be required to be replaced in the Spring of 2009.

E51.3 Materials

E51.3.1 Water

(a) Water shall be potable and free of minerals that may be detrimental to plant growth.

E51.3.2 Fertilizer

(a) Fertilizer shall be slow release organic. Fertilizer shall contain N-P-K in ratio as recommended by soil test results from an approved agricultural soil-testing laboratory.

E51.3.3 Root Ball Burlap

(a) Root ball burlap shall be 150 g Hessian burlap.

E51.3.4 Anti-dessicant

(a) Anti-desiccant shall be wax-like emulsion to provide film over plant surfaces reducing evaporation but permeable enough to permit transpiration.

E51.3.5 Wound Dressing

(a) Wound dressing shall be horticultural accepted non-toxic, non-hardening emulsion.

E51.3.6 Plant Material

(a) All plant material supplied shall be containerized and/or ball and burlap Nursery Stock. All plants shall be from the Winnipeg area and the Oak-Aspen Forest Eco-region.

(b) Nursery Stock shall be nursery grown and of species and sizes as indicated on the Construction Drawings. Nursery Stock shall be No. 1 Grade material complying with latest edition of the “Guide Specification for Nursery Stock”, produced by Landscape Canada (CNTA), which refers to quality, size and development of nursery-grown plant material and root balls.

(c) Any plants designated as Nursery Stock but dug from native stands, wood lots, orchards, or neglected nurseries that have not received proper cultural maintenance, shall be designated as “Collected Stock”. Material sources are to be approved by Contract Administrator prior to ordering or collecting. The Contractor shall provide all of the necessary nursery certificates to ensure that the plant species comply with this specification.

(d) All plant material shall be measured when branches are in their natural position. Height and spread dimensions specified in the Plant List on the Construction Drawings refer to the main body of the plant, and not from branch tip to root base or from branch tip to branch tip. Where trees are measured by calliper (cal.), reference is made to the diameter of the trunk measured at 300mm above ground as the tree stands properly planted in the nursery.

(e) All containerized whips and herbaceous plant material shall have a minimum of one full year's growth. Roots shall be healthy, reaching the sides of the containers, and developed such that the root ball can be kept intact during transplanting. Roots shall not encircle each other to the extent of inhibiting plant growth.

(f) All trees shall have one, only, sturdy, reasonably straight and vertical trunk, and a well-balanced crown with fully developed leader, unless designated “multi-stem”. All evergreens shall be symmetrically grown and branched from ground level, up.

(g) Use trees, shrubs and groundcovers with structurally sound, strong fibrous root systems, and free of disease, insects, defects or injuries, including rodent damage,

sun scald, frost cracks, abrasions or scars to the bark. Plants must have been root pruned regularly, but not later than one growing season prior to arrival on site.

(h) All parts of the plants shall be moist and show live, green cambium tissue when cut.

(i) At least one (1) plant of each variety supplied shall bear a tag showing both the botanical and common name of the plant.

(j) Additional Plant Material Qualifications:

(i) Cold Storage

- Approval of the Contract Administrator is required for plant material that has been held in cold storage.

(ii) Container grown Stock

- Container-grown stock is acceptable if the containers used are large enough for root development. Trees and shrubs must have grown in container for minimum of one growing season but no longer than two. Root systems must be able to hold soil when removed from containers. Plants that have become root-bound are not acceptable. Container stock must have been fertilized with slow releasing fertilizer.

(iii) Balled and Burlapped Plant Material

- Deciduous trees in excess of 3m height must have been dug with large firm ball. Root balls must include 75% of fibrous and feeder root system. This excludes use of native trees grown in light sandy or rocky soil. Secure root balls with burlap, heavy twine and rope. For large trees: wrap ball in double layer of burlap and drum lace with minimum 10 mm diameter rope. Protect root balls against sudden changes in temperature and exposure to heavy rainfall.

(iv) Tree Spade Dug Material

- Obtain approval of the Contract Administrator for digging plant material with mechanized digging equipment, hydraulic spade or clamshell type. Dig root balls to satisfy Landscape Canada (CNTA) standards. Lift root ball from hole, place in wire basket designed for purpose, line with burlap. Tie basket to ball with heavy rope. Take care not to injure trunk of tree with wire basket ties or rope.

(v) Substitutions

- Substitutions to plant material as indicated on the Plant List will not be permitted unless written approval has been obtained as to type, variety and size prior to Award of Contract. Plant substitutions must be of similar species and of equal size to those originally specified.

E51.4 Construction Methods

E51.4.1 Workmanship

(a) The Contractor shall stake out location of planting beds, trees and shrubs as per the Construction Drawings. Obtain Contract Administrator's approval prior to excavating.

(b) Prior to commencing planting operations the Contractor shall obtain clearances from all utilities, with respect to underground lines located in the areas to be excavated.

(c) The Contractor shall apply anti-desiccant in accordance with material manufacturer's instructions.

(d) The Contractor shall coordinate planting operations; keep the site clean and planting holes drained, and immediately remove soil or debris spilled onto pavements.

E51.4.2 Planting Time

(a) Plant only under conditions that are conducive to health and physical conditions of plants.

(b) The Contractor shall provide the Contract Administrator with a planting schedule at least two weeks prior to planting operations. Extending planting operations over long period using limited crew will not be accepted.

(c) The Contractor shall generally plant deciduous plant material during dormant periods before buds have broken. In particular, plant material noted for spring planting, only, must be planted in dormant stage.

(d) When permission has been obtained to plant deciduous plant material after buds have broken, spray plants with anti-desiccant to slow down transpiration prior to transplanting.

(e) When permission has been obtained from the Contract Administrator, trees, shrubs and ground covers growing in containers may be planted throughout the growing season.

E51.4.3 Excavations

(a) Shrub beds: excavate to minimum depth of 300mm, as indicated on the Construction Drawings. Individual shrubs shall be planted in 500mm deep holes backfilled with planting soil mixture.

(b) Trees: excavate to depth of at least 200mm deeper than height of root ball, with a surface width of two times the diameter of the root ball. Backfill planting soil mixture around the root balls.

(c) If natural drainage does not exist provide drainage for planting holes in heavy soil. Have method approved.

(d) Protect the bottoms of excavations against freezing.

(e) Remove water that enters excavations prior to planting. Ensure source of water is not ground water.

E51.4.4 Planting

(a) Loosen bottom of planting hole to depth of 150 to 200mm. Cover bottom of each excavation with minimum of 150mm of planting soil mixture.

(b) Plant trees, shrubs and groundcover vertically, with roots placed straight out in hole. Orient plant material to give best appearance in relation to structures, roads and walkways.

(c) Place plant material to depth equal to depth they were originally growing in nursery or in locations collected.

(d) Ball and burlap root balls: loosen burlap and cut away minimum top 1/3 without disturbing root ball. Do not pull burlap or rope from under root ball. With container stock, remove entire container without disturbing root ball. Non-biodegradable wrappings must be removed.

(e) Tree spade excavated materials:

(i) Tree spade planting shall be permitted only by approval of the Contract Administrator.

(ii) Dig tree pit with same mechanical equipment as used to dig plant material. Ensure hole dug is upright as possible. Place in hole a mixture of 40 L of planting soil and fertilizer mixed with water to soupy consistency. This will be forced up sides of ball as root ball is placed in hole.

(iii) Loosen the bottom of planting hole to depth of 150mm to 200mm. Cover bottom of each excavation with minimum 150 mm topsoil mixture.

(f) Tamp planting soil mixture around root system in layers of 150mm eliminating air voids. Frozen or saturated planting soil is unacceptable. When 2/3 of planting soil has been placed, fill hole with water. After water has been completely penetrated into soil, complete backfilling.

(g) Excavate to 200 mm depth an additional 600mm beyond planting pits around the perimeter of all individual tree planting pits, and fill with planting soil mixture.

(h) Construct 100 mm deep saucers around the outer edge of planting pits to assist with maintenance watering.

(i) When planting is completed apply slow release organic fertilizer at minimum rate of 12kg/100m for shrub beds or 50g/mm of calliper for trees, or as recommended by the soil analysis. Mix fertilizer thoroughly with top layer of planting soil and water in well.

E51.4.5 Pruning

(a) Prune trees, shrubs and groundcover after planting. Postpone pruning of those trees where heavy bleeding may occur, until in full leaf. Employ clean sharp tools and make cuts flush with main branch, smooth and sloping as to prevent accumulation of water. Remove projecting stumps on trunks or main branches. Remove dead and injured branches and branches that rub causing damage to bark. Trim trees and shrubs without changing their natural shape. Do not damage lead branches or remove smaller twigs along main branches.

E51.4.6 Standards

(a) All roots shall be cleanly cut; split roots are not acceptable.

(b) Branches and trunks shall be tied and protected; broken or abraded branches or trunks are not acceptable.

(c) Planting shall be protected from drying conditions; desiccated material not acceptable.

(d) All plants shall be free of insects and disease: galls, blight and other manifestations of insect infestation or disease not acceptable.

E51.4.7 Wood Chip Mulch

(a) All planting beds shall be covered with a 50mm depth of wood chip mulch to the limits shown on the planting details.

(b) Place wood chip mulch under tree limbs but stay 150mm from tree trunks.

(c) The saucers of all trees not planted in beds shall be covered with a 50mm depth of wood chip mulch.

E51.5 Maintenance

E51.5.1 Watering

(a) For the first four weeks following installation, water plant material once a week, and once every second week, thereafter. Ensure adequate moisture in root zone at freeze-up.

E51.5.2 Weeding

(a) Keep mulched shrub beds and tree saucers weed-free by manually removing weeds during the maintenance period.

E51.5.3 Insects and Diseases

(a) Spray plants to combat pests and diseases. Use only organic chemical insecticides approved by Agriculture Canada.

E51.5.4 Adjustments

(a) Make adjustments requested by the Contract Administrator, including straightening trees, tightening guy wires and removing tree stakes. Keep all trees straight, and monitor to prevent damage to bark or branches from wires and stakes.

E51.5.5 Maintenance Period

(a) Maintain plant material for a period of two years following completion of planting operations and acceptance by City inspection following the 30-day maintenance period, as determined by the Contract Administrator.

E51.6 Method of Measurement

E51.6.1 Trees, Shrubs and Vines

(a) Supply and installation of trees, shrubs and vines will be measured on a unit price basis for each tree, shrub and vine listed on the Plant List, installed in accordance with this Specification and accepted by the Contract Administrator, as computed by the Contract Administrator.

E51.6.2 Fertilizer

(a) Supply and installation of fertilizer for plant material will be included in the Contract Unit prices for plant material.

E51.7 Basis of Payment

E51.7.1 Trees, Shrubs and Vines

(a) Supply and installation of trees, shrubs and vines will be paid for at the Contract Unit Price for each species and size shown on the Plant List, measured as specified herein, which price shall be payment in full for supply of all materials and performing all operations herein described and all other items incidental to the work included in this Specification.

E52. LONG-TERM SCHEDULED MAINTENANCE OF PLANT MATERIAL, PLANTING BEDS, SOD AND SEEDED AREAS

E52.1 Description

E52.1.1 This Specification shall cover the maintenance of plant material, planting beds, sod and seeded areas, following acceptance of the work by the Contract Administrator.

E52.2 Materials

E52.2.1 The Contractor shall provide all necessary materials and equipment including: additional topsoil, soil ameliorates, mulches, sod, seed, fertilizers and pesticides, as well as tractors, mowers, hand mowers, trimmers, fertilizer spreaders, pruning tools, water trucks, hoses, water metres and any other items necessary for the maintenance of the areas indicated in this Specification.

E52.3 Personnel

E52.3.1 Provision of Maintenance Personnel

(a) The Contractor shall provide all necessary personnel for the ongoing maintenance operations.

E52.3.2 Capability of Personnel

(a) Maintenance personnel should have at least one year of experience in landscape maintenance and should be under the direction of a foreman, in all cases, with not less than five years of experience with similar maintenance operations.

(b) The maintenance foreman shall be familiar with native grasses and wildflowers, and plant identification techniques.

E52.4 Timing

E52.4.1 Long-term Maintenance Period

(a) Maintain plantings, sod, seeded grasses and legumes, salt-tolerant prairie grasses, and wildflower and grass areas, as well as unit paving, for a period of two (2) years from the completion of the Maintenance for Establishment period, as determined by the Contract Administrator. Note: Completion shall not occur after October 30, or before May 15 of any year.

E52.4.2 Maintenance Schedule

(a) Provide the Contract Administrator a Schedule of Proposed Maintenance Activities for the two-year long-term scheduled maintenance period, based on the requirements outlined herein. The scheduled maintenance period shall not commence until the Contract Administrator has reviewed this maintenance schedule.

E52.4.3 Recording Long-Term Maintenance Operations

(a) The Contractor shall provide a detailed maintenance log, including but not limited to the following:

(i) Hours of labour undertaken;

(ii) Number of personnel employed, and

(iii) Equipment used.

(b) The log will itemize watering, spraying and any other maintenance work. Contractor shall submit logs monthly at regularly scheduled meetings with the Contract Administrator. Maintenance log will be incidental to the long-term maintenance work

E52.5 Maintenance Methods

E52.5.1 Traffic

(a) Keep lanes open during work.

E52.5.2 Maintenance of Trees, Shrubs, Vines and Planting Beds

(a) Maintain trees, shrubs, vines and planting beds as indicated in E51, Section E51.5, above.

E52.5.3 Watering Trees, Shrubs and Vines

(a) Newly planted trees, shrubs and vines require water to become established; however, watering too often can kill a plant. During the summer, if temperatures are fairly high and there has been no rainfall, water approximately once a week.

(b) The Contractor shall determine the need for watering by taking soil tests weekly with a one-inch auger. Take a test sample from both the planting soil and from tree root balls by drilling to a minimum depth of 600mm. The soil shall contain enough moisture to hold together when compressed in the hand, but shall not be muddy.

(c) Testing shall be undertaken at a minimum of 5 sites per week at a minimum of 10m between sites. Plant material shall not be allowed to dry out to the detriment of viability. The Contractor shall monitor and submit maintenance summaries to the Contract Administrator, monthly.

(d) The Contractor shall water-in plant material in the late fall during the scheduled maintenance period. Thoroughly soak coniferous trees prior to winter freeze-up.

E52.5.4 Fertilizing, Pruning and Spraying Deciduous Trees, Shrubs and Vines

(a) Because of the specialized nature of such operations, employ a qualified local arborist for fertilizing, pruning and spraying. Refer to “Chemical Weed Control”.

E52.5.5 Pruning Deciduous Trees and Shrubs

(a) Prune as noted in E51, Section E51.4.5 by thinning out unnecessary limbs or portions of limbs and by cutting back the terminal growth. Cut with sharp pruning shears and handsaws for limb-wood. When cutting terminal growth, make the cuts one-quarter inch above the bud or lead twig. Where an entire limb is removed, make the cuts flush with the main stem or trunk.

E52.5.6 Cultivation

(a) Cultivate only as required to reconstruct planting beds or tree saucers, or to remove significant weed growth.

(b) Do not cultivate around plants with a shovel or spade. The tendency is to penetrate too deeply and cause root injury. Cultivate with a hoe or similar tool. When using a hoe never penetrate soil more than 50mm. Maintain the natural elevation of the surrounding area when cultivating. Create a gentle saucer to contain water around the tree root zone.

(c) Avoid pyramiding soil around the base of any plant. This causes water to drain away and will encourage undesirable top root growth.

(d) The boundary between the adjacent sod and soil saucer should be crisp and well formed.

(e) Replace wood chip mulch when cultivation completed.

E52.5.7 Spraying

(a) Spray trees and shrubs to control insect pests and diseases. Use horticultural compounds approved by Agriculture Canada, which are specific for the problem to be contained.

E52.5.8 Straightening, Monitoring Stakes and Guy Wires

(a) Straighten trees as required or as directed by the Contract Administrator. Monitor and remove staking and guy wires after the first year, or as directed by the Contract Administrator.

E52.5.9 Mulching

(a) Add mulch to planting bed areas as required to maintain an even fresh surface.

E52.5.10 Weeding

(a) Hand weed and lightly rake a minimum of once per month, or as determined by the Contract Administrator, to remove competition for installed plant material/undesirable plant material. Dispose of undesirable material off-site.

(b) The Contractor shall be responsible for any fines or weed control notices issued for the planting areas. The Contractor shall deal with all such notices in a timely fashion. Copies of any fines and notices shall be provided to the Contract Administrator within five (5) working days of receipt by the Contractor.

E52.5.11 Start of Long-Term Maintenance

(a) The long-term maintenance period will commence after sod and seeded areas have been accepted by City inspection upon completion of 30-day maintenance for sod and when all short-term maintenance criteria have been met for seeded areas.

E52.5.12 Long-term Maintenance of Sod Areas Over-seeded Trefoil and Vetch

(a) Mowing

(i) Mow grass to a height of 65mm just prior to over-seeding with Birdsfoot trefoil and Crown vetch.

(ii) Cut grass once, in the mid fall, or as directed by the Contract Administrator to control excessive weed growth,

(b) Fertilize grass areas in the spring and late fall as follows:

(i) Spring: 16-20-0

(ii) Fall: 10-6-4

(c) Weed Control

(i) Prior to over-seeding with Birdsfoot trefoil and Crown vetch, the Contractor shall spray sod areas with broadleaf weed controls once in the spring or late summer, or more frequently as required or directed by the Contract Administrator. Use environmentally friendly chemical agents approved by Agriculture Canada.

(ii) Following over-seeding, spot spray to control noxious weeds.

(d) Insect Control

(i) Use chemical agents approved by Agriculture Canada to control damaging insects.

(e) Remove leaves from turf grass areas or thoroughly mulch in the fall.

(f) Spring Sand/Salt Cleanup and Sod Repair

(i) Remove salt and sand from all turf grass areas in the spring of each year of long-term maintenance operations: typically around April 15. Replace damaged sod, or top-dress and over-seed with a 75% Kentucky bluegrass and 25% Creeping Red fescue seed mix, as required by the Contract Administrator.

(g) Standard

(i) At the end of the required maintenance period uniform stands of grass must be well established in all turf grass areas or re-sodding/re-seeding will be required at the Contractor's expense, to the satisfaction of the Contract Administrator.

- Scattered bare spots, none of which is larger than 100mm square will be allowed up to a maximum of three (3) percent of any turf grass area.

(ii) Defective sod shall be replaced and areas so replaced shall be maintained, without additional payment, for a 30-day period in the next growing season.

(iii) Re-seeded areas shall be maintained until accepted by the Contract Administrator based on the establishment requirements outlined in CW 3520-R6

(iv) Any areas re-sodded after September 15th, which do not show an even stand of live growth and/or adequate root development in that year shall have the basic maintenance period commence on May 15th of the following year or such date as mutually agreed upon by all parties, at which time all sod must show an even stand of live growth.

(v) Re-seed areas which fail to show trefoil or vetch upon completion of the two-year maintenance period.

E52.5.13 Maintenance of Salt-tolerant Prairie Grass Seed Mix, and Wildflowers and Grass Seed Mix Areas

(a) Repair and re-seed dead or bare spots to the satisfaction of the Contract Administrator.

(b) Eliminate weeds by hand or chemical means. Spot treat localized weedy areas, only, with Roundup, 2-4D or Diacamba.

(c) Water only as required for seed establishment and seed maintenance in periods of severe drought.

(d) Mowing

(i) Mow salt-tolerant prairie grasses; wildflower and grass areas, and sod areas over-seeded with trefoil and vetch in the late fall, or as directed by the Contract Administrator to remove excessive weed growth.

(ii) Removed cuttings.

(iii) Mow prairie grass and wildflower and grass areas, and sod over-seeded with trefoil and vetch to a height of 100 mm.

E52.5.14 General Cleanup

(a) Cleanup garbage and debris throughout site during the two-year maintenance period.

(b) Remove soil or grass clippings from walkway areas.

(c) Dispose of collected garbage and clippings at a recognized solid waste disposal site.

E52.6 Method of Measurement

E52.6.1 Trees, Shrubs and Vines, Planting Beds, Sod Areas, and General Cleanup

(a) Long-Term maintenance will begin following relevant short-term maintenance acceptances of trees, shrubs, vines, and planting beds; sod areas, and seeded areas.

(i) Two-year general maintenance of trees, shrubs and vines, and planting beds including: fertilizing, pruning, spraying for insects, disease control, cultivation, care of guy wires and turnbuckles, straightening, mulching and watering, will be measured twice each season, typically in July and October, for a six month annual growing season from April 15 to October 15 each year.

(b) Sod and Ditch Seed Areas

(i) Two year general maintenance of regular sod and ditch seed areas, including: scheduled mowing, fertilizing, watering, weed and insect control, and removal of leaves will be measured twice each season, for the six month annual growing season for work completed in each area.

(c) Salt-tolerant Prairie Grass Seed Mix and Wildflower and Grass Seed Mix Areas, and Sod Areas Over-seeded with Trefoil and Vetch

(i) Two-year general maintenance of Salt-tolerant Prairie Grass and Wildflower and Grass areas, and areas over-seeded with trefoil and vetch, including mowing once in the fall or as required to control excessive weed growth, spot weed control, and removal of cuttings, will be measured twice each season, for the six month annual growing season for work completed in each area each year.

(d) General Cleanup

(i) Two-year general cleanup of all landscaped areas, including removal of garbage and debris and grass clippings in the roadway corridor, will be measured twice each season, for the six-month annual growing season, for the entire project area.

(ii) All measured work will be in accordance with the Construction Drawings and this Specification and accepted by the Contract Administrator, as computed by the Contract Administrator.

E52.6.2 Watering of Sod Areas

(a) Watering of plant material, sod and seeded areas during the two-year maintenance period will be measured on a per-time basis for watering in each area, as computed by the Contract Administrator. Provide watering logs.

E52.6.3 Spring Cleanup

(a) Spring cleanup will be measured on a per time basis for each recorded cleanup completed in accordance with this Specification and accepted by the Contract Administrator, as computed by the Contract Administrator. Provide cleanup time logs.

E52.7 Basis of Payment

E52.7.1 General Maintenance of Plant Material and Planting Beds, Sod and Seeded Areas, and General Clean-Up

(a) General maintenance and general clean-up will be paid for at the Contract Unit Prices for "General Plant Material and Planting Bed Maintenance", "General Sod Maintenance", “General Maintenance of Ditch Seed Areas”, “General Maintenance of Salt-tolerant Prairie Grass Seed Areas” and General Maintenance of Wildflower and Grass Seed Areas”, and "General Clean-up Operations", which prices will include supply of all labour, equipment and materials and performing all operations herein described, and all other items incidental to the Work included in this specification.

E52.7.2 Watering of Trees and Watering of Sod Areas

(a) Watering of plant material, sod and seeded areas during the two-year maintenance period will be paid for at the Contract Unit Prices for “Watering of Trees, Shrubs and Vines”, "Watering of Sod Areas", and “Watering of Ditch Seed Areas” and “Watering of Salt-tolerant Prairie Grass Seed Areas, and Wildflower and Grass Seed Areas”, pro-rated to the percentage of sod area or seeded area watered, which prices will include supply of all labour, equipment and materials and performing all operations herein described, and all other items incidental to the Work included in this Specification.

E52.7.3 Spring Cleanup

(a) Spring Cleanup will be paid for at the Contract Unit Price for “Annual Spring Cleanup of All Landscaped Areas”, pro-rated to the percentage of area completed, which price will include supply of all labour, equipment and materials and performing all operations herein described, and all other items incidental to the Work included in this Specification.

E53. PLANT MATERIAL WARRANTY

E53.1 Description

E53.1.1 This Specification shall cover the provision of warranty for all plant material itemized on the Plant List, for the two-year maintenance period and for the individual areas identified within the overall Contract Area, including any changes confirmed by the Contract Administrator to the plant materials or areas.

E53.2 Timing

(a) Warranty shall be for two years, commencing upon acceptance of installed plant material.

E53.3 Warranty

(a) The Contractor hereby warrants that the plant material as itemized on the Plant Lists on each of the Construction Drawings will remain free of defects for the maintenance period indicated for each area of the Contract.

E53.4 End-of-Warranty Inspection

(a) Contract Administrator reserves the right to extend the Contractor's warranty responsibilities for an additional year, at the end of the designated warranty period for the appropriate area, if at that time plant material leaf development and growth are not sufficient to ensure future survival.

E53.5 Replacement

(a) During the warranty period, remove from the site any plant material that has died or failed to grow satisfactorily, as determined by the Contract Administrator and immediately replace as instructed by the Contract Administrator, with healthy plant material of the same species and size.

(b) Replace plant material in the following spring or fall as directed by the Contract Administrator.

(c) Extend warranty on replacement plant material for an additional period until the end of the specified warranty period or for one full growing season, whichever is the longer period.

(d) Continue such replacement and warranty until plant material is acceptable.

(e) Any failure by the Contractor to replace plant material as instructed by the Contract Administrator will cause the maintenance period to be extended by a period equal to the delay in performance, as determined by the Contract Administrator.

E53.6 Method of Measurement

(a) Warranties on plant material will not be measured or paid.

(b) Warranties on plant material shall be considered as included in the Contract Upit prices for plant materials.

E54. CHEMICAL CONTROL OF VEGATATION

E54.1 Description

E54.1.1 This Specification covers the requirements for the application of herbicides for weed control.

E54.2 General

E54.2.1 Safety Requirements

(a) Comply with Federal, Provincial, pesticide control regulations. Provide Material Safety Data sheets (MSDS) for all chemicals to be used.

(b) Obtain Provincial Pesticide Applications License and any other permits and licenses necessary to complete work.

(c) Comply with label directions on the use of herbicide products.

(d) Comply with label directions as to ambient temperature ranges for application.

E54.2.2 Delivery and Storage

(a) Deliver, store and maintain packaged materials with manufacturer's seals and labels intact.

(b) Prevent damage, adulteration and soiling of material during delivery, handling and storage.

(c) Store material in accordance with label directions, including those on maximum and minimum storage temperatures.

(d) Store herbicide products in original containers as supplied by manufacturer and keep sealed until used.

(e) Store herbicide products in sheltered, well ventilated, controlled access location.

(f) Do not store herbicides near feeds and food stuffs, agricultural plants, seeds, fungicides, insecticides, fertilizers or other agricultural chemicals.

(g) Identify storage area as pesticide storage facility for fire protection purposes.

(h) Post in a prominent place a list of medical and fire department telephone numbers.

(i) Post in a prominent location on the outside of the storage area a list of products stored. Provide a copy of this list to fire department. Keep list up to date.

E54.3 Materials

E54.3.1 Herbicides

(a) Select appropriate herbicides to achieve specified control requirement. Refer to Manitoba Guide to Chemical Weed Control.

(b) Herbicide products used must be registered for such use by Agriculture Canada under Pest Control Products Act.

(c) Do not use herbicides containing sodium chlorate.

E54.3.2 Adjuvants

(a) Adjuvants shall be compatible with herbicide product used.

E54.3.3 Spray Equipment

(a) Tank Spray: Do not use air-blast, mist or fog sprayer. Sprayer unit to meet the following requirements:

(i) Sprayer shall have adjustable height boom, hose and handgun for spot treatments, strainers and nozzles to produce spray pattern compatible with job.

(ii) Tank shall be equipped with continuous agitation device.

(iii) Pressure gauge and regulator shall be capable of maintaining uniform pressure between 100 and 450 kPa.

(b) Backpack Sprayer:

(i) Sprayer shall have hose and handgun for spot treatment.

(c) Equip spray tank loading pipe with check valve located within one metre of pump or hydrant to prevent siphoning from spray tank resulting in contamination of water source.

E54.4 Construction Methods

E54.4.1 Notice of Spray Operation

(a) Post areas to be treated with signs placed at each road access and 100m intervals around perimeter.

(b) Indicate on signs that spray program is being implemented.

(c) Put signs in place prior to commencement of spray operation and retain in place for 24 hours after spray operation is completed for each particular area.

E54.4.2 Environmental Protection

(a) Application may continue only when wind velocities range between 2 and 10 km/h.

(b) Do not spray when air turbulence will prevent uniform application.

(c) Do not apply herbicides within 65m of wells, rivers, streams, lakes, marshes or other environmentally sensitive areas unless otherwise sanctioned by provincial permit.

(d) In case of herbicide spill, notify Contract Administrator and Provincial Ministry of Environment verbally immediately and subsequently in writing.

(e) Do not allow drifting beyond target area. Use mechanical method to minimize herbicide drift.

(f) When spraying adjacent to desirable vegetation, use sprayer fitted with protective hood suitable to prevent contamination or provide protective covering for such vegetation while spray is in progress.

(g) Do not apply sterilants to slopes greater than 3 to 1 where killing vegetation would lead to erosion problems.

E54.4.3 Application of Herbicides

(a) Treat areas as indicated with appropriate herbicides.

(b) Calibrate equipment to achieve manufacturer's recommended application rates.

(c) Confine herbicide application to areas as indicated to achieve specified control requirements.

(d) Space successive passes to provide uniform coverage of treated area.

(e) Use markers or other aids as necessary to indicate successive passes.

(f) Where roots of desirable vegetation run under treatment area, use contact herbicides.

(g) Ensure formulation and rate of sterilant will not lead to leaching outside treatment area.

(h) Retreat areas in accordance with label directions until specified control requirements are achieved.

E54.4.4 Control Requirements

(a) For weed control, achieve within 30 days of treatment, minimum of 90% kill of target plants without damaging installed plant material.

(b) For soil sterilization, achieve within 12 months of treatment, 100% kill of vegetation.

E54.4.5 Waste Disposal

(a) Triple rinse empty herbicide containers with dilutent and add rinsate to spray mixture in tank.

(b) Puncture and crush glass plastic metal containers making them unsuitable for further use.

(c) Dispose of containers in accordance with provincial requirements.

(d) Do not rinse or wash spray tanks and equipment on site.

E54.4.6 Report

(a) Within 7 days of work completion, submit to Contract Administrator a written report containing following information:

(i) Full name and PCP Registration number of herbicide products used including adjuvants.

(ii) Types and makes of application equipment used.

(iii) Total amount of herbicide applied and rate of application expressed in kilograms of active ingredients per square metre and in kilograms of product per square metre.

(iv) Dates and times treatment commenced and terminated each day.

(v) Summary of daily weather conditions during treatment.

(vi) Number of hectares completed each day.

(vii) Description of disposal techniques, total number of containers discarded for each chemical, exact location of disposal site.

(viii) Names of drivers, mixers and applicators.

(ix) Copies of provincial applicator's license and pesticide project application permit.

E54.5 Method of Measurement

E54.5.1 Chemical Control of Vegetation

(a) Broad scale application of chemical herbicides following topsoil installation will be paid for on an area basis. The area paid for shall be the total number of square metres sprayed in accordance with this Specification and accepted by the Contract Administrator, as computed by the Contract Administrator.

E54.5.2 Spot Weed Control

E54.6 Application of chemical herbicides to control excessive weed growth in sod or seeded areas, in planting beds or around trees, following completion of planting operations will be included in the Contract Price for General Maintenance.

E54.6.1 Chemical Control of Vegetation

(a) Chemical Control of Vegetation will be paid for at the Contract Unit Price per square metre for "Chemical Application of Herbicide", which payment shall be considered compensation in full for supplying all of the labour, materials, equipment, tools and completing all operations herein described and all other work incidental to the work included in this Specification.

E55. PAVING STONES ON A LEAN CONCRETE BASE

E55.1 Description

E55.1.1 This Special Provision shall amend and supplement City of Winnipeg Standard Construction Specification CW 3335 “Interlocking Paving Stones on a Lean Concrete Base”, and shall cover the supply and installation of pre-cast unit paving stones and lean concrete base in areas indicated on the Construction Drawings.

E55.2 Materials

E55.2.1 Use Barkman Concrete Ltd. Roman Pavers:

(a) Edge, Soldier Course - Natural Grey colour, and

(b) Inside, Random Pattern 1 - Sierra Grey colour.

E55.2.2 Lean concrete base and bedding sand to be as per CW 3335.

E55.3 Construction Methods

E55.3.1 Supply and install Roman pavers over lean concrete base in accordance with CW 3335.

E55.3.2 Install Roman pavers in a single soldier course pattern around all perimeter and inside edges of curbs and concrete sidewalks, as shown on the Construction Drawings.

E55.3.3 Install Roman pavers inside the soldier course perimeter in Barkman Concrete Ltd. “Random Pattern 1”.

E55.4 Method of Measurement

E55.4.1 Measure supply and installation of pre-cast paving stones on lean concrete base in accordance with CW 3335, except that the area measurement will include both paving stones and base.

E55.5 Basis of Payment

E55.5.1 The supply and installation of pre-cast paving stones on lean concrete base shall be paid for at the Contract Unit Price per square metre for "Paving Stones complete with Lean Concrete Base", 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 this Specification.

E56. GROUTED TYNDALL STONE PIECES

E56.1 Description

E56.1.1 This Special Provision shall amend and supplement City of Winnipeg Standard Construction Specification CW 3615-R2 "Riprap", and shall cover the supply and installation of grouted stone riprap in areas indicated on the Construction Drawings.

E56.2 Materials

E56.2.1 Riprap shall be angular grey Tyndall stone pieces, rough sawn and ranging in surface area from 200mm x 200mm to 300mm x 300mm. Vertical depth of pieces to be between 200mm and 250mm.

E56.2.2 Concrete sand grout to be as per CW 3615-R2.

E56.3 Construction Methods

E56.3.1 Supply and install grouted Tyndall stone riprap in accordance with CW 3615-R2 and the Construction Drawings.

E56.4 Method of Measurement

E56.4.1 Measure the supply and installation of grouted Tyndall stone riprap in accordance with CW 3615-R2.

E56.5 Basis of Payment

E56.5.1 The supply and installation of grouted Tyndall stone riprap shall be paid for at the Contract Unit Price per cubic metre for "Grouted Tyndall Stone", 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 this Specification.

E57. TREE REMOVAL

E57.1 Description

E57.1.1 This Special Provision shall amend the City of Winnipeg Standard Construction Specification CW 3010-R4 "Clearing and Grubbing", and shall cover the removal of trees as specified on the Contract Drawings.

E57.2 Construction Methods

E57.2.1 Remove Trees in accordance with CW 3010-R4.

E57.3 Method of Measurement

E57.3.1 Tree removal will be measured on a unit basis. The Contractor will be paid according to the total number of trees removed within the limits of the work and approved by the Contract Administrator.

E57.4 Basis of Payment

E57.4.1 The removal of trees shall be paid for at the Contract Unit Price per tree for "Tree Removal", 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 this Specification.

E58. DEMOLITION OF GUARDHOUSE AND GATE (6M X 6M)

E58.1 Description

E58.1.1 This Special Provision covers the demolition of the Guardhouse and Gate with arm as specified on the Contract Drawings.

E58.2 Removal Methods

E58.2.1 The Contractor shall completely demolish the guardhouse and structural foundation above and below ground, sidewalls, gate, etc. on the Site. The Contractor shall remove and dispose of rubbish and debris. The Contractor shall not store or permit debris or rubbish to accumulate on the Site for more than one Working Day.

E58.2.2 The Contractor shall not place backfill material until the Contract Administrator has inspected and approved the excavation. Should the Contract Administrator place any backfill prior to approval, the excavation shall be re-opened by the Contractor, at his expense.

E58.2.3 The Contractor shall haul and deposit concrete to a concrete recycler. All material from Site to the City's Brady Road Landfill site, unless otherwise directed by the Contract Administrator.

E58.3 Method of Measurement

E58.3.1 Demolition of the Guardhouse and Gate will be measured on a lump sum basis. The Contractor will be paid according to complete demolition within the limits of work and approved by the Contract Administrator

E58.4 Basis of Payment

E58.4.1 The demolition of guardhouse and gate shall be paid for at the lump sum Contract Unit Price for "Demolition of Guardhouse and Gate", 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 this Specification.