

Canada



Manitoba 

THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 83-2005

KENASTON UNDERPASS PROJECT
STERLING LYON PARKWAY (EAST)
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS

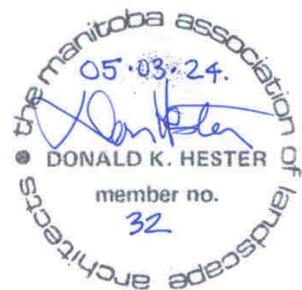
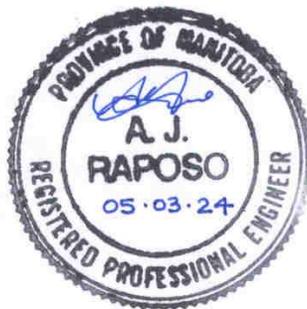


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PART B

BIDDING PROCEDURES

PART B - BIDDING PROCEDURES

B1. PROJECT TITLE

- B1.1 KENASTON UNDERPASS PROJECT
STERLING LYON PARKWAY (EAST)
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS

B2. SUBMISSION DEADLINE

- B2.1 The Submission Deadline is 12:00 noon Winnipeg time, April 15 ,2005..
- 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 Bidder may view the Site without making an appointment.

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 in Adobe Acrobat (.pdf) format at The City of Winnipeg, Corporate Finance, Materials Management 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 Division's Bid Opportunities 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 at 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
- (d) 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 PDF version of the Form B: PRICES and the Excel version of the 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 Division
185 King Street, Main Floor
Winnipeg MB R3B 1J1

B8. BIDDER

- 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 Clause B7.3.2 and B15.4.2, an electronic spreadsheet of Form B: PRICES (Excel format) is available with the Documents for this Bid Opportunity at the Materials Management Division's Bid Opportunities 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 Division 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 Division 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 Manitoba, 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.
- B11.3 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.
- B11.4 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.

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 Division, 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 in Adobe Acrobat (pdf) format on the Closed Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division 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 page at The City of Winnipeg, Corporate Finance, Materials Management Division 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, or by other authorities having jurisdiction.

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 Award Authority 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;
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B10;
- (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 of Winnipeg 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, statements, receipts and vouchers, in accordance with generally accepted accounting principles for a least five (5) years from Total Performance. The Contractor agrees that representatives 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 hereby amended by deleting 3.2 (a) and substituting the following thereof:
- (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 Award Authority 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.
- B17.4 The award of this Contract is contingent upon the Federal Government approving funding for the Work from the Canada Strategic Infrastructure Fund. Bidders are advised that Federal funding is contingent on a satisfactory Environment Assessment Review. If sufficient funding for this Contract is not approved by the Federal Government, the City shall have the right to not award the Contract.

PART C

GENERAL CONDITIONS

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 in Adobe Acrobat (.pdf) format on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division internet site at <http://www.winnipeg.ca/matmgt>.

PART D

SUPPLEMENTAL CONDITIONS

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 completed under the Contract shall consist of:
- (a) Construction of a new Portland Concrete Pavement on Sterling Lyon Parkway from Kenaston Boulevard to Victor Lewis Drive

The major components of this Work are as follows:

- (i) Clearing and Grubbing,
- (ii) Stripping and stockpile of topsoil;
- (iii) Excavation;
- (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 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 seeding;
- (xiv) Ditch grading and sloping;
- (xv) Landscaping

- (b) Construction of a new intersection at Kenaston Boulevard and Sterling Lyon Parkway

The major components of this Work are as follows:

- (i) Stripping and stockpile of topsoil;
- (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) 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) Boulevard grading and seeding;
- (xii) Ditch grading and sloping;
- (xiii) Landscaping

- (c) Construction of intersection improvements at Wilkes Avenue, Victor Lewis Drive and Sterling Lyon Parkway

The major components of this 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 250mm concrete pavement (plain-dowelled)
- (viii) Adjustment of existing manholes and catchbasins;
- (ix) Construction of 180mm barrier curb and splash strip in median and gutter (separate) utilizing slip-form paving equipment ;
- (x) Boulevard grading and seeding;
- (xi) Ditch grading and sloping;
- (xii) Landscaping

Installation of Land Drainage Sewer (LDS), DND Utility Relocations, and Miscellaneous Underground Works

- (d) Construction of an LDS on Sterling Lyon Parkway from Kenaston Boulevard to Victor Lewis Drive

The major components of this Work are as follows:

- (i) Installation on new land drainage sewer lines on, Sterling Lyon Parkway
- (ii) Installation of new waste water sewer lines by trenchless methods;
- (iii) Watermain installation by trenchless methods;
- (iv) Connect new watermains to existing watermains;
- (v) Installation of gate valves;
- (vi) Connect new land drainage sewer to existing land drainage sewer;
- (vii) Installation of new manholes;
- (viii) Installation of new catch basins;

- (e) Construction of LDS in the Patrick Way right of way (Future Street)

The major components of this Work are as follows:

- (i) Installation on new land drainage sewer lines on Patrick Way;
 - (ii) Installation of new manholes;
 - (iii) Installation of new catch basins;
- (f) Construction of LDS and Forcemain on Kenaston Boulevard from Wilkes Avenue to Sterling Lyon Parkway

The major components of this Work are as follows:

- (i) Installation on new land drainage sewer lines on Kenaston Boulevard;
 - (ii) Installation of new forcemain on Kenaston Boulevard;
 - (iii) Connect new land drainage sewer to existing land drainage sewer;
 - (iv) Removal of existing manholes, catchbasins and land drainage sewer pipes;
 - (v) Installation of new manholes;
 - (vi) Installation of new catch basins;
- (g) Construction of Utility Relocations within DND – PPCLI compound

The major components of this Work are as follows:

- (i) Installation of new combined sewer lines by trenchless methods;
- (ii) Watermain installation by trenchless methods;
- (iii) Connect new watermains to existing watermains;
- (iv) Reconnection of water service connections;
- (v) Installation of gate valves and hydrant assemblies;
- (vi) Abandon and plug existing watermains and services, including removal of existing valves and hydrants;
- (vii) Abandon and plug existing sewer services on DND property and Kenaston Boulevard;
- (viii) Reconnect existing sewer services to new combined sewer;
- (ix) Removal of existing manholes, catchbasins and land drainage sewer pipes;
- (x) Installation of new manholes;
- (xi) Relocation of existing catch basins;

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

- (i) Installation on new land drainage sewer lines on Kenaston Boulevard, Sterling Lyon Parkway and Patrick Way;
- (ii) Installation of new forcemain on Kenaston Boulevard;
- (iii) Installation of new waste water sewer lines by trenchless methods;
- (iv) Installation of new combined sewer lines by trenchless methods;
- (v) Watermain installation by trenchless methods;
- (vi) Connect new watermains to existing watermains;
- (vii) Reconnection of renewal of water service connections;
- (viii) Installation of gate valves and hydrant assemblies;
- (ix) Abandon and plug existing watermains and services, including removal of existing valves and hydrants;
- (x) Re-route existing 300 watermain on south side of Wilkes at Patrick Way;
- (xi) Abandon and plug existing sewer services on DND property and Kenaston Boulevard;
- (xii) Reconnect existing sewer services to new combined sewer;
- (xiii) Connect new land drainage sewer to existing land drainage sewer;
- (xiv) Removal of existing manholes, catchbasins and land drainage sewer pipes;

- (xv) Installation of new manholes;
- (xvi) Installation of new catch basins;

D2.3 Bidders are advised that the City currently has insufficient approved funding in the Capital Budget for this Contract, but is anticipating receiving notification about funding from the Federal Government by April 27, 2005. The Work is contingent upon the Federal Government approving sufficient funding.

D2.3.1 If notice of sufficient funding is not received, the City shall not award the Contract.

D3. DEFINITIONS

D3.1 When used in this Bid Opportunity:

"DND" means Department of National Defence ;

"CN" means Canadian National;

"CPR" means Canadian Pacific Railway;

D4. CONTRACT ADMINISTRATOR

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

Gil Mourant, P.Eng.
Project Manager
905 Waverley Street,
Winnipeg, MB R3T 5P4

Telephone No. (204) 489-5900

Facsimile No. (204) 453-9012

D4.2 At the pre-construction meeting, Gil Mourant, P.Eng. 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 Division internet site at <http://www.winnipeg.ca/matmgt>

D9. INSURANCE

- D9.1 The Contractor shall provide and maintain the following insurance coverage at all times during the performance of the Work and throughout the warranty period except for all claims made policies, which shall be maintained for a minimum period of twenty four (24) months after the date of Total Performance.
- (a) Commercial General Liability insurance, in the minimum amount of ten million dollars (\$10,000,000.00) inclusive. The said Commercial General Liability insurance shall include coverage for products and completed operations, blanket contractual liability, cross liability, non owned automobile, and unlicensed motor vehicle liability. The said Commercial General Liability insurance shall include The City of Winnipeg, The Province of Manitoba The Federal Government of Canada and their ministers, officers, employees and agents, The Department of National Defence, Canadian National Railway, Canadian Pacific Railway, and the Contract Administrator as additional insureds.

- (b) All Risk Course of Construction insurance in the amount of one hundred percent (100%) of the total Contract price written in the name of the Contractor and The City of Winnipeg and shall include, The Province of Manitoba, The Federal Government of Canada and their ministers, officers, employees and agents, The Department of National Defence, Canadian National Railway, Canadian Pacific Railway, and the Contract Administrator as additional insureds.
- (c) Automobile Liability insurance for 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 Deductibles shall be borne by the Contractor.

D9.3 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D9.4 The Contractor shall provide the City Solicitor with evidence of insurance detailing all insurance requirements, in a form satisfactory to the City Solicitor, 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.

D9.5 GC:17 is hereby amended by adding the following:

D9.5.1 The Contractor agrees at all times to indemnify and save harmless Her Majesty in the Right of Canada and Her Majesty in the Right of Manitoba, its officers, servants, employees or agents, from and against all claims and demands, loss, costs, damages, actions, suits or other proceedings by whomsoever brought or prosecuted in any manner based upon, or occasioned by any injury to persons, damage to or loss or destruction of property, economic loss or infringement of rights caused by or arising directly or indirectly from:

- (a) The performance of this Contract or the breach of any term or condition of this Contract by the Contractor, its officers, employees, agents and subcontractors; and
- (b) Any omission or other wilful or negligent act of the Contractor and its officers, employees, agents and subcontractors except to the extent to which such claims and demands, losses, costs, damages, actions, suit, or other proceedings relate to the act of negligence of an officer, employee or agents of Her Majesty in the Right of Canada or Her Majesty in the Right of the Province of Manitoba in the performance of his or her duties.

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 Manitoba, 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; and
- 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 within seven (7) Working Days of receipt of the letter of intent.

D14.4 The City intends to award this Contract April 29, 2005.

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) Construction of Sterling Lyon Parkway West of Kenaston Boulevard
- (b) Construction of roadway detour East side of Kenaston Boulevard from Taylor Avenue to Wilkes Avenue
- (c) Construction of CN Rail Detour north of CN River subdivision and Kenaston Boulevard
- (d) Installation of new street lights by Manitoba Hydro on Sterling Lyon Parkway;
- (e) Relocation of underground and overhead utilities by Manitoba Hydro
- (f) Installation of new gas lines, lowering/wrapping of gas lines by Manitoba Hydro-Natural Gas
- (g) Installation of new traffic signal plant at Sterling Lyon Parkway and Kenaston Boulevard, Sterling Lyon Parkway and Whidden Gate, new tie lines on Sterling Lyon Parkway, and modification of signalized intersection at Sterling Lyon Parkway and Victor Lewis Drive, by City of Winnipeg.
- (h) Traffic Services by City of Winnipeg.
- (i) Installation of new MTS Allstream lines and adjust manholes.
- (j) Remove East track, install West track crossing, install signals and gates, and remove wood pole, by CN
- (k) Install track crossing, install signals and gates, by CPR

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 5 phases . Each Phase shall be subdivided into stages. Stages are further subdivided into major items of Work.

D17.1.2 **Phase I** – Remove Excess Fill on Sterling Lyon Parkway right of way

- (i) Remove all excess fill material to within 0.3m of finished grade between stations 2+675 and 3+075 prior to installation of the Gravity Sewer.

D17.1.3 **Phase II** – Underground Works

(a) **Stage I** – Installation on new land drainage sewer lines on Sterling Lyon Parkway (East) Kenaston Boulevard,

- (i) Installation on new land drainage sewer lines
- (ii) Re-route existing 300 watermain on south side of Wilks at Patrick Way;
- (iii) Connect new land drainage sewer to existing land drainage sewer;
- (iv) Installation of new manholes;
- (v) Installation of catch basins and connection pipe;

This Work is to proceed in such a manner that road Works can begin in two locations, starting at Victor Lewis Drive heading west and Kenaston Boulevard heading east, on May 16, 2005.

(b) **Stage II** –Miscellaneous Underground Works

- (i) Installation of new waste water sewer lines by trenchless methods;
- (ii) Installation of new combine sewer lines by trenchless methods;
- (iii) Watermain installation by trenchless methods;
- (iv) Connect new watermains to existing watermains;
- (v) Reconnection of renewal of water service connections;
- (vi) Installation of gate valves and hydrant assemblies;

(c) **Stage III** – Installation of new forcemain on Kenaston Boulevard

- (i) Installation on new forcemain lines
- (ii) Connect to existing new land drainage sewer lines

(d) **Stage IV** – Installation on new land drainage sewer lines on Patrick Way

- (i) Installation on new land drainage sewer lines

D17.1.4 **Phase III** - Road Works

(a) **Stage I** – Sterling Lyon Parkway (East)

- (i) Cleaning and Grubbing, stripping and stockpile topsoil;
- (ii) Excavation;
- (iii) Installation of subdrains;
- (iv) Compaction of existing sub-grade;
- (v) Placement of separation/reinforcement fabric;
- (vi) Placement of sub-base and base course materials;
- (vii) Construct 230mm concrete pavement (plain-dowelled) utilizing slip-form paving equipment;
- (viii) Adjustment of existing manholes;
- (ix) Construct 180mm barrier curb and splash strip in median and gutter (separate) utilizing slip-form paving equipment ;

- (x) Construct asphalt multiuse sidewalk;
- (xi) Boulevard grading;
- (xii) Ditch grading and sloping;
- (xiii) Landscaping;

(b) **Stage II** – Intersection of Kenaston Boulevard and Sterling Lyon Parkway (East)

- (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) Construct 250mm concrete pavement (plain-dowelled) utilizing slip-form paving equipment;
- (viii) Adjustment of existing manholes;
- (ix) Construct 180mm barrier curb and splash strip in median and gutter (separate) utilizing slip-form paving equipment ;
- (x) Construct concrete / asphalt multiuse sidewalk;
- (xi) Boulevard grading;
- (xii) Ditch grading and sloping;
- (xiii) Landscaping;

The north and south bound left turning lanes shall be scheduled to be constructed first.

(c) **Stage III** – Intersection of Wilkes Avenue/Victor Lewis Drive and Sterling Lyon Parkway (East)

- (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) Adjustment of existing manholes;
- (viii) Construct 200mm concrete pavement (plain-dowelled) utilizing slip-form paving equipment;
- (ix) Construct 180mm barrier curb and splash strip in median and gutter (separate) utilizing slip-form paving equipment ;
- (x) Construct concrete / asphalt multiuse sidewalk;
- (xi) Boulevard grading;
- (xii) Ditch grading and sloping;
- (xiii) Landscaping;

D17.1.5 **Phase IV** – DND Utility Relocation

(a) **Stage I** – Miscellaneous Underground Works

- (i) Reconnect of renewed water service connections ;

- (ii) Abandon and plug existing watermains and services, including removal of existing valves and hydrants;
- (iii) Abandon and plug existing sewer services on DND property and Kenaston Boulevard;
- (iv) Reconnect existing sewer services to new combine sewer; and
- (v) Removal of existing manholes, catchbasins and land drainage sewer pipes;

D17.1.6 **Phase V** – Landscaping

- (i) Sodding
- (ii) Seeding
- (iii) Planting trees and shrubs

D17.2 The Contractor shall coordinate with the identified activities and modify his proposal in order to minimize disruptions.

D18. SUBSTANTIAL PERFORMANCE

D18.1 The Contractor shall achieve Substantial Performance by September 16, 2005, excluding landscaping Works to be completed in 2006..

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 July 14, 2006 .

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 sodded and seeded areas as specified in E23, E24, and E27;
- (b) Maintenance of plant material as specified in E26, E27, and E28;
- (c) Reflective crack maintenance during two years warranty period as specified in CW3250-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 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 D23,] 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.

D24.3 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 OPPURTUNITY NO. 83-2005

KENASTON UNDERPASS PROJECT
STERLING LYON PARKWAY (EAST)
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 – 83-2005

KENASTON UNDERPASS PROJECT
STERLING LYON PARKWAY (EAST)
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
STERLING LYON PARKWAY (EAST)
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
SURFACE WORKS		
<u>Supply of Materials:</u>		
Concrete		
Asphalt		
Base Course & Sub-Base		
Geotextile Materials		
Top soil / Sod		
<u>Installation/Placement:</u>		
Concrete		
Asphalt		
Sub base & Base course		
Geotextile Materials		
Top soil / Sod		
UNDERGROUND WORKS:		
<u>Supply of Materials:</u>		
Pipes		
Subdrains		
Precast Concrete Catch Basins/Manholes/Ring Section		
Catch Basins/Manholes Frames, Covers and Boxes		
Connecting and Sewer Service Pipe		
<u>Installation/Placement:</u>		
Pipes		
Subdrains		
Precast Concrete Catch Basins/Manholes/Ring Section		
Catch Basins/Manholes Frames, Covers and Boxes		
Connecting and Sewer Service Pipe		

FORM K: EQUIPMENT
(See D12)

**KENASTON UNDERPASS PROJECT
STERLING LYON PARKWAY (EAST)
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS**

<p>1. Category/type: LDS Works</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>2. Category/type: Earthmoving/Excavation</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>3. Category/type: Compaction and Grading</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>

FORM K: EQUIPMENT
(See D12)

**KENASTON UNDERPASS PROJECT
STERLING LYON PARKWAY (EAST)
ROAD WORKS, LDS AND MISCELLANEOUS UNDERGROUND WORKS**

<p>4. Category/type: Concrete Paving (Slip Form)</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>5. Category/type: Asphalt Paving</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>6. Category/type: Miscellaneous</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>

FORM L: DETAILED WORK SCHEDULE
 (See D13)

**KENASTON UNDERPASS PROJECT
 STERLING LYON PARKWAY (EAST)
 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 –Remove Excess Fill on Sterling Lyon Parkway right of way					05/20/2005
Phase II –Underground Works					08/12/2005
Stage I Installation of new land drainage sewer lines on Sterling Lyon Parkway (East) and Kenaston Boulevard					
Installation of new land drainage sewer lines on Sterling Lyon Parkway (East)					
Connect new land drainage sewer to existing land drainage sewer					
Installation of new manholes					
Installation of new catch basins and connection pipe					
Stage II Miscellaneous Underground Works					
Installation of new waste water sewer lines by trenchless methods					
Watermain installation by trenchless methods					
Connect new watermains to existing watermains					
Installation of gate valves					
Stage III Installation of new land drainage sewer and forcemain on Kenaston Boulevard					06/30/2005
Installation of new land drainage sewer lines on Kenaston Boulevard					
Connect new land drainage sewer to existing land drainage sewer					
Installation of new manholes					
Installation of new catch basins and connection pipe					
Installation on new forcemain lines					
Connect to new land drainage sewer lines					
Stage IV Installation of new land drainage sewer lines on Patrick Way					09/09/2005
Installation of new manholes					
Phase III Road Works					09/16/2005
Stage I –Sterling Lyon Parkway (East)					

FORM L: DETAILED WORK SCHEDULE
 (See D13)

**KENASTON UNDERPASS PROJECT
 STERLING LYON PARKWAY (EAST)
 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%
Cleaning and Grubbing, stripping and stockpile topsoil					
Excavation					
Drainage Works					
Placement of sub-base and base course materials					
Construct 230mm concrete pavement					
Construct 180mm barrier curb and splash strip					
Construct asphalt multiuse sidewalk					
Ditch grading and sloping					
Boulevard grading,					
Stage II – Intersection of Kenaston Boulevard and Sterling Lyon Parkway (East)					06/24/2005
Excavation					
Drainage Works					
Placement of sub-base and base course materials					
Construct 250mm concrete pavement					
Construct 180mm barrier curb and splash strip					
Construct asphalt multiuse sidewalk					
Ditch grading and sloping					
Boulevard grading,					
Stage III – Intersection of Wilkes Avenue/Victor Lewis Drive and Sterling Lyon Parkway (East)					
Construct concrete pavement					
Construct 180mm barrier curb and splash strip					
Construct asphalt multiuse sidewalk					
Boulevard grading,					
Phase IV – DND Utility Relocation					06/30/2005

FORM L: DETAILED WORK SCHEDULE
 (See D13)

**KENASTON UNDERPASS PROJECT
 STERLING LYON PARKWAY (EAST)
 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%
Installing of combined sewer line					
Installing of watermains					
Installing of gate valves and hydrant assembly					
Connection of watermains to existing watermains					
Reconnection of water service connections					
Abandon and plug existing watermains and services					
Abandon and plug existing sewer services on DND property					
Reconnect existing sewer services to new combined sewer					
Removal of existing manholes, catchbasins and land drainage sewer pipes					
Phase V – Landscaping					07/14/2006
Sodding					
Seeding					
Planting trees and shrubs					

PART E

SPECIFICATIONS

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 in Adobe Acrobat (.pdf) format on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division internet site at <http://www.winnipeg.ca/matmgt>.
- E1.1.2 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:

E1.3

Drawing Title	Drawing No.	Size
Kenaston Underpass Project.	P-3258-01	A1
Sterling Lyon Parkway (East) Site Plan- Limits of Works	P-3258-02	A1
Horizontal Geometry – North and South Control Line	P-3258-03	A1
Kenaston Boulevard		
Horizontal Geometry – Sta. 0+685.069 to 1+062.085	P-3258-04	A1
Sterling Lyon Parkway		
Horizontal Geometry – Kenaston Boulevard To Sta.2+750	P-3258-05	A1
Horizontal Geometry - Sta.2+750 to Sta. 3+025	P-3258-06	A1
Horizontal Geometry - Sta. 3+025 to Sta. 3+325	P-3258-07	A1
Horizontal Geometry - Sta. 3+325 to Sta. 3+625	P-3258-08	A1
Horizontal Geometry - Sta. 3+625 to Sta. 3+975	P-3258-09	A1
Horizontal Geometry - Sta. 3+975 to Sta. 4+337.197	P-3258-10	A1
Wilkes Avenue/Victor Lewis Drive		
Horizontal Geometry - Sta.0+412.583 to Sta. 0+663.044	P-3258-11	A1
Pavement Drawing Key Plan	P-3258-12	A1
Kenaston Boulevard		
Horizontal and Vertical Alignment – Sta. 0+685.069 to 1+062.085	P-3258-13	A1

Drawing Title	Drawing No.	Size
Sterling Lyon Parkway		
Horizontal and Vertical Alignment – Kenaston Boulevard. to Sta.2+750	P-3258-14	A1
Horizontal and Vertical Alignment – Sta.2+750 to Sta. 3+025	P-3258-15	A1
Horizontal and Vertical Alignment – Sta. 3+025 to Sta. 3+325	P-3258-16	A1
Horizontal and Vertical Alignment – Sta. 3+325 to Sta. 3+625	P-3258-17	A1
Horizontal and Vertical Alignment – Sta. 3+625 to Sta. 3+900	P-3258-18	A1
Horizontal and Vertical Alignment – Sta. 3+900 Sta. 4+150	P-3258-19	A1
Horizontal and Vertical Alignment – Sta. 4+150 to Sta. 4+337.197	P-3258-20	A1
Wilkes Avenue/Victor Lewis Drive		
Horizontal and Vertical Alignment – Intersection – Left Turn Lanes	P-3258-21	A1
Intersection Joint Details - Kenaston Boulevard	P-3258-22	A1
Intersection Joint Details - Patrick Way	P-3258-23	A1
Intersection Joint Details - Whidden Gate	P-3258-24	A1
Intersection Joint Details - Wilkes Avenue	P-3258-25	A1
Kenaston Boulevard		
Pavement Cross Sections and Details	P-3258-26	A1
Sterling Lyon Parkway		
Pavement Cross Sections	P-3258-27	A1
Pavement Cross Sections	P-3258-28	A1
Wilkes Avenue/Victor Lewis Drive		
Pavement Cross Sections	P-3258-29	A1
Miscellaneous Road Details	P-3258-30	A1
Kenaston Boulevard		
Land Drainage System – Sterling Lyon Parkway (East) to Sta. 1+075.	D-8616	A1
Sterling Lyon Parkway		
Land Drainage System - Kenaston Boulevard To Sta.2+750	D-8617	A1
Land Drainage System - Sta.2+750 to Sta. 3+025	D-8618	A1
Land Drainage System – Sta. 3+025 to Sta. 3+325	D-8619	A1
Land Drainage System – Sta. 3+325 to Sta. 3+625	D-8620	A1
Land Drainage System – Sta. 3+625 to Sta. 3+900	D-8621	A1
Land Drainage System – Sta. 3+900 Sta. 4+150	D-8622	A1

Drawing Title	Drawing No.	Size
Land Drainage System – Sta. 4+150 to Victor Lewis Drive	D-8623	A1
Patrick Way		
Land Drainage System – Sterling Lyon Parkway East to Sta. 0+705	D-8624	A1
Land Drainage System – Sta. 0+705 to Wilkes Avenue	D-8625	A1
Wilkes Avenue		
Ditch Regrading Kenaston Boulevard Detour to Sta. 0+325	LD-3106	A1
Ditch Regrading Sta. 0+325 to Sta. 0+625	LD-3107	A1
Ditch Regrading Sta. 0+625 to CPR La Riviere Subdivision	LD-3108	A1
CN Cement Lead Rail Ditching at Sterling Lyon Parkway	LD-3109	A1
CPR La Riviere Rail Row/Hydro Row Ditching at Sterling Lyon Parkway	LD-3110	A1
Kenaston Detour		
Land Drainage System - Sta. 1+075 to Sta. 1+300	D-8626	A1
Land Drainage System - Sta. 1+300 to Wilkes Avenue	D-8627	A1
Kenaston Boulevard / DND Property		
Underground Utility Relocation Plan	D-8628	A1
Underground Utility Relocation Plan	D-8629	A1
Surface Works Plan	D-8630	A1
Miscellaneous Underground Details	D-8631	A1
Miscellaneous Underground Details	D-8632	A1
Electrical Site Services	P-3258-31	A1
Landscape Works		
Landscape Plan – Kenaston Boulevard to Sta. 3+025	P-3258-32	A1
Landscape Plan – Sta. 3+025 to Sta. 3+625	P-3258-33	A1
Planting Bed Enlargements – Sta. 3+025 to Sta. 3+625	P-3258-34	A1
Landscape Plan – Sta. 3+625 to Victor Lewis Dr./Wilkes Ave.	P-3258-35	A1
Planting Bed Enlargements – Sta. 3+625 to Sta. 3+900	P-3258-36	A1
Landscape Plan – Sta.0+550 to Sta. 1+150.	P-3258-37	A1
Planting and Paving Details	P-3258-38	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 metres, 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°C or 24-25°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, table 3mx1.2m, one stool one four drawer legal size filing cabinet, and minimum 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 East and West traffic at Sterling Lyon Parkway and Victor Lewis Drive intersection shall be maintained during construction to allow for a minimum of one lane of traffic in each direction.
- E6.1.3 Only empty trucks will be allowed on Brockville Street.
- E6.1.4 No construction truck traffic will be allowed on Whidden Gate.
- E6.1.5 Pedestrians and Ambulance/emergency vehicle access must be maintained at all times

E7. WATER USED BY CONTRACTOR

E7.1 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.

E8. SURFACE RESTORATIONS

E8.1 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.

E9. INFRASTRUCTURE SIGNS

E9.1.1 The Contractor shall obtain six (6) Canada/Province of Manitoba/City of Winnipeg infrastructure signs from the Traffic Services Sign Shop at 421 Osborne Street. The Contractor shall mount each sign securely to a rigid backing material approved by the Contract Administrator. The Contractor shall fasten each sign to a suitable support and erect and maintain the sign 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 erection and removal of the six (6) infrastructure signs will be measured on a unit basis and paid for at the Contract Unit Price for the "Infrastructure Signs". Number of units to be paid for will be the total number of "infrastructure signs" erected and removed in accordance with this specification, accepted and measured by the Contract Administrator.

E10. REMOVAL OF EXCESS FILL ON STERLING LYON PARKWAY (EAST)

E10.1 Contractor is directed to existing ground profile along Sterling Lyon Parkway (East) between stations 2+675 and 3+075, and geotechnical report (Appendix 'A'). Excess fill material (clay, gravel, sand, topsoil, concrete debris, etc.) has been deposited within the right-of-way from nearby construction activities.

E10.2 The Contractor shall remove all excess fill material to within 0.3m of finished grade between stations 2+675 and 3+075 prior to installation of the Gravity Sewer. Excavation shall be approved by the Contract Administrator to ensure adequate excavation has been completed prior to Gravity Sewer installation.

E10.3 Excavation of excess fill will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Excavation". The removal of loose rock, concrete debris, and other fill materials within the project limits, shall be included with the excavation of excess fill and no separate measurement for payment will be made.

E11. AFTER HOURS WORK

E11.1 Further to Section 3.10 of CW 1130 of the General Requirements, the Contractor shall obtain written permission from the Contract Administrator for any Work to be performed after regular hours of Work. Regardless of the Contract Administrator's approval, any such Work done by the Contractor between these hours shall conform to all applicable Laws, By-Laws and Ordinances.

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 hereby 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 incidental and shall be included in the unit price bid for installation of gravity sewer piping.

E13. RELOCATION OF EXISTING SERVICES

- E13.1 Further to Section 3.4 of CW 1120 of the General Requirements, the City will be responsible for the costs of relocating existing trees, poles, traffic signals, signs and lamp standards which are shown on the drawings as "to be relocated by others", or which interfere with the proposed construction and are approved for relocation by the Contract Administrator.

E14. SAFETY PRECAUTIONS

- E14.1 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.

E15. ENCROACHMENT ON PRIVATE PROPERTY

- E15.1 Further to Section 3.11 of CW 1130 of the General Requirements, the Contractor shall confine his Work to the public right-of-ways 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.
- E15.2 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.
- E15.3 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.

E16. DAMAGE TO EXISTING STRUCTURES AND PROPERTY

- E16.1 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.
- E16.2 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.

E17. PROVISIONAL ITEMS

- E17.1 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.
- E17.2 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.
- E17.3 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.

E18. GRAVITY SEWERS

E18.1 Description

This Specification shall amend and supplement Standard Specification CW2130-R9.

E18.2 Materials

E18.2.1 Reinforced Precast Concrete Pipe

- (a) 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.
- (b) Pipe 1200 mm and larger used for jacking shall be supplied complete with a steel banding plate around the bell end of the pipe. The banding plate shall be manufactured with 14 gauge steel and shall have a width 1.5 times the length of the bell end groove or approved equal.
- (c) Where practical, pipe lengths used shall be the longest size manufactured to minimize the number of joints in each section of sewer.
- (d) 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/m³ for shafts backfilled in boulevard areas and 2160 kg/m³ 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.
- (e) 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.
- (f) Each direct design pipe shall be clearly marked internally to designate its strength class in a manner approved by the Contract Administrator.
- (g) Details of closures required to facilitate pipe jacking for pipe 1200 mm and larger shall be provided by a Shop Drawing submission in accordance with Clause 1.5 of CW 1110-R1.
- (h) The Contractor shall make a Shop Drawing submission (stamped with a seal of a Professional Engineer, Registered in the Province of Manitoba) in accordance with Clause 1.5 of CW 1110-R1 for the following:
 - (i) 1800 – 22 ½ LDS bend
 - (ii) 2100 – 22 ½ LDS bend
 - (iii) 1800 – 900 LDS wye
 - (iv) 2100 – LDS reducer

E18.2.2 Flowable Cement-Stabilized Fill

- (a) 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.

E18.2.3 Ditch Inlet Grate

- (a) 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.

E18.2.4 Geotextile Fabric

- (a) 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

NON-WOVEN PROPERTIES

	ASTM Test Method	Units	Minimum Average Roll Values
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 strength retained per hours of UV exposure following conditioning in accordance with ASTM D-4355.

- E18.2.5 Grouted Stone Rip Rap
- (a) Grouted stone rip rap for ditch inlet grated catchbasins shall be in accordance with CW 3615-R2.
- E18.3 Construction Methods
- E18.3.1 Method of Pipe Installation for 1200 Diameter and Larger
- (a) Land Drainage sewers to be installed by open cut and, where shown on the Construction Drawings, by jacking or tunnelling methods and in accordance with these specifications.
- E18.3.2 Method of Pipe Installation for 1050 mm Diameter and Smaller
- (a) 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.
- (b) 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.
- E18.3.3 Bedding and Backfilling Shafts
- (a) Backfill of shafts within or partially within existing or proposed pavement areas shall be Class 2 as shown in Standard Drawing SD-002 and specified in Section CW 2030-R6.
- (b) 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.
- (c) 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.
- E18.3.4 Submission of Construction Methodology
- (a) Contractor shall note that the majority of construction of the sewer along the Sterling Lyon Parkway (East) will be in a narrow 12.0 m wide, median boulevard.
- (b) Land Drainage Sewers in Open Trench installations shall be constructed in general conformance with Open Trench Detail as shown on the Construction Drawings, (DWG. No. D-8632). Trench walls, due to limitations of median boulevard width and proposed roadway pavements, shall be cut in accordance with Open Trench Detail above the Trench Box. Bracing and shoring shall be utilized if, in the opinion of the

Contractor, it 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.

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

E18.3.5 Connecting to Existing Manholes or Sewers

- (a) 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.

E18.3.6 Connecting to Existing 2100 LDS at Kenaston Boulevard

- (a) The terminal end of the 2100 LDS and plug on Kenaston Boulevard was constructed with shoring, which in all likelihood was never removed after construction. The Contractor will note that during excavation procedures, the shoring may be providing some support to the nearby shallow utilities (gas, hydro). The Contractor shall be responsible for the connection to the 2100 LDS stub while maintaining full support to the nearby shallow utilities, by utilizing additional shoring, bracing, or other procedures and installation deemed necessary for the successful connection to the existing 2100 LDS.

E18.3.7 Connections to the Proposed Sewer

- (a) All connecting pipe connections to the proposed sewer shall be made with precast junctions (tee or wye type) as per Clause 3.10 of CW 2130-R9.

E18.3.8 Reinforced Sections for Tunnel Sewer

- (a) 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.

E18.3.9 Unauthorized Excavation

- (a) Unauthorized excavation during tunnelling shall be refilled with concrete of equal strength to the final tunnel lining at the Contractor's expense.

E18.3.10 Design Diameters

- (a) 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.

E18.3.11 Abandonment of Existing Sewers or Connecting Pipe

- (a) Existing sewers or connecting pipe to be abandoned are noted on the Construction Drawings.
- (b) Conduits to be abandoned shall be completely filled with a flowable cement-stabilized fill as per Clause E20.2.2 of this Specification. Abandonment shall include installation of plugs within 1 m of sewer mains and blocked with a stiff concrete mixture at the high end as per Clause 3.19 of CW 2130-R9.

E18.3.12 Utilities Relocations

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

E18.3.13 Ditch Inlet Grates

- (a) The Contractor shall be required to supply and install ditch inlet grates on drainage inlets shown on the construction drawings.
- (b) 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.
- (c) 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.
- (d) Any galvanized surfaces that are damaged shall be coated with a galvanizing compound approved by the Contract Administrator.

E18.4 Measurement and Payment

E18.4.1 Special Precast Fittings

- (a) Special precast fittings shall be measured on a unit basis. All other fittings, couplings, and sewer junctions will be included in sewer installation.
- (b) Construction of special precast fittings shall be made at the Contract Unit Price for "Supply and Installation of Special Fittings". Payment shall be compensation in full for supply and installation of all materials, and the performing of all necessary operations, including any items incidental to the Work as specified.

E18.4.2 Abandoning Existing Sewers or Connecting Pipe with Flowable Fill

- (a) 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.

- (b) 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.

E18.4.3 Ditch Inlet Grates

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.

E18.5 Connecting to Existing Sewer Stub

Connecting to existing 2100 LDS on Kenaston Boulevard shall be measured on a lump sum basis. Price paid shall be compensation in full for all necessary excavation, shoring, bracing, supply of materials, utility locates and/or standby time and hard/soft dig requirements, removal of 2100 LDS plug and any concrete reinforcement installations, connection to 2100 LDS pipe, and backfilling with Class 2 backfill material.

E19. SEWER MANHOLES

E19.1 Description

E19.2 This Specification shall amend and supplement Standard Specification CW 2130-R9 and CW 2160-R6.

E19.3 Materials

E19.3.1 Standard Manhole Frames and Covers

- (a) Manhole frames and covers shall have machined seating surfaces and shall be in accordance with Standard Drawings SD-104A and SD-105A.

E19.3.2 Manhole Bases

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

E19.4 Construction Methods

E19.4.1 Bedding and Backfill

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

E19.4.2 Channelled Floors

- (a) 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.

E20. CORRUGATED STEEL PIPE (CSP)

E20.1 Description

This description shall amend and supplement Standard Specification CW 2130-R9 and CW3610-R3.

E20.2 Material

E20.2.1 Corrugated Steel Pipe

- (a) Corrugated Steel Pipe shall conform to 68 mm x 13 mm corrugation profile with a 2.0 mm thickness.

E20.2.2 Bedding and Backfill

- (a) Bedding and initial backfill material shall consist of 20 mm down limestone, as specified in Clause 2.1 of CW2030-R6, placed on a prepared subgrade and compacted to the thickness and density as specified.

E20.2.3 Galvanized Primer

- (a) Galvanized primer for repair of coating shall be zinc rich, ready mix to CGSB-1-GP-181M.

E20.3 Construction Methods

E20.3.1 Bedding and Backfill

- (a) The bedding and backfilling for corrugated steel pipe installed in (landscaped) boulevard areas shall be Class 4 as specified in CW 2030-R6, Clause 3.8 except as noted below.
- (b) The bedding and backfilling for corrugated steel pipe installed under existing or proposed pavement, driveways, or sidewalks shall be Class 2 as specified in CW 2030-R6, Clause 3.8 except as noted below.
- (c) The following revisions for bedding and initial backfill apply to Class 4 and Class 2 backfill:
 - (i) Limestone base material as previously specified shall be used for bedding and initial backfill.
 - (ii) A minimum thickness of 100 mm of compacted 20 mm limestone bedding shall be placed on the prepared subgrade. A 75 mm blanket of loose uniform bedding material shall then be placed on the compacted bedding to provide fill for the corrugations in the invert.
 - (iii) Manual placing and compaction of material shall be used to build up the backfill to encompass the lower part of the pipe. Backfill material shall be placed under the haunches by shovel and compacted firmly by power compaction ("jumping jack") equipment. Valleys of the corrugations and the area immediately next to the pipe must be compacted by hand operated methods. At no time shall heavy compaction equipment be brought closer than 1 m from the CSP.
 - (iv) Backfill shall be so placed and mechanically compacted that the fill rises equally and simultaneously on both sides, including handWork next to the pipe. Layers shall be placed with equipment running parallel to the structure.
 - (v) Initial backfill around pipe shall be placed in 150 mm lifts (maximum), alternatively on either side of the pipe until a height of 200 mm above CSP has been achieved.
 - (vi) When the fill on both sides of the pipe approaches the crown of the pipe, the same techniques of spreading shallow layers and compacting thoroughly shall be followed as the backfill covers the pipe. Light tamping equipment shall be used for the initial layers over the pipe.

- (vii) No distortion of the structure greater than 2% of the span or rise shall be allowed.
- (viii) The backfill material shall be placed in layers not exceeding 300 mm. Backfilling shall be carried out in such a manner as to obtain uniform compaction without soft spots. Compaction shall be 95% of the Standard Proctor Density.
- (ix) No traffic of any sort shall be permitted over the structure until cover of a minimum depth of 600 mm is properly compacted in place.
- (x) All compaction equipment used shall be subject to the approval of the Contract Administrator.

E20.3.2 Remove and Reinstall Existing Culvers

- (a) The excavation for the removal and/or reinstallation of existing culverts outside of proposed roadway pavement shall be backfilled to Class 4 standards. The excavation for removal and/or reinstallation of existing culverts or existing, driveways or sidewalks shall be backfilled to Class 2 standards.
- (b) 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.
- (c) Culverts removed at locations indicated on the Construction Drawings for the purpose of reinstallation to new line and/or grades shall be measured for payment as "Remove and Reinstall Existing Culverts".
- (d) Culverts that are deemed unsalvageable by the Contract Administrator shall be removed and disposed of off site. Removal of culverts off site shall be considered incidental to the "Removal of Existing Culverts" and no further payment shall be made.
- (e) The Contract Administrator shall specify which culverts are to be reused and the new line and grade for the reinstalled culverts.

E20.4 Measurement and Payment

E20.4.1 Removal of Existing Culverts

- (a) 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.
- (b) Removal of existing culverts will 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 for performing all operations required to complete the Work as specified.

E20.4.2 Removal and Reinstallation of Existing Culverts

- (a) The removal and reinstallation of existing culverts will be measured on a unit basis. The number to be paid for shall be the total number of culverts removed and reinstalled in accordance with this Specification and accepted by the Contract Administrator. Designation will be made for culvert type and diameter reinstalled.
- (b) Removal and reinstallation of existing culverts will be paid for at the Contract Unit Price per unit for "Remove and Reinstall Existing Culverts", which price shall be payment in full for the supply of all materials and for performing all operations required to complete the Work as specified.

E21. PRESSURE MAINS

E21.1 Description

This description shall amend and supplement Standard Specifications CW 2110-R8 and shall apply for specification requirements for the installation of Forcemain pipe.

E21.2 Materials

E21.2.1 750 mm PVC Forcemain Pipe

- (a) 750 mm Forcemain in accordance with AWWA – C905, PR 80, DR 51.
- (b) Where practical, pipe lengths used shall be the longest size manufactured to minimize the number of joints in the length of the line.
- (c) The PVC fittings shall be manufactured in accordance with the PVC series pipe noted in this Specification and shall conform to CSA B137.3.
- (d) The Contract Administrator may at any time require the Contractor to produce certification by an independent testing agency that materials used conform to the specified standards, and the costs of such certifications shall be borne by the Contractor.
- (e) Testing laboratories or agencies to test materials shall be independent testing agencies approved by the Contract Administrator.
- (f) Contractor shall submit pipe jointing procedures as recommended by the pipe manufacturer.
- (g) Material requirements for pipe bedding, backfill, and concrete shall be in accordance with CW2110-R8.

E21.3 Construction Methods

E21.3.1 Method of Pipe Installation for 750mm Forcemain

- (a) Forcemain to be installed by open cut and, where shown on drawings, by trenchless methods in accordance with these specifications.
- (b) 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.

E21.3.2 Unloading, Shoring, Hauling, Stringing

- (a) Unloading, stockpiling, loading, hauling, stringing shall be done in such a manner as to prevent damage to pipe, lining, coating, fittings, and other materials.
- (b) Use only equipment approved by the Contract Administrator
- (c) Protect material from exposure to sunlight or from any condition that may harm pipe, linings or coating. Handle PVC pipe in cold weather in accordance with the manufacturer's recommendations.
- (d) String pipe without interfering with access for constructions, land owners and tenants.

E21.3.3 Trench Inspection

- (a) Check trench bottom for stability and notify the Contract Administrator.
- (b) Remove unstable soil from bottom of trench and replace with compacted 20mm down limestone if ordered by the Contract Administrator.

E21.3.4 Trench Widths

- (a) Widths of trenches shall be such that pipes can be laid and jointed properly and backfill placed and compacted properly.
- (b) Trench walls shall be vertical to 300mm above the top of the pipe and the width at this location shall not exceed the maximum.

- (c) Trench Width – Single Pipe
 - (i) Minimum – nominal pipe diameter plus 400mm
 - (ii) Maximum – nominal pipe diameter plus 600mm

E21.3.5 Bedding and Backfilling Shafts

- (a) Backfill of shaft within or partially within existing or proposed pavement area shall be class 3 as shown in Standard Drawing SD-002 as specified in Section CW 2030-R6.
- (b) Bedding for coring shaft be supplemented by a foundation of 100mm of mechanical compacted 20mm down limestone or a concrete skin coat (conforming to Clause 2.16 of CW 2160-R6) or equal.

E21.3.6 Pipelaying – General

- (a) Lay pipes with the bell ends facing in direction of laying operations.
- (b) Cut pipes where necessary to install fittings. Make cuts in accordance with the manufacturer's recommendations using recommended cutting tools and cut pipes squarely and accurately.
- (c) Pipe deflections at joint shall not exceed those specified by the pipe manufacturer.
- (d) Do not lay pipe in water or when, in the opinion of the Contract Administrator, trench conditions are unsuitable.
- (e) Cover open ends of installed pipe, when piping laying is not in progress to keep out trench water.
- (f) Heat gaskets as necessary for pipelaying in cold weather conditions.

E21.3.7 Lowering Pipe and Accessories into Trench

- (a) Use implements, tools and facilities satisfactory to Contract Administrator, and use care to prevent damage to pipe and material. Do not drop pipe or materials into the trench.
- (b) Cover pipe ends if necessary to keep clean.

E21.3.8 Inspection of Pipe and Accessories

- (a) Inspect for defects immediately before lowering into the trench.
- (b) Clean pipe and fittings before installation.
- (c) Inspect pipe for ovality, gouges, or cuts, and reject any pipe having cuts deeper than 10% of the pipe wall thickness.

E21.3.9 Laying the 750mm PVC Pipe

- (a) Clean the bell and spigot ends of the pipes.
- (b) Insert the rubber ring with care so that the ring is in the correct position and is seated evenly around the pipe.
- (c) Do not lubricate the rubber ring.
- (d) Lubricate the spigot end, covering the bevelled end and the entire circumference of pipe, using a brush, cloth, hand, sponge or glove.
- (e) Insert the spigot end into bell so that it is in contact with ring. Push the spigot end in until the reference mark on spigot end is flush with the end of the bell, using a bar and block or other approved equipment.
- (f) Cut pipe to make square cut and bevel the ends using a bevelling tool. Locate the reference mark the proper distance from the bevel end.
- (g) Lay PVC pipe in accordance with the recommendations of manufacturer of the pipe.

E21.3.10 Hydrostatic Testing – General

- (a) The contractor shall supply all testing equipment and personnel to perform hydrostatic test.
- (b) Personnel shall be qualified to operate testing equipment and testing equipment shall be approved by Contract Administrator. Test pumps shall be motor driven and shall be complete with pressure gauges. An approved pressure recorder shall be provided to continuously record line pressure over 24 hour period.
- (c) The Contractor shall advise the Contract Administrator 24 hours in advance of filling the line for testing.

E21.3.11 Pressure Test

- (a) Pressure test after backfill in the pipe zone is complete and concrete thrust block are cured.
- (b) Apply hydrostatic pressure of 1.5 times operating pressure or 690 kPa whichever is greater.
- (c) Inspect all pipe joints for leakage.
- (d) Repair leaks or replace defective pipe.

E21.3.12 Leakage Test

- (a) Leakage test shall be performed on all pressure pipe systems, after backfilling is complete.
- (b) Test in sections not exceeding 500m of main, or obtain the approval of the Contract Administrator to test larger sections.
- (c) Test procedures are similar for all types of pipe installed, however leakage allowances shall be in accordance with the specified allowance for each type of pipe.
- (d) Fill the system with water and expel air. If necessary install temporary taps to expel air and plug these after testing is completed.
- (e) Apply test pressure by means of test pump equipped with a measurable volume container acceptable to the Contract Administrator.
- (f) Test pressures shall be:
 - (i) 750mm Polyvinyl Chloride pipe – 1.50 times the operating pressure at the lowest part of the system or the rated pressure class of pipe, whichever is less.
 - (ii) Do not vary test pressures more than 5 psi.
- (g) Maintain test pressures for a duration of two hours.
- (h) Repair and test until leakage is within specified limits.

E21.3.13 Leakage Allowances

- (a) Allowable leakage will be determined by Contract administrator using formula

$$L = NDP / 128,300$$

Where L = allowable leakage in litres per hour
N = number of joints in the test section
D = Nominal pipe diameter in millimetres
P = square root of the test pressure in kPa

- (b) The number of joints is estimated from the length of pipe installed.
- (c) An additional allowance is made when testing against closed metal seated valves. This allowance is 0.0012 litres per hour for each millimetre in nominal valve size.

E21.3.14 Valve Pit Removal

- (a) Where indicated on the drawings, the Contractor shall remove the existing valve pits (including all internal watermain appurtenances). The Contractor shall remove the existing valve pits and minimize damage to surrounding structure. The existing valve pits shall be removed prior to the installation of new watermain valves and fittings. The Contractor shall dispose of the excess material off site and no additional payment will be made for the removal of this material. Backfill material shall be Class B bedding and Class 3 Backfill. The Contractor shall get approval of backfilling procedures from the Contract Administrator prior to backfilling. Restoration shall be consistent with existing pavement cross section.
- (b) Valve pit removal will be measured for payment on unit basis and paid for at the Contract Unit Price for "Valve Pit Removal". The number to be paid for shall be the total number of valve pits removed in accordance with this specification, accepted and measured by the Contract Administrator.

E21.3.15 Cut-off and Cap 50 mm Watermain

- (a) Where indicated on the drawings, the Contractor shall expose 50 mm watermain at the Sterling Parkway Lyon north property line (approximate station 3+830 –Drawing D-8621). The watermain shall be cut square and end plugged.
- (b) Cut-off and Cap 50 mm Watermain will be measured for payment on unit basis and paid for at the Contract Unit Price for "Cut-off and Cap 50 mm Watermain". The number to be paid for shall be the total number of 50 mm watermians cut-off and capped in accordance with this specification, accepted and measured by the Contract Administrator.

E22. ELECTRICAL SCOPE OF WORK

E22.1 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 electrical power posts, outdoor receptacles, power transformer, light standards, etc., as indicated.
- (b) Disconnect and abandon underground power conductors associated with the above noted equipment as indicated.
- (c) Installation of new outdoor wall mounted light fixtures as indicated.
- (d) Installation of circuit breakers, wire, cable, conduits, etc., as required for the above noted electrical Works.

E22.2 Materials

E22.2.1 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 encased 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 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.

E22.2.2 Cable Protection

- (a) Provide identification tape labelled as indicated showing location of direct buried cables.

E22.2.3 Conduits

- (a) Electrical metallic tubing (EMT): with couplings. Minimum size shall be 19 mm.
- (b) Flexible metal conduit and liquid-tight flexible metal conduit.

E22.2.4 Conduit Fastenings

- (a) One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.
- (b) Beam clamps to secure conduits to exposed steel Work.
- (c) U channel type supports for two or more conduits at 1500 mm oc. (Surface mounted or suspended).
- (d) Six mm dia. galv. threaded rods to support suspended channels.

E22.2.5 Conduit Fittings

- (a) Fittings for raceways: to CSA C22.2 No.18.
- (b) Fittings: manufactured for use with conduit specified. Coating: same as conduit.
- (c) Factory "ells" where 90 deg. bends are required for 25 mm and larger conduits.
- (d) Steel set screw connectors and couplings. Insulated throat liners on connectors.
- (e) Rain-tight connectors and fittings c/w O-rings for use on weatherproof or sprinkler proof enclosures. Rain-tight couplings to be used for surface conduit installations exposed to moisture or sprinkler heads.

E22.2.6 Expansion Fittings for Rigid Conduit

- (a) Weatherproof expansion fittings with internal bonding assembly suitable for 100 or 200 mm linear expansion.
- (b) Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.
- (c) Weatherproof expansion fittings for linear expansion at entry to panel.

E22.2.7 Fish Cord

- (a) Polypropylene c/w 3 m spare length at each conduit end.

E22.2.8 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 40⁰C, 90⁰ 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.

E22.2.9

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.

E22.2.10 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.

E22.2.11 Circuit Breakers - General

- (a) Bolt-on moulded case circuit breakers, quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40⁰ C ambient.
- (b) Common-trip breakers with single handle for multipole applications.
- (c) Magnetic instantaneous trip elements in circuit breakers, to operate only when the value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3-10 times current rating.
- (d) Circuit breakers with interchangeable trips as indicated.

E22.2.12 Thermal Magnetic Breakers

- (a) Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping.

E22.2.13 Magnetic Breakers

- (a) Magnetic circuit breaker to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for short circuit protection (motor starters).

E22.2.14 Enclosures

- (a) All new breakers shall be mounted in existing main distribution and panel boards as indicated. All circuit breakers in main distribution panel shall match existing.

E22.2.15 Lighting Fixtures

- (a) Outdoor wall mounted lighting fixture c/w vandal resistant polycarbonate lens.

- (b) 400 W metal halide lamp
- (c) 208 V energy efficient ballast
- (d) Photocell control
- (e) Acceptable manufacturer shall be Lithonia, Powerlite, or Keene-Widelight.

E22.3 Construction Methods

E22.3.1 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.

E22.3.2 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.

E22.3.3 Conduit

- (a) Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass. All conduits shall be surface mounted unless otherwise indicated.

- (b) Cut conduit ends square and ream to remove burrs and sharp edges. Ensure that conduits butt in couplings and other fittings.
- (c) Bends and offsets shall have a minimum radius of curvature not less than the minimum bending radius of the cable to be installed.
- (d) Temporarily plug all conduits terminating in cabinets and boxes where moisture and foreign matter may enter.
- (e) Blow all conduits through with clean compressed air to clear all foreign matter and moisture prior to the installation of wires or cables.
- (f) Install fish cord in all conduits.
- (g) Group exposed conduits together wherever possible and run parallel to building lines, supported from structural members and protected by the flanges of the structural member where practical.
- (h) Support horizontal and vertical runs of individual exposed conduits by one-hole or two-hole conduit straps and suitable fasteners or beam clamps for mounting to building structure or bracket. Make no holes in building structural members for supporting conduits without the permission of the Contract Administrator.
- (i) Securely fasten exposed conduits in place at regular intervals with hangers, supports or straps. Provide additional supports at each elbow and terminations at a box or cabinet.
- (j) Perforated metal straps used to support conduits are unacceptable.
- (k) Install conduits at least 150 mm (6") clear of all steam pipes and flues, and 1 m (39") clear of heaters. Do not bend over sharp objects or improperly form.
- (l) The maximum length of straight conduit run shall be 30 M (100 feet) between pull boxes or other terminations. This length shall be reduced by 10 M (32 feet) for each 90 degree bend or 5 M (12.5 feet) for each 45 degree bend or offset. Conduit runs shall not include more than the equivalent of two 90 degree bends between pull boxes except where indicated otherwise on the drawings.
- (m) Where conduits pass through roof, seal with flashing and make weatherproof. For conduits passing through exterior walls, above or below grade, seal with waterproof sealing compound.
- (n) Coordinate installation of conduit with Work of other sub-trades to ensure final installation is completed in a neat and professional manner free from marks, scratches, paint drops, etc. Any conduit damaged in this fashion is unacceptable.
- (o) Not less than 900 mm (3'-0") of flexible conduit and of sufficient length to allow the lighting fixture to be relocated to any location within a 6 ft. (1.8m) radius shall be used for the connection of recessed lighting fixtures. A separate drop to be used for each fixture unless fixtures are mounted in continuous rows.
- (p) No circuits fed from emergency or essential power sources shall be run in the same conduit as other systems.
- (q) Provide separate conduit system for emergency distribution.

E22.3.4 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-bolt 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.

E22.3.5 Circuit Breakers Installation

- (a) Install circuit breakers in existing panelboards as indicated.

E22.3.6 Lighting Fixtures Installation

- (a) As per C.E.C. Section 22 and Section 30.
- (b) Unit shall conform to building lines being parallel or perpendicular.
- (c) Install of all lighting equipment shall comply with the relevant Section of this Specification and the Canadian Electrical Code
- (d) At the completion of construction and acceptance of Work, all lighting fixtures shall be clean, complete with all necessary accessories and provided with the required operating lamp(s).
- (e) Mount outdoor wall mounted lighting fixtures at 4.5 m above grade to underside of fixture.

E22.4 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.

E22.5 Basis of Payment

All electrical Works in this Contract will be measured and will be paid for at the Contract Unit Price for each item, 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.

- (i) Removal of light standards;

- (ii) Removal of outdoor car block heater receptacles and wooden parts;
- (iii) Removal of outdoor power transformer;
- (iv) Outdoor wall mounted lighting fixture;
- (v) Circuit breakers and wiring for building P1 light fixtures;
- (vi) Circuit breakers and wiring for building C4 light fixtures;
- (vii) Underground trenching and cabling to existing light standards adjacent to building.

E23. SODDING

E23.1 Description

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. Referenced Standard Construction

E23.2 Material

E23.2.1 Turf Grass Sod

Turf grass sod shall conform to CW 3510-R8.

Sod shall be a mixture of 95% Kentucky bluegrass, using equal proportions of any three Class 2 cultivars, and 5% Creeping Red fescue.

E23.3 Construction Methods

E23.3.1 Preparation of Finish Grade, Placement of Sod, Watering and Rolling and 30-Day Maintenance

Finish grading, sod placement, watering and rolling and 30-day maintenance shall conform to CW 3510-R8.

Install one width of sod, 600mm, along all pavements following installation of topsoil or completion of soil amendments, and prior to installation of plant material and seed.

E23.4 Method of Measurement

Measure sod in greater than 600mm width, complete with 100mm imported topsoil, in accordance with CW 3510-R8.

Measure edge sod less than or equal to 600mm width, complete with 50mm topsoil or soil amendments, on an area basis for the number of square metres of sod, including the 50mm soil base, installed in accordance with this specification as determined by the Contract Administrator.

E23.5 Basis of Payment

Payment for supply and installation of sod greater than 600mm width, including 30-day maintenance, will be in accordance with CW 3510-R8.

Payment shall be in accordance with the following:

- (a) 75% of quantity following supply and placement of sod, and
- (b) 25% of quantity following termination of the 30-day maintenance period.

Payment for edge sod less than or equal to 600mm width, will be at the Contract Unit Price for "Edge Sod", which shall be compensation in full for supplying all materials and performing all operations specified, and all other items incidental to the Work of this specification.

E24. SEEDING

E24.1 Description

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.

E24.2 Material

E24.3 General

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.

Obtain Contract Administrator's approval for any proposed adjustments to the seed mix species or cultivars.

E24.3.1 Turf Grass Seed Mix

Turf grass seed mix shall conform to CW 3520-R6.

Turf grass seed shall be a mixture of the following species:

- (a) 60% Kentucky bluegrass (*Poa pratensis*), including equal proportions of any three Class 1 or 2 cultivars;
- (b) 30% Creeping Red fescue (*Festuca rubra*), and
- (c) 10% Perennial ryegrass, using any of the recommended cultivars.

E24.3.2 Trefoil and Clover Seed Mix

Trefoil and Clover Seed Mix shall be a mixture of the following species and cultivars:

- (a) 40% Creeping Red fescue (*Festuca rubra*);
- (b) 20% Reubens Canada bluegrass (*Poa compressa* 'Reubens');
- (c) 15% Fiesta II Perennial ryegrass (*Lolium perenne* 'Fiesta II');
- (d) 10% White clover (*Trifolium repens*);
- (e) 10% Upstart Birdsfoot trefoil (*Lotus corniculatus* 'Upstart'), and
- (f) 5% Emerald Crown vetch (*Coronilla varia* 'Emerald').

E24.3.3 Ditch Seed Mix

Ditch Seed Mix shall be a mixture of the following species and cultivars:

- (a) 25% Creeping Red fescue (*Festuca rubra*);
- (b) 20% Mustang Tall fescue (*Festuca arundinacea* 'Mustang');
- (c) 15% Fiesta II Perennial ryegrass (*Lolium perenne* 'Fiesta II');
- (d) 15% Kentucky bluegrass (*Poa pratensis*), any Class 2 cultivar;
- (e) 10% Victory Chewings fescue (*Festuca commutata* 'Victory');
- (f) 10% White clover (*Trifolium repens*), and
- (g) 5% Timothy (*Phleum pratense*).

E24.3.4 Salt-tolerant Prairie Grass Seed Mix

Salt-tolerant Native Grass Seed Mix shall include 15 to 25%, each, of at least three of the following salt-tolerant native grass species:

- (a) Alkalai Cord Grass (*Spartina gracilis*);
- (b) Switch Grass (*Panicum virgatum*);
- (c) Whitetop (*Scolochloa festucacea*);
- (d) Basin Wildrye (*Elymus cinereus*);
- (e) Nuttall's Alkali Cordgrass (*Puccinellia nuttali*);

Plus 15 – 20%, each, of at least two of the following additional native grass species:

- (f) Canada Wildrye (*Elymus canadensis*);
- (g) Blue grama (*Bouteloua gracilis*);
- (h) Side-oats grama (*Bouteloua curtipendula*);
- (i) Awned wheatgrass (*Agropyron trachycaulum* var. *unilaterale*);
- (j) Indian Grass (*Sorghastrum nutans*), and
- (k) Green Needle Grass (*Stipa viridula*).

E24.3.5 Big Bluestem Seed

Seed shall be pure Big Bluestem (*Andropogon gerardi*) seed.

E24.3.6 Little Bluestem Seed Mix

Little Bluestem Seed Mix shall be a mixture of the following species:

- (a) 80 - 85% Little Bluestem (*Schizashyrium scoparium*);
- (b) 5 % Awned Wheatgrass (*Agropyron unilatrale*);
- (c) 5% Sheep's fescue (*Festuca saximontana*);
- (d) 5 – 10% Wildflowers, including:
 - (i) Beautiful Sunflower (*Helianthus laetiflorus*);
 - (ii) Purple Coneflower (*Echinacea angustifolia*);
 - (iii) Cut-leaved Anemone (*Anemone multifida*);
 - (iv) Three-flowered Avens (*Geum triflorum*);
 - (v) Hairy Golden Aster (*Chrysopsis villosa*), and
 - (vi) Prairie cinquefoil (*Potentilla pennsylvanica*).

E24.3.7 Wildflower and Grass Seed Mix

Wildflower and Grass Seed Mix shall be a mix of the following species:

- (a) 85% Azay Sheep's fescue (*Festuca saximontana*)
- (b) 15% Wildflowers, including:
 - (i) Yarrow (*Achillea millefolium*);
 - (ii) Indian Blanketflower (*Gaillardia aristata*);
 - (iii) Purple Coneflower (*Echinacea angustifolia*);
 - (iv) Purple Prairie clover (*Petalostemon purpureum*);
 - (v) White Prairie clover (*Petalostemon candidum*);
 - (vi) Lance-leaved Coreopsis/Tickseed (*Coreopsis lanceolata*);
 - (vii) Canada Glodenrod (*Solidago canadensis*);
 - (viii) Black-eyed Susan (*Rudbeckia hirta*);
 - (ix) Prairie Coneflower (*Ratibida columnifera*), and

(x) Meadow Blazing Star (*Liatris ligulistylis*).

E24.3.8 Trefoil and Vetch Over-seed Mix

Trefoil and Vetch Over-seed Mix shall be a blend of the 50% Birdsfoot trefoil and 50% Crown vetch.

E24.3.9 Cover Crop (Nurse Crop)

Use Annual ryegrass as a cover crop in all seeded areas.

E24.3.10 Herbicides and Insecticides

Herbicides and insecticides shall be in accordance with CW 3520-R6 and these Specifications.

E24.3.11 Hydro Mulch

Mulch, water and tackifier shall be in accordance with CW 3520-R6.

E24.4 Construction Methods

E24.4.1 Imported Topsoil and Finish Grading; Seeding and Hydro Mulching, and Maintenance for Turf Grass Seed Mix

Imported topsoil and finish grading; seeding and hydro mulching, and maintenance for Turf Grass Seed Mix shall conform to CW 3520-R6.

E24.4.2 Site Topsoil; Seeding and Hydro Mulching, and Maintenance for Ditch Seed Mix

Seed with a Brillion Seeder, or equal, on 50 mm compacted depth of site topsoil placed over scarified sub-grade and conditioned in accordance with SP. 1, in Ditch Seed Areas. Preparation of seed bed as per CW 3520-R6.

Seeding and hydro mulching, and maintenance of areas of Ditch Seed Mix shall conform to CW 3520-R6:

- (a) Sow Ditch Seed Mix at 1.0 kg/100 square metres (100 kg per hectare), and
- (b) Sow Cover Crop at 0.6 kg/100 square metres (60 kg per hectare).

E24.4.3 Soil Amendments, Seeding and Hydro Mulching for Salt-tolerant Prairie Grass Seed Mix, Big Bluestem Seed, Little Bluestem Seed Mix and Wildflower and Grass Seed Mix, and Trefoil and Clover Seed Mix

Soil amendments shall be as per E-25 , Topsoil, Planting Soil, Soil Amendments and Finish Grading.

Seeding and hydro mulching shall be in accordance with CW 3520-R6:

- (a) Sow native seed and seed mixes, and Trefoil and Clover Seed Mix at 1.0 kg/100 square metres (100 kg per hectare), and
- (b) Sow cover crop at 0.6 kg/100 square metres (60 kg per hectare).

E24.4.4 Seeding with Trefoil and Vetch Over-seed Mix

Immediately following the 30-day sod maintenance period, over-seed designated sod areas with Trefoil and Vetch Over-seed Mix. Broadcast seed. Avoid seeding during windy weather.

Over-seed sod with Trefoil and Crown Vetch Over-seed Mix at 0.50 kg/100 square metres.

E24.4.5 Maintenance of Areas Seeded with Salt-tolerant Prairie Grass Seed Mix, Big Bluestem Seed, Little Bluestem Seed Mix and Wildflower and Grass Seed Mix, and Trefoil and Clover Seed Mix

The Contractor shall water seeded and hydro mulched areas as required to obtain optimum soil moisture levels for germination and continued growth of flowers and grasses. Control the watering to prevent seed washouts.

The Contractor shall mow native seed and seed mix areas and Trefoil and Clover Seed Mix areas, once annually, in October, during the Maintenance Period, removing cut material that would smother seeded plants.

Additional mowing, to a height of 125 mm, shall be completed as directed by the Contract Administrator in order to remove extensive weed growth and/or to maintain healthy growth of wildflowers and grasses.

E24.4.6 Chemical Weed Control

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, clover, vetch and wildflowers with chemical weed control agents.

E24.4.7 Termination of Maintenance Period

Refer to E27 for 2 year Extended Maintenance of seed area. Extended maintenance to begin when seed area have been accepted to start the warranty.

After completion of planting operation to the satisfaction of the Contract Administrator, the Contractor shall be responsible for maintenance of the seed area during establishment period until accepted.

The maintenance period shall be terminated after the following criteria have been met:

- (a) The certified seed sowed meets the requirements of CW 3520-R6;
- (b) The seeded area is free of debris, including leaves;
- (c) The seeded area has a firm, uniform and even surface;
- (d) Seeded grasses and legumous plants show healthy, vigorous growth;
- (e) The area is free of bare and dead spots and with has than 10 noxious weeds per 50 square metres;
- (f) The seeded area has sufficient growth density that bare spots do not exceed 5% of total surface area, and
- (g) Seeded areas are free of damaging insects.

Water sufficiently to maintain optimum growing conditions. Ensure adequate moisture in root zone at freeze-up.

E24.5 Measurement and Payment

E24.5.1 Turf Grass Seed Mix

Measure Turf Grass Seed Mix in accordance with CW 3510-R8.

E24.5.2 Ditch Seed Mix with Imported Topsoil

Measure Ditch Seed Mix with 50mm Imported Topsoil on an area basis. The total area to be paid for 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.

No measurement shall be made for seed placed outside the limits of placement unless directed by the Contract Administrator.

E24.5.3 Native Grass Seed and Grass, and Wildflower Seed Mixes and Trefoil and Clover Seed Mix

Native grass seed (Big Bluestem Seed) and grass and wildflower seed mixes (Salt-tolerant Prairie Grass Seed Mix, Little Bluestem Seed Mix and Wildflower Seed Mix), and Trefoil and Clover 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.

No measurement shall be made for see placed outside the limits of placement unless directed by the Contract Administrator.

E24.5.4 Trefoil and Vetch Over-seeding Mix

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 mixture. 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.

E24.5.5 Nurse or Cover Crop Seeding

There will be no separate measurement for nurse or cover crop seeding. Seeding of a nurse crop will be incidental to other seeding operations.

E24.5.6 Herbicides and Insecticides

There will be no separate measurement for materials, equipment and operations related to the use of herbicides and insecticides.

E24.6 Basis of Payment

E24.6.1 Turf Grass Seed Mix

Supply, placement and maintenance of turf grass seed mix and ditch seed mix will be paid for at the Contract Unit Prices for "Turf Grass Seed Mix", which prices shall be payment in full for supplying all materials and performing all operations herein specified, and all other items incidental to the Work in accordance with this Specification and CW2510-R8.

E24.6.2 Ditch Seed Mix with 50mm Imported Topsoil

Supply, placement and maintenance of ditch seed mix will be paid for at the Contract Unit Prices for "Ditch Seed Mix" 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 in accordance with this Specification and CW2510-R8.

E24.6.3 Native Grass Seed and Grass and Wildflower Seed Mixes, and Trefoil and Clover Seed Mix

Supply, placement and maintenance of native grass seed and grass and wildflower seed mixes, and Trefoil and Clover Seed Mix will be paid for at the Contract Unit Prices for "Salt-tolerant Prairie Grass Seed Mix", "Big Bluestem Seed", "Little Bluestem Seed Mix", "Wildflower and Grass Seed Mix" and "Trefoil and Clover Seed Mix", which prices shall be payment in full for supplying all materials and performing all operations herein specified, and all other items incidental to the Work in accordance with this Specification and CW2510-R8.

E24.6.4 Trefoil and Vetch Over-seeding

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 incidental to the Work of this Specification.

E25. TOPSOIL, PLANTING SOIL, SOIL AMENDMENTS AND FINISH GRADING

E25.1 Description

This Special Provision shall amend and supplement City of Winnipeg Standard Construction Specification CW 3540-R3 "Topsoil and Finish Grading for Establishment of Turf Areas", and

shall cover supply, preparation and placement of topsoil, planting soil and soil amendments, including preparation of existing grade, finish grading and fertilizer application.

E25.2 Material

E25.2.1 Site Topsoil

Stockpiled on-site topsoil and imported topsoil shall conform to CW 3540-R3.

E25.2.2 Peatmoss

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.

E25.2.3 Sand

Sand shall be hard, granular, sharp sand to CSA A82.56-M1976, well-washed and free of impurities, chemicals and organic matter.

E25.2.4 Bonemeal

Bonemeal shall be raw, finely ground with a minimum chemical analysis of 3% nitrogen and 20% phosphoric acid.

E25.2.5 Wood Chip Mulch

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.

The Contractor shall supply a wood chip mulch sample to the Contract Administrator for approval prior to installation.

E25.2.6 Fertilizer

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:

- (a) Sod (City Specification) with imported topsoil;
- (b) Ditch Seed Mix (City Specification) with site topsoil;
- (c) Horticultural trees and shrubs with planting soil mix;
- (d) Native grasses and wildflower seeding with soil amendment, and
- (e) Trefoil and Clover Seed Mix with soil amendment

E25.2.7 Chemical Application

Roundup or similar chemical herbicides approved by Agriculture Canada shall be used only with the approval of the Contract Administrator.

E25.2.8 Erosion Control Blanket

Erosion control blanket 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.

E25.2.9 U-Staples

Use U staples to anchor the reinforced composite mat to slopes.

E25.2.10 Straw Wattle

Use Stenlog or other bio-degradable straw wattle.

E25.2.11 Plastic Edging

Use heavy-duty 200mm deep black PVC garden edging with rounded top

E25.3 Construction Methods

E25.3.1 Imported Topsoil and Finish Grading

Installation of imported topsoil in areas to receive sod or turf grass seed 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-R3.

E25.3.2 Conditioning Site Topsoil

Conditioning of site topsoil shall involve the following operations:

- (a) Install site topsoil to 50 mm compacted depth in areas to be seeded with Ditch Seed Mix.
- (b) Break up site topsoil, cross cultivate, using a disc or harrow to obtain a friable soil base for seeding;
- (c) Remove any stones, branches, large roots, debris or other material deleterious to obtaining smooth grass surfaces and good plant growth;
- (d) Mix in soil ameliorants and fertilizer as recommended by soil testing laboratory.

E25.3.3 Planting Soil Mixture for Trees, Shrubs and Vines

Planting soil mixture shall be a mix of 75% topsoil and 20% peatmoss, loose by volume. Incorporate 5% sand, or as required, to improve soil texture. Incorporate bonemeal at 3 kg/cubic metre of planting soil mixture.

E25.3.4 Construction of Planting Beds

Excavate planting beds to a depth of 300 mm.

Install planting soil mixture, loosely compacted, 300 mm 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 and shrubs.

Install 50 mm wood chip mulch in all beds following planting operations.

E25.3.5 Soil Amendment for Native Grass and Wildflower Seeding

Soil amendment for native grass and wildflower seeding, as well as Trefoil and Clover Mix shall consist of a mix of 60% peat moss and 40% sand, loose by volume.

Cross-cultivate the entire area of soil base (clay) that is to receive soil amendments to a depth of 150 mm. Redo areas where equipment used for hauling and spreading has re-compacted sub-grade

Spread 30 mm of peat moss and 20 mm sand over the area of soil amendments.

Roto-till or disc the peat moss and sand into the top 100 to 125 mm of base material and mechanically roll to obtain a level surface.

Grade to eliminate rough spots and low spots and to maintain positive drainage.

Consolidate seedbed to required bulk density using equipment approved by the Contract Administrator. Leave surfaces smooth, uniform and firm against deep foot-printing.

E25.3.6 Erosion Control Blanket

Install erosion control blanket in accordance with the Construction Drawings and the manufacturer's specifications in all areas where slopes exceed 3:1.

E25.3.7 Straw Wattle

Install 300 mm Stenlog or other straw wattle sediment control material in accordance with the manufacturer's specifications around all rip rap areas, drainage inlets and outlets, and catch basins within seeded areas.

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 150 mm minimum to prevent water and sediment passing. Achieve a tight seal between the wattle segments.

Dog leg terminal ends of straw wattle up the slope to prevent channeling of sedimentation.

Use 300 mm 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 1200 mm on centre. Leave 30 to 50 mm of wood stake exposed above the wattle.

Avoid damage to wattles. Damaged areas of wattles should be cut and tied off, then treated as terminal ends.

E25.3.8 Plastic Edging

Install 200mm depth plastic edging between areas of sod and native grass and wildflower seeding, excepting Edge Sod, as indicated on the Construction Drawings.

E25.4 Method and Measurement

E25.4.1 Imported Topsoil and Fine Grading

There shall be no separate measurement for Work associated with imported topsoil and finish grading as described in this Specification.

E25.4.2 Planting Soil Mixture

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.

There will be no separate measurement for planting soil mixture used in planting individual trees and shrubs that are not planted in beds.

E25.4.3 Wood Chip Mulch

Supply and installation of wood chip mulch shall be measured on an area basis for the number of square metres of 50 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.

There will be no separate measurement for wood chip mulch used in individual trees saucers.

E25.4.4 Soil Amendments for Native Grass and Wildflower Seeding and Trefoil and Clover Mix

Soil amendments 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.

E25.4.5 Chemical Application

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.

E25.4.6 Erosion Control Blanket

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.

E25.4.7 Straw Wattle

Straw wattle will be measured on a length basis for the number of linear metres or wattle installed in accordance with the Construction Drawings and this Specification, and accepted by the Contract Administrator, as computed by the Contract Administrator.

E25.4.8 Plastic Edging

Plastic edging shall be measured on a linear basis for the number of linear metres or edging installed in accordance with the Construction Drawings and this Specification, and accepted by the Contract Administrator, as computed by the Contract Administrator.

E25.5 Basis of Payment

E25.5.1 Planting Soil Mixture

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.

E25.5.2 Wood Chip Mulch

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 herein specified, and all other items incidental to the Work of this Specification.

E25.5.3 Soil Amendments for Native Seeding and Trefoil and Clover Mix

Soil amendments will be paid for at the Contract Unit Price for "Soil Amendments for Native Seeding and Trefoil and Clover Seed Mix", 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.

E25.5.4 Chemical Application

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.

E25.5.5 Erosion Control Blanket

Erosion control blanket will be paid for 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.

E25.5.6 Straw Wattle

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.

E25.5.7 Plastic Edging

Plastic edging will be paid for at the Contract Unit Price for "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.

E26. TREES, SHRUBS AND GROUND COVERS

E26.1 Description

This Special Provision shall amend and supplement City of Winnipeg Standard Construction Specification CW 3540-R3 "Topsoil and Finish Grading for Establishment of Turf Areas", and shall cover supply, preparation and placement of topsoil, planting soil and soil amendments, including preparation of existing grade, finish grading and fertilizer application.

E26.2 General

E26.2.1 Nomenclature

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.

E26.2.2 Source Quality Control

All nursery stock supplied shall be nursery grown and of species and sizes as indicated on the Construction Drawings. Nursery stock shall be No. 1 Grade material in accordance with the current edition of Landscape Canada's (CNTA) "Guide Specifications for Nursery Stock".

- (a) Any nursery stock dug from native stands, wood lots, orchards, or neglected nurseries, which have not received proper cultural maintenance, shall be designated as "collected plants". Obtain permission of the Contract Administrator to use collected plants.
- (b) The Contractor shall notify Contract Administrator of source of plant material at least 7 days in advance of shipment.
- (c) Acceptance of plant material at source does not prevent rejection of same plant material on site prior to or after planting operations.
- (d) Imported plant material must be accompanied with necessary permits and import licenses. Conform to federal and provincial regulations.

E26.2.3 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 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.

E26.2.4 Replacement

During the first two years following successful completion of planting operations, and 30-day acceptance period 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.

E26.3 Materials

E26.3.1 Water

Water shall be potable and free of minerals that may be detrimental to plant growth.

E26.3.2 Fertilizer

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.

E26.3.3 Root Ball Burlap

Root ball burlap shall be 150 g Hessian burlap.

E26.3.4 Anti-desiccant

Anti-desiccant shall be wax-like emulsion to provide film over plant surfaces reducing evaporation but permeable enough to permit transpiration.

E26.3.5 Wound Dressing

Wound dressing shall be horticultural accepted non-toxic, non-hardening emulsion.

E26.3.6 Plant Material

- (a) All plant material specified for this project 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) Comply with latest edition of the "Guide Specification for Nursery Stock", produced by Landscape Canada (CNTA), referring to quality, size and development of nursery-grown plant material and root balls.
- (c) Nursery stock shall be No. 1 grade trees, shrubs and vines.
- (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 300 mm 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) 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.

- (g) 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.
- (h) 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.
- (i) All parts of the plants shall be moist and show live, green cambium tissue when cut.
- (j) At least one (1) plant of each variety supplied shall bear a tag showing both the botanical and common name of the plant.
- (k) Additional Plant Material Qualifications:
 - (i) Imported Plant Material
 - Obtain Contract Administrator's approval to use any imported plant material
 - Plant material obtained from areas with milder climatic conditions from those of site acceptable only when moved to site prior to the breaking of buds in their original location and heeled-in in a protected area or placed in cold storage until conditions suitable for planting.
 - (ii) Cold Storage
 - Approval required for plant material that has been held in cold storage.
 - (iii) Container-Grown Stock
 - Acceptable if containers large enough for root development. Trees and shrubs must have grown in container for minimum of one growing season but not longer than two. Root system must be able to hold soil when removed from container. Plants that have become root bound are not acceptable. Container stock must have been fertilized with slow releasing fertilizer.
 - (iv) Balled and Burlapped Plant Material
 - Deciduous trees in excess of 3 m 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.
 - (v) Tree Spade Dug Material
 - Obtain approval of the Contract Administrator for digging plant material with mechanized digging equipment, hydraulic spade or clam-shell 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.
 - (vi) 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.

E26.4 Construction Methods

E26.4.1 Workmanship

- (a) The Contractor shall stake out location of trees, shrubs and planting beds as per the Construction Drawings. Obtain Contract Administrator's approval prior to excavating.
- (b) The Contractor shall obtain clearances from all utilities, with respect to underground lines located in the areas to be excavated, prior to commencing planting operations.
- (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 pavement.

E26.4.2 Planting Time

- (a) The Contractor shall plant deciduous plant material during dormant period before buds have broken. Plant material noted for spring planting only must be planted in dormant stage.
- (b) Plant material imported from region with warmer climatic conditions may only be planted in early spring.
- (c) 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.
- (d) When permission has been obtained, trees, shrubs and ground covers growing in containers may be planted throughout growing season.
- (e) Plant only under conditions that are conducive to health and physical conditions of plants.
- (f) 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.

E26.4.3 Excavations

- (a) Shrub beds: excavate to minimum depth of 300 mm, as indicated on the Construction Drawings. Individual shrubs shall be planted in 500 mm deep holes backfilled with planting soil mixture.
- (b) Trees: excavate to depth of at least 200 mm deeper than height of root ball, with a surface width of two times the diameter of the root ball. Backfill around trees with planting soil mixture.
- (c) Provide drainage for planting holes in heavy soil if natural drainage does not exist. 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.

E26.4.4 Planting

- (a) Loosen bottom of planting hole to depth of 150 to 200 mm. Cover bottom of each excavation with minimum of 150 mm 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 bottom of planting hole to depth of 150 to 200 mm. Cover bottom of each excavation with minimum 150 mm topsoil mixture.
 - (iv) Tamp planting soil mixture around root system in layers of 150 mm 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.
 - (v) Excavate 200 mm depth an additional 600 mm beyond planting pits around the perimeter of all tree planting pits, and fill with planting soil mixture.
 - (vi) Construct 100 mm deep saucers around the outer edge of planting pits to assist with maintenance watering.
- (f) When planting is completed apply slow release organic fertilizer at minimum rate of 12 kg/100 m for shrub beds or 50 g/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.

E26.4.5 Pruning

Prune trees, shrubs and groundcover after planting, as indicated. 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.

E26.5 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.

E26.6 Wood Chip Mulch

- (a) All planting beds shall be covered with a 50 mm depth of wood chip mulch to the limits shown on the planting details.

- (b) Wood chip mulch shall extend under all tree limbs, but shall not be installed within 150 mm of the tree trunk.
- (c) The saucers of all trees not planted in beds shall be covered with a 50 mm depth of wood chip mulch.

E26.7 Maintenance

E26.7.1 Watering

Plant material shall be watered once a week for first four weeks following installation, and once every second week, thereafter. Ensure adequate moisture in root zone at freeze-up.

E26.7.2 Weeding

Keep mulched shrub beds and tree saucers weed-free by manually removing weeds during the maintenance period.

E26.7.3 Insects and Diseases

Spray plants to combat pests and diseases. Use organic chemical insecticides approved by Agriculture Canada. Protect adjacent areas from spray.

E26.7.4 Adjustments

Make adjustments requested by the Contract Administrator, including straightening trees, tightening guy wires and removing tree stakes.

E26.7.5 Maintenance Period

Refer to E27 for 2 year Extended Maintenance of plant material. Extended maintenance to begin when plant material has been accepted to start the warranty.

After completion of planting operation to the satisfaction of the Contract Administrator, the Contractor shall be responsible for maintenance of the plant material during establishment period until accepted.

Plant material shall be accepted to start warranty when installation in accordance with the Drawings and Specifications is complete and there is no sign of, wilting, chlorosis, pest infection, transplant shock or any conditions deleterious to longevity and appearance.

Replace any dead or damaged plant material during the maintenance period, including replacement of vandalized material.

Water sufficiently to maintain optimum growing conditions. Ensure adequate moisture in root zone at freeze-up.

E26.8 Method of Measurement

E26.8.1 Trees, Shrubs and Vines

Supply and installation of trees, shrubs and vines, as well as other herbaceous material 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.

Plant Material replaced due to a non- Contractor accident clause or vandalism will be measured on a unit basis.

E26.8.2 Fertilizer

Supply and installation of fertilizer for plant material will be incidental to the Work of this Contract.

E26.9 Basis of Payment

E26.9.1 Trees, Shrubs and Vines

Supply and installation of trees, shrubs and vines, as well as other herbaceous material will be paid for at the Contract Unit Price for each species and size of plant 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.

Plant Material replaced due to a non- Contractor accident clause or vandalism will be paid on a unit basis.

E27. LONG-TERM SCHEDULED MAINTENANCE OF PLANT MATERIAL, PLANTING BEDS, SOD, SEEDED GRASS AND WILDFLOWER, AND TREFOIL AND CLOVER AREAS

E27.1 Description

This Specification shall cover the maintenance of plant material, planting beds, sod, seeded grass and wildflower areas, and trefoil and clover areas following acceptance to start the 2 year extended maintenance period.

E27.2 Materials

The Contractor shall provide all necessary materials and equipment including: additional topsoil, soil ameliorates, and mulches, sod, seed, fertilizers and pesticides, and 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.

E27.3 Personnel

E27.3.1 Provision of Maintenance Personnel

The Contractor shall provide all necessary personnel for the ongoing maintenance operations.

E27.3.2 Capability of Personnel

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.

The maintenance foreman shall be familiar with native plantings and plant identification techniques.

Tree pruning shall be by a qualified Manitoba Arborist.

E27.4 Timing

E27.4.1 Maintenance Period

Maintain plantings, sod, seeded turf grass, native grass and wildflower areas, and trefoil and clover 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.

E27.4.2 Maintenance Schedule

Provide the Contract Administrator a Schedule of Proposed Maintenance Activities for the two-year scheduled maintenance period, based on the requirements outlined herein. The scheduled maintenance period shall not commence until the schedule has been reviewed by the Contract Administrator.

E27.4.3 Recording Maintenance Operations

The Contractor shall provide a detailed maintenance log, including but not limited to the following: hours of labour undertaken, number of personnel employed and equipment used. The log will itemize watering, mowing, 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 maintenance Work.

E27.5 Maintenance Methods

E27.5.1 Traffic

Do not conduct maintenance operations on Kenaston Boulevard during peak traffic hours (Monday to Friday from 7:00 to 9:00 and from 15:30 to 18:30).

E27.5.2 Maintenance of Trees, Shrubs, Vines and Planting Beds

- (a) Maintain trees, shrubs, vines and planting beds as indicated in E26.7.
- (b) Watering Trees, Shrubs and Vines
 - (i) 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.
 - (ii) 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 the tree root balls by drilling to a minimum depth of 600 mm. The soil shall contain enough moisture to hold together when compressed in the hand, but shall not be muddy.
 - (iii) Testing shall be undertaken at a minimum of 10 sites per week at a minimum of 10m between sites. The installed plant material and bioengineering shall not be allowed to dry out to the detriment of the viability of the plant material. Contractor shall monitor and submit lots to the Contract Administrator, monthly. Contractor shall water-in plant material Works in late fall during the scheduled maintenance period.
 - (iv) Thoroughly soak coniferous trees prior to winter freeze-up.
- (c) Fertilizing, Pruning and Spraying Deciduous Trees and Shrub
 - (i) Because of the specialized nature of such operations, employ a qualified local arborist. Refer to "Chemical Weed Control" E24.4.6.
- (d) Pruning Deciduous Trees and Shrubs
 - (i) Prune as noted in E26.4.5, by thinning out unnecessary limbs or portions of limbs and by cutting back the terminal growth. Cut with pruning shears and with handsaws for limb-wood. When cutting the 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.
- (e) Cultivation
 - (i) Cultivate only as required to reconstruct planting beds or tree saucers, or to remove significant weed growth.
 - (ii) 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 50 mm. Maintain natural elevation of the surrounding area when cultivating. Create a gentle saucer to contain water around the tree root zone.
 - (iii) Avoid pyramiding soil around the base of any plant. This causes water to drain away and will encourage undesirable top root growth.

- (iv) The boundary between the adjacent sod and soil saucer should be crisp and well formed.
- (v) Replace wood chip mulch when cultivation completed.
- (f) Spraying
 - (i) 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. Restrict spray drift.
- (g) Straightening
 - (i) Straighten trees as required or as directed by the Contract Administrator.
- (h) Mulching
 - (i) Add mulch to planting bed areas as required to maintain an even fresh surface.
- (i) Weeding
 - (i) Hand weed and lightly rake a minimum of one 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.
 - (ii) The Contractor shall be responsible for any fines or weed control notices issued for the planting areas. All such notices shall be dealt with by the Contractor 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.

E27.5.3 Maintenance of Sod and Turf Grass Areas

- (a) Maintain sod areas as specified in CW 3510-R8 Sodding during the 30-day sod maintenance period.
- (b) Mowing
 - (i) Following the completion of the 30-day sod maintenance period, mow turf grass to a height of 65 mm
 - (ii) Overseed with Trefoil and Vetch Mix.
 - (iii) Cut grass once following the completion of overseeding, in the late fall, or as directed by the Contract Administrator.
 - (iv) Remove thatch following fall mowing.
- (c) Fertilize turf grass areas in the spring and late fall as follows:
 - (i) Spring: 16-20-0
 - (ii) Fall 10-6-4
- (d) Weed Control

Spray sod areas overseeded with Trefoil and Vetch only to control noxious weed growth.

The Contractor shall spray turf grass areas with broadleaf weed controls in the spring and late summer, or as directed by the Contract Administrator. Use environmentally friendly chemical agents approved by Agriculture Canada.

Spray areas with wildflowers and clover only as required to control noxious weed growth or as directed by the Contract Administrator. Use environmentally friendly chemical agents approved by Agriculture Canada.
- (e) Insect Control

Control damaging insects as required with chemical agents approved by Agriculture Canada.
- (f) Remove leaves from turf grass areas or thoroughly mulch in the fall.
- (g) Spring Sand/Salt Cleanup and Sod Repair

Remove salt and sand from all turf grass areas in the spring: typically around April 15. Replace damaged sod, or top-dress and over-seed with a Kentucky bluegrass and Creeping Red fescue seed mix, as required by the Contract Administrator.

(h) Standard

- (i) At the end of the required maintenance period uniform stands of grass must be well established in all turf grass areas or resodding/reseeding will be required at the Contractor's expense and to the satisfaction of the Contract Administrator. Scattered bare spots, none of which is larger than 100 mm square will be allowed up to a maximum of three (3) percent of any turf grass area.
- (ii) Defective sod shall be replaced and the area so replaced shall be maintained for a 30-day period in the next growing season.
- (iii) Reseeded 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 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.

E27.5.4 Maintenance of Native Grass and Wildflower Seeded Areas, and Trefoil and Clover Areas

- (a) Repair and reseed 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 native grass and wildflower areas, and trefoil and clover areas in the late fall, or as directed by the Contract Administrator to remove excessive weed growth.
 - (ii) Removed cuttings.
 - (iii) Mow turf native grass and wildflower areas, and trefoil and clover areas to a height of 100 mm.

E27.6 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.

E27.7 Method of Measurement

E27.7.1 General Maintenance of Trees, Shrubs and Vines, Planting Beds, Sod and Turf Grass Areas, and General Cleanup.

(a) Trees, Shrubs and Vines, and Planting Beds

Two year general maintenance of trees, shrubs and vines, and other herbaceous material, and planting beds including: fertilizing, watering, 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, within a six month annual growing season from April 15 to October 15 each year.

(b) Sod Areas, Overseeded with Trefoil and Vetch

Two year general maintenance of sod areas, overseeded with trefoil and vetch, including: scheduled fall mowing, watering, fertilizing, weed and insect control, and removal of leaves will be measured twice each season, within the six month annual growing season for Work completed in each area.

(c) Seeded Turf Areas

Two year general maintenance of seeded turf grass areas, including: scheduled mowing, watering, fertilizing, weed and insect control, and removal of leaves will be measured twice each season, within the six month annual growing season for Work completed in each area.

(d) Native Grass and Wildflower Areas, and Trefoil and Clover Areas

Two year general maintenance of native grass and wildflower areas and trefoil and clover areas, 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, within the six month annual growing season for Work completed in each area each year.

(e) General Cleanup

Two-year general cleanup of landscaped areas, including removal of garbage and debris and grass clippings in the roadway corridor will be measured twice each season, within the six-month annual growing season, for the entire project area. 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.

E27.7.2 Spring Cleanup

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.

E27.8 Basis of Payment

E27.9 General Maintenance of Trees, Shrubs, Vines and Herbaceous Material, Sod, and Seeded Areas, and General Clean-Up

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, Overseeded with Trefoil and Clover Maintenance", "General Maintenance of Seeded Turf Grass Areas", "General Maintenance of Native Grass and Wildflower Areas", "General Maintenance of Trefoil and Clover 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.

E27.10 Spring Cleanup

Spring Cleanup will be paid for at the Contract Unit Price for "Annual Spring Cleanup of 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.

E28. PLANT MATERIAL WARRANTY

E28.1 Description

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.

E28.2 Warranty

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 a period of two years, commencing upon acceptance of installed plant material.

E28.3 End-of-Warranty Inspection

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.

E28.4 Replacement

During the warranty period, remove from site any plant material that has died or failed to grow satisfactorily, as determined by the Contract Administrator and replace with healthy plant material of the same species and size.

Replace plant material in the following spring or fall as directed.

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.

Continue such replacement and warranty until plant material is acceptable.

E28.5 Method of Measurement

Warranties on plant material will not be measured or paid for.

Warranties on plant material shall be considered incidental to the Work of this Contract.

E29. CHEMICAL CONTROL OF VEGETATION

E29.1 Description

This Specification covers the requirements for the application of herbicides for weed control.

E29.2 General

E29.2.1 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.

E29.2.2 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 foodstuffs, 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.

E29.3 Materials

E29.3.1 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.

E29.3.2 Adjuvants

- (a) Adjuvants shall be compatible with herbicide product used.

E29.3.3 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) 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.
- (c) Backpack Sprayer:
 - (i) Sprayer shall have hose and handgun for spot treatment.

E29.4 Construction Methods

E29.4.1 Notice of Spray Operation

- (a) Post areas to be treated with signs placed at each road access and 100 m 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.

E29.4.2 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 65 m 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 authorities 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.

E29.4.3 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 flagmen 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) Re-treat areas in accordance with label directions until specified control requirements are achieved.

E29.4.4 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.

E29.4.5 Waste Disposal

- (a) Triple rinse empty herbicide containers with diluent 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.

E29.4.6 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.

E29.5 Method of Measurement

E29.5.1 Spot Weed Control

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 to the general two-year maintenance requirements.

E30. INSTALLATION OF INTERLOCKING PAVING STONES ON A LEAN CONCRETE BASE

E30.1 Description

E30.1.1 General

- (a) This specification shall supplement and amend City of Winnipeg Standard Construction Specification CW 3335 "Installation of Interlocking Paving Stones on a Lean Concrete Base".

E30.2 Referenced Standard Construction Specifications

- (a) CW 3335- Installation of Interlocking Paving Stones on a Lean Concrete Base

E30.3 Referenced Standard Detail

- (a) SD-240B- Interlocking Paving Stones On Lean Concrete Base

E30.4 Materials

E30.4.1 Interlocking Paving Stones

- (a) Paving stones shall be Barkman Concrete "Roman Pavers" as found in the Barkman Concrete Ltd. 2004 Catalogue. The outside course shall be natural colour in a soldier course pattern. Inside courses shall be sierra grey in colour and arranged in accordance with the manufacturer's "Random Pattern #1".
- (b) Paving stones shall conform to the requirements of CAN3-A231.2, Precast Concrete Pavers.
- (c) Further to CAN3-A231.2.6.1.1, where concrete pavers are shipped for installation before the pavers are twenty-eight (28) days old, the average compressive strength of these pavers at the time of delivery to the Work site shall be not less than 40 MPa.

E30.5 Other Materials

E30.5.1 All other materials, including aggregates for the lean concrete mix, the lean concrete mix, bedding sand and filler sand shall be in accordance with CW 3335.

E30.6 Construction Methods

E30.6.1 Installation of Paving Stones on a Lean Concrete Base

E30.6.2 Install paving stones on a lean concrete base in accordance with CW 3335 and SD-240B.

E30.7 Measurement and Payment

E30.7.1 Supply and Installation of Interlocking Paving Stones

E30.7.2 Supply and installation of interlocking paving stones shall be measured and paid for in accordance with CW 3335.

E30.8 Supply and Installation of Lean Concrete Base

E30.8.1 Supply and installation of lean concrete base shall be measured and paid for in accordance with CW 3335.

E31. REMOVAL OF EXISTING BOLLARDS

E31.1 Remove existing bollards as shown on the drawings or as directed by the Contract Administrator.

E31.2 Measurement and Payment

E31.2.1 Removal of existing bollards will be measured on a unit basis and paid for at the Contract Unit Price for the "Removal of Existing Bollards". Number of units to be paid for will be the total number of existing bollards removed in accordance with this specification, accepted and measured by the Contract Administrator.

E32. REMOVAL OF EXISTING FENCE

E32.1 Remove chain link fence as shown on the drawings or as directed by the Contract Administrator.

E32.2 Measurement and Payment

E32.2.1 Removal of existing chain link fence will be measured for payment on a length basis and paid for at the Contract Unit Price for "Removal of Existing Fence". Length to be paid for will be the total number of linear meters of existing fence removed in accordance with this specification, accepted, and measured by the Contract Administrator.

E33. PROPOSED CROSSING OF NATURAL GAS PIPELINES AT KENASTON BOULEVARD AND STERLING LYON PARKWAY

E33.1 The proposed construction will impact Manitoba Hydro's NPS4 distribution pipeline, NPS12 high pressure pipeline and NPS12 transmission pipeline at the intersection of Sterling Lyon Parkway East and Kenaston Boulevard. Manitoba Hydro will not require the relocation of these pipelines, however the Contractor will adhere to the requirements below when Working in their proximity.

- (a) Manitoba Hydro will have emergency standby on site during the excavation of the above lines.

- (b) All gas pipelines within the construction area will be exposed and backfilled by the Contractor. Manitoba Hydro will have qualified staff on site to rockwrap all pipes and oversee the excavation of pipes.
- (c) Once the pipes have been rockwrapped, the Contractor shall place a 150 mm sand backfill layer on top of all pipes. After placement of the 150 mm backfill layer the road shall be built up to 600 mm above the top of the pipes before any compaction can take place over the top of the pipes.
- (d) Travel over the pipes is permitted only at the Sterling Lyon Parkway East crossing location. If equipment must drive over the pipes prior to placement of the 600 mm of fill over the pipes, steel plates shall be placed over the pipes at each crossing location extending 1.0 m on either side of the pipe alignments.
- (e) A minimum clearance of 900mm (3 feet) shall be maintained between the top of the pipelines and the finished grade at all crossing locations.

All construction operations within the vicinity of natural gas pipelines are to take place in a manner so as not to damage or cause detriment to the integrity of the natural gas pipeline. The operations are not to commence unless these conditions are adhered to. Manitoba Hydro's approval of the natural gas pipeline crossing method will be required prior to the commencement of construction

E34. COORDINATION OF CONSTRUCTION WITH THE RAILWAY COMPANIES

E34.1 General Requirements

- (a) The Contractor shall be responsible to meet all railway companies, Canadian National (CN) and Canadian Pacific Railway (CPR), constraints, requirements, and safety measures.

E34.2 Description of Work

- (a) Prior to the Contractor commencing Work within the railway property, the railway companies 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.

E34.3 Temporary Construction Crossing

- (a) The City has entered into agreements with both railways whereby a temporary use crossing may be constructed prior to the completion of the road. The successful Contractor will be required to enter into an agreement with the City whereby they become jointly named user of the crossings should they wish to use them during construction.
- (b) These crossings will be restricted to the use of the Contractors equipment and designated supervisory personnel only. Crossings will be used only during Working hours and will be left such that unauthorized access is prevented.
- (c) The Contractor shall be responsible for construction and removal of temporary crossings. No measurement for payment will be made for performing all operations herein described and all other items incidental to the Work described.
- (d) All sections of Appendix B covering railway requirements apply.

E34.4 Railway Flagging Costs

- (a) The railway companies 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 incidental to the Work described.

E34.5 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.

E34.6 CPR Requirements

- (a) CPR 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 CPR tracks and property.

E35. ENVIRONMENTAL PROTECTION PLAN

E35.1 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.

E35.2 The Contractor is advised that at least the following Acts, Regulations, and By-laws apply to the Work and are available for viewing on line at the applicable websites or at the office of the Contract Administrator.

E35.3 Federal

- (i) Canadian Environmental Assessment Act (CEAA) c.37
- (ii) Transportation of Dangerous Goods Act and Regulations c.34
- (iii) Railway Safety Act
- (iv) Notice of Railway Works Regulations

E35.4 Provincial

- (i) The Dangerous Goods Handling and Transportation Act D12
- (ii) The Endangered Species Act E111
- (iii) The Environment Act c.E125
- (iv) The Fire Prevention Act F80
- (v) The Manitoba Heritage Resources Act H39-1
- (vi) The Manitoba Noxious Weeds Act N110
- (vii) The Manitoba Nuisance Act N120
- (viii) The Public Health Act c.P210
- (ix) The Workplace Safety and Health Act W210
- (x) And current applicable associated regulations (Note: Provincial regulations updated as of September 1999).'

(b) Municipal

- (i) The City of Winnipeg By-law No. 2480/79 and all amendments up to and including 7976/2000
- (ii) The City of Winnipeg By-law No. 1573/77 and all amendments up to and including 7670/2000
- (iii) And any other applicable Acts, Regulations, and Bylaws.

E35.5 The Contractor is advised that the Environmental Approval to be issued for this project will be included by addendum.

- E35.6 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 is included in Appendix C and describes the mitigation measures to be adhered to by the Contractor.
- E35.7 The Contractor is advised that the following environmental protection measures apply to the Work.
- E35.8 Materials Handling and Storage
- (i) Storage of construction materials shall be confined to the defined laydown areas as shown on the Contract Drawings.
 - (ii) Construction materials shall not be deposited or stored on or near drainage ditches unless written acceptance from the Contract Administrator is received in advance.
 - (iii) 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.
- (b) Fuel Handling Storage
- (i) 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.
 - (ii) All fuel handling and storage facilities shall comply with The Dangerous Goods and Transportation Act Storage and Handling of Petroleum Products Regulation and any local land use permits.
 - (iii) Fuels, lubricants, and other potentially hazardous materials as defined in The Dangerous Goods and Transportation Act shall be stored and handled within the approved storage areas.
 - (iv) The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage.
 - (v) Products transferred from the fuel storage area(s) to specific Work sites shall not exceed the daily usage requirement.
 - (vi) When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheets of suitable material (such as HDPE) and size shall be spread on the ground to catch the fluid in the event of a leak or spill.
 - (vii) Refuelling of mobile equipment and vehicles shall take place at least 100 metres from a watercourse.
 - (viii) The area around storage sites and fuel lines shall be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.
 - (ix) A sufficient supply of materials, such as absorbent material and plastic oil booms, to clean up minor spills shall be stored nearby on-site. The Contractor shall ensure that additional material can be made available on short notice.
- (c) Waste Handling and Disposal
- (i) The construction area shall be kept clean and orderly at all times during and at completion of construction.
 - (ii) At no time during construction shall personal or construction waste be permitted to accumulate for more than one day at any location on the construction site, other than at a dedicated storage area as may be approved by the Contract Administrator.
 - (iii) 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).

- (iv) Indiscriminate dumping, littering, or abandonment shall not take place.
 - (v) No on-site burning of waste is permitted.
 - (vi) Waste storage areas shall not be located so as to block natural drainage.
 - (vii) Runoff from a waste storage area shall not be allowed to cause siltation of a watercourse.
 - (viii) Waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.
 - (ix) Equipment shall not be cleaned near watercourses; contaminated water from onshore cleaning operations shall not be permitted to enter watercourses.
- (d) Dangerous Goods/Hazardous Waste Handling and Disposal
- (i) Dangerous goods/hazardous waste are identified by, and shall be handled according to, The Dangerous Goods Handling and Transportation Act and Regulations.
 - (ii) The Contractor shall be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.
 - (iii) The Contractor shall have on site staff that is trained and certified in the handling of the dangerous/hazardous goods, when said dangerous/hazardous goods are being utilized on site for the performance of the Work.
 - (iv) Different waste streams shall not be mixed.
 - (v) Disposal of dangerous goods/hazardous wastes shall be at approved hazardous waste facilities.
 - (vi) Liquid hydrocarbons shall not be stored or disposed of in earthen pits on site.
 - (vii) Used oils shall be stored in appropriate drums, or tankage until shipment to waste oil recycling centres, incinerators, or secure disposal facilities approved for such wastes.
 - (viii) Used oil filters shall be drained, placed in suitable storage containers, and buried or incinerated at approved hazardous waste treatment and disposal facilities.
 - (ix) Dangerous goods/hazardous waste storage areas shall not be located so as to block natural drainage.
 - (x) Runoff from a dangerous goods/hazardous waste storage area shall not be allowed to cause siltation of a watercourse.
 - (xi) Dangerous goods/hazardous waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.
- (e) Emergency Response
- (i) The Contractor shall ensure that due care and caution is taken to prevent spills.
 - (ii) The Contractor shall report all major spills of petroleum products or other hazardous substances with significant impact on the environment and threat to human health and safety (as defined in Table 1 below) to Manitoba Environment, immediately after occurrence of the environmental accident, by calling the 24-hour emergency phone number (204) 945-4888.
 - (iii) 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.
 - (iv) The following actions shall be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on-site emergency response 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.
- (b) 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.
- (c) 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.
- (d) 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.
- (e) 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)		

(f) Noise

- (i) 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 advance by the Contract Administrator.
- (ii) 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 performed during the night-time period, on Sundays, and Holidays as stated in the Licence shall not exceed the approved limit.

(g) Dust

- (i) 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.
- (ii) 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.
- (iii) The Contractor shall ensure that trucks which are used to haul excavated material and backfill material to and from the Work site utilize tarpaulin covers during transport to prevent material from falling onto the street and creating dust.
- (iv) Stockpiled soils shall be covered with tarpaulin covers to prevent the creation of dust.

(h) Erosion Control

- (i) The Contractor shall develop a sediment control plan prior to beginning construction to the satisfaction of the Contract Administrator.
- (ii) 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.

- (iii) **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.**
- (iv) **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.**
- (v) 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.
- (i) Runoff Control

 - (i) 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.
 - (ii) Areas that are heavily disturbed and vulnerable to erosion or gullyng shall be dyked to redirect surface runoff around the area prior to spring run-off.
 - (iii) Construction activities on erodible slopes shall be avoided during spring run-off and heavy rainfall events.
- (j) Vegetation

 - (i) Right-of-way clearing shall be restricted to areas identified on the Construction Drawings.
 - (ii) Rare, endangered, or threatened plant species shall be protected as specified in the Environmental Screening Report, if encountered.
 - (iii) Vegetation shall not be disturbed without written permission from the Contract Administrator.
 - (iv) 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.
 - (v) Herbicides and pesticides shall not be used adjacent to any surface watercourses.
 - (vi) Trees or shrubs shall not be felled into watercourses.
 - (vii) 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.
 - (viii) 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.
 - (ix) Damaged trees which are not viable shall be replaced at the expense of the Contractor.
- (k) Landscaping

 - (i) 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.
 - (ii) The Contractor shall adhere to the landscaping plan for maintenance of initial stages and development stages of the plant community.
- (l) Heritage Resources

 - (i) 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.
- (ii) The Contractor shall be prepared to continue his Work elsewhere on the project while the Archaeologist investigates the finding and determines its heritage value.
 - (iii) 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.
 - (iv) 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.
 - (v) 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.
 - (vi) 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.
 - (vii) If the human remains are considered forensic, The City of Winnipeg Police shall be responsible for their removal.
 - (viii) Additional information may be obtained by contacting: Archaeological Assessment Services, Historic Resources Branch
- (m) Construction Traffic
- (i) 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.
 - (ii) 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.
 - (iii) The Contractor's laydown 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.
 - (iv) 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.
- (n) Access
- (i) The Contractor shall maintain access to affected residential properties.
 - (ii) The Contractor shall provide or maintain general and off-street access to any affected business during construction.

E36. ACCESS TO FORMER PPCLI – CFB WINNIPEG

- E36.1 Contractor shall note that municipal and utility relocations are proposed within the former PPCLI – CFB Winnipeg. Department of National Defense (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 hereby 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.

E37. SALVAGE OF EXISTING DUST COLLECTOR – DND SITE

- E37.1 Existing dust collector located on the south side of Building P1 (Warehouse), within DND Site will need to be salvaged. The items to be salvaged shall include all external components of the dust collector system including dust collector, bracing, supports, and all ducting above grade.
- E37.2 All external components shall be dismantled and removed from the current location and salvaged to a site within DND Lands to be identified by the Contract Administrator. It is anticipated that the disposal site will be within 500 metres of the existing location.
- E37.3 Contractor to provide dismantling procedures to the Contract Administrator outlining equipment proposed to conduct the salvage operations. Contractor shall receive approval for the dismantling procedures prior to salvage operations. Contractor shall be responsible for damages caused to the existing materials if approved construction procedures have not been followed during the salvage operations.
- E37.4 The salvage of existing dust collector shall be measured for payment on a lump sum basis. Price paid shall be compensation in full for all necessary salvage operations herein described.