THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 96-2009

SOUTHWEST RAPID TRANSIT CORRIDOR - STAGE 1: LAND DRAINAGE PUMPING STATION AND ASSOCIATED WORKS

TABLE OF CONTENTS F CONTENTS

PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 SOUTHWEST RAPID TRANSIT CORRIDOR - STAGE 1: LAND DRAINAGE PUMPING STATION AND ASSOCIATED WORKS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, April 22, 2009.

B2.2 Bids 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 C3.1, 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 D3.1.

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

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

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

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

B5. ADDENDA

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

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

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

B5.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

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

B6. SUBSTITUTES

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

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

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

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

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

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

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

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

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

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

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

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

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

B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may 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.

B6.10 Notwithstanding B6.2 to B6.9, and in accordance with B7.6 deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B15.1(a).

B7. BID COMPONENTS

B7.1 The Bid shall consist of the following components:

(a) Form A: Bid;

(b) Form B: Prices;

(c) Bid Security

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

B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.

B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.

B7.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.

B7.4.1 Samples or other components of the Bid 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.

B7.5 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.

B7.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B15.1(a).

B7.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B7.8 Bids shall be submitted to:

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

B8. BID

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

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

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

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

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

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

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

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

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

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

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

(c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, should 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 should be printed below such signatures.

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 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 Notwithstanding C.12.2.3(c), prices on Form B: Prices for **items B.5, B.6, B.7 and B.8 only** shall not include the Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable.

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

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

B9.4 Prices from Non-Resident Bidders are subject to a Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

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; and

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

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

B10.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

(a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/debar.stm

B10.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

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

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

(c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);

B10.4 Further to B10.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

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

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

B10.5 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B10.6 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B11. BID SECURITY

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

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

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

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

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

B11.1.2 All signatures on bid securities shall be original.

B11.1.3 The Bidder shall sign the Bid Bond.

B11.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.

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

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

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

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

B12. OPENING OF BIDS AND RELEASE OF INFORMATION

B12.1 Bids 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 Bids 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 Following the submission deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt

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

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

B13. IRREVOCABLE BID

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

B13.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the performance security furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid.

B14. WITHDRAWAL OF BIDS

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

B14.1.1 Notwithstanding C23.3, 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 will:

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

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

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

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

B15. EVALUATION OF BIDS

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

(a) compliance by the Bidder with the requirements of the Bid Opportunity, or acceptable deviation there from (pass/fail);

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

(c) Total Bid Price;

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

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

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 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 Further to B15.1(a), in the event that a unit price is not provided on Form B: Prices, the City will determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B16. AWARD OF CONTRACT

B16.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B16.2 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.

B16.2.1 Without limiting the generality of B16.2, 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.

B16.3 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, in accordance with B15.

B16.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his Bid upon written request to the Contract Administrator.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

C0.1 The *General Conditions for Construction* (Revision 2006 12 15) are applicable to the Work of the Contract.

C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm

C0.2 A reference in the Bid Opportunity to a section, clause or subclause with the prefix "**C**" designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of the construction of Construction of a complete and operating pumping station.

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

(a) Site Development
(b) Demolitions and Removals
(c) Gravity Sewers
(d) Excavations and Rough Grading
(e) Excavation, Shoring, Dewatering
(f) Substructure
(g) Backfill
(h) Superstructure
(i) Mechanical Works
(j) Electrical Works
(k) Fencing
(l) Site Restoration

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is Dillon Consulting Limited, represented by:

Dave Krahn, P.Eng.
Project Manager
200-895 Waverley Street
Winnipeg, Manitoba R3T 5P4

Telephone No. (204) 453-2301
Facsimile No. (204) 453-2212

D3.2 At the pre-construction meeting, Dave Krahn, P.Eng. will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D4. CONTRACTOR'S SUPERVISOR

D4.1 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.

D4.2 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 D4.1 or an alternate can be contacted 24 hours a day to respond to an emergency.

D5. NOTICES

D5.1 Except as provided for in C23.2.2, 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.

D5.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D5.3, D5.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the address or facsimile number identified in D3.1.

D5.3 Notwithstanding C21, 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 Financial Officer
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9

Facsimile No.: (204) 949-1174

D5.4 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
Internal Services Department
Legal Services Division
Attn: City Solicitor
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1

Facsimile No.: (204) 947-9155

D6. FURNISHING OF DOCUMENTS

D6.1 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

D7. AUTHORITY TO CARRY ON BUSINESS

D7.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

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 C4.1 for the return of the executed Contract.

D8.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg,

Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/Safety/default.stm

D9. INSURANCE

D9.1 The Contractor shall provide and maintain the following insurance coverage:

(a) commercial general liability insurance, in the amount of at least two million dollars ($2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability, broad form property damage cover and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;

(b) automobile liability insurance for owned automobiles used for or in connection with the Work in the amount of at least two million dollars ($2,000,000.00) at all times during the performance of the Work and until the date of Total Performance;

(c) an all risks Installation Floater carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.

D9.2 Deductibles shall be borne by the Contractor.

D9.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4.1 for the return of the executed Contract.

D9.4 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.

D10. PERFORMANCE SECURITY

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

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

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

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

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

D10.2 If the bid security provided in his Bid 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 but in no event later than the date specified in C4.1 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 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.

D12. ENVIRONMENTAL PROTECTION PLAN

D12.1 Prior to commencing construction activities or delivery of materials to Site, submit an Environmental Protection Plan for review and approval by the Contract Administrator. The Environmental Protection Plan is to present a comprehensive plan to address known or potential environmental issues which may be present during construction. Where applicable, the Environmental Protection Plan shall include Subcontractor activities. The submission of the Site Environmental Plan to the Contract Administrator shall in no way relieve the Contractor of full responsibility for the success or failure of all the environmental management practices and procedures.

D12.2 The Environmental Protection Plan shall address the following:

(a) Name[s] of person[s] responsible for ensuring adherence to Environmental Protection Plan.

(b) Name[s] and qualifications of person[s] responsible for manifesting hazardous waste to be removed from Site.

(c) Name[s] and qualifications of person[s] responsible for training Site personnel.

(d) Erosion and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

(e) Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features including vegetation to be preserved within authorized work areas.

(f) Environmental Emergency Response: including procedures, instructions, and reporting in the event of unforeseen spill of regulated substance.

(g) Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

(h) Hazardous materials and waste management plan outlining storage, transportation and disposal.

(i) Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project Site.

(j) Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

(k) Waste water management plan that identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete wash or curing water, clean-up water, dewatering of ground water, hydrostatic test water, and water used in flushing of lines.

(l) Monitor and report to ensure implementation of environmental protection measures.

D12.3 Fires

D12.3.1 Fires and burning rubbish or waste materials on Site is not permitted.

D12.4 Disposal of Waste

D12.4.1 Dispose all waste at licensed facilities or with licensed haulers.

D12.4.2 All waste disposal grounds receiving debris and construction waste from this project must be operated under the authority of a valid permit issued pursuant to MR 150 (latest edition) Waste Disposal Grounds Regulation under the Environment Act.

D12.4.3 Dispose of all sewage and septage from the on-site sanitary facilities in accordance with the Onsite Wastewater Management Systems Regulation MR 83/2003.

D12.4.4 Do not bury waste materials on Site.

D12.4.5 Do not dispose of solid or liquid wastes in drains or waterways.

D12.5 Hazardous Waste

D12.5.1 Definitions

(a) Dangerous Goods: product, substance, or organism that is specifically listed or meets hazard criteria established in the Dangerous Goods Handling and Transportation Act or regulations including hazardous materials and wastes.

(b) Hazardous Material: product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.

(c) Hazardous Waste: any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.

(d) Workplace Hazardous Materials Information System (WHMIS): a Canada-wide system designed to give employers and workers information about hazardous materials used in workplace. Under WHMIS, information on hazardous materials is provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by combination of federal and provincial laws.

D12.5.2 Materials Management

(a) Only bring on Site quantity of hazardous materials required to perform Work.

(b) Maintain MSDSs in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

(c) Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

D12.5.3 Storage and Handling

(a) Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

(i) Sign storage areas.

(ii) Store and handle flammable and combustible materials in accordance with current Manitoba and National Fire Code of Canada requirements.

(iii) Do not transfer of flammable and combustible liquids in vicinity of open flames or heat-producing devices.

(iv) Do not use flammable liquids having flash point below 38 degrees C, such as naptha or gasoline as solvents or cleaning agents.

(v) Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.

(vi) Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.

(b) Keep no more than 100 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.

(i) Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.

(ii) Storage of quantities of flammable and combustible liquids exceeding 100 litres for Work purposes requires the written approval of the Engineer

(iii) Fuel storage exceeding 100L shall be a minimum distance of 100 metres from any waterbody and in compliance with the requirements of the Storage and

Handling of Petroleum Products and Allied Products Manitoba Regulation 188/2001 of the Dangerous Goods Handling and Transportation Act.

(c) Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:

(i) Store hazardous materials and wastes in closed and sealed containers.

(ii) Label containers of hazardous materials and wastes in accordance with WHMIS.

(iii) Store hazardous materials and wastes in containers compatible with that material or waste.

(iv) Segregate incompatible materials and wastes. Ensure that different hazardous materials or hazardous wastes are not mixed.

(v) Store hazardous materials and wastes in secure storage area with controlled access.

(vi) Maintain clear egress from storage area.

(vii) Store hazardous materials and wastes in location that will prevent them from spilling into environment.

(viii) Store products on spill trays or berms with 110% capacity.

(ix) Do not store within 30 meters of a waterway or drain

(x) Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.

(xi) Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began and disposal occurred. Maintain tipping and other disposal receipts.

(d) Report spills or accidents immediately

(i) to the Engineer

(ii) to Manitoba Conservations Accident Reporting Line at 204-944-4888 in accordance with Manitoba Regulation 439/87 of the Dangerous Goods and Transportation Act.

(iii) Submit a written spill report to the Engineer outlining cause and proposed corrective action and Manitoba Conservation as required. Provide copies of reports submitted to Manitoba Conservation to the Engineer.

D12.5.4 Transportation

(a) Transport hazardous materials and wastes in accordance with the Manitoba Dangerous Goods Handling and Transportation Act.

(i) Ensure that trained personnel handle, offer for transport, or transport dangerous goods.

(ii) Use licensed carrier authorized by provincial authorities to accept subject material.

(iii) Label container[s] with legible, visible safety marks as prescribed by federal and provincial regulations.

(iv) Provide photocopy of shipping documents and waste manifests to the Engineer.

(v) Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to the Engineer.

(vi) Report discharge, emission, or escape of hazardous materials immediately to the Engineer and appropriate provincial authority. Take measures to control release.

D12.5.5 Disposal

(a) Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.

(i) Recycle hazardous wastes for which there is approved, cost effective recycling process available.

(ii) Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.

(iii) Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.

(iv) Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

D12.5.6 Erosion and Sediment Control

(a) Develop an erosion control plan to control negative impacts on water and air quality; plan should meet these objectives:

(i) Prevent loss of soil during construction by storm water run-off and wind erosion.

(ii) Protect against erosion from stockpiled topsoil aggregates.

(iii) Prevent sedimentation of the land drainage system and receiving streams with dust, particulate matter or eroded sediment.

(b) The Contractor shall supply, install, maintain and remove (as applicable and when no longer required) effective sediment control barriers and erosion control before starting Work that may result in the deposit of sediment into a ditch or waterbody to avoid potential impacts to fish and fish habitat.

(i) Erosion and sediment control measures and installations include, as required, silt socks around storm drains, silt fence barriers, erosion control blanket, straw wattles, and geotextile fabric as appropriate.

(ii) The Contractor shall routinely inspect all erosion and sediment control measures and installations and shall immediately repair any deficiencies.

D12.5.7 Work to Adjacent Waterways

(a) Do not operate construction equipment in waterways and, where possible, avoid operating equipment within 30 meters of the waterway.

(b) Do not use waterway beds for borrow material.

(c) Do not dump excavated fill, waste material or debris in ditches or waterway.

(d) Design and construct temporary crossings to minimize erosion to waterways.

(e) Dispose of excavated materials above the high water mark and 30 meters way from a watercourse.

D12.5.8 Drainage

(a) Provide temporary drainage and pumping as necessary to keep excavations and Site free from water.

(b) Do not pump water containing suspended materials into waterways, sewer or drainage systems.

(c) Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

D12.5.9 Reducing Site Disturbances

(a) The Contractor shall not disturb, in any way, the embankment slopes, roadway shoulders, and adjacent ground surfaces areas outside the limits of the construction areas including the approved lay down, staging and access unless the Contractor has obtained written permission from the Engineer. Such written permission will be granted if it can be shown that there is no alternative.

(b) The Contractor shall minimize disturbance of any undeveloped areas on Site and maintain existing Site grading where indicated and where possible.

(i) Minimize stripping of topsoil and vegetation

(ii) Re-grade and plant vegetation on construction Site as soon as possible.

(iii) Avoid soil compaction where possible.

D12.5.10 Pollution Control

(a) Maintain temporary erosion and pollution control features installed under this contract.

(b) Maintain construction equipment in good working order. Control emissions from equipment.

(c) Cover or wet down dry materials and stockpiled soils to prevent blowing dust and debris. Provide dust control for the construction Site, temporary and access roads.

(d) Bring only clean fill, granular, rip rap and other similar construction materials to the project Site.

D13. DETAILED WORK SCHEDULE

D13.1 The Contractor shall provide the Contract Administrator with a detailed Work schedule 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.

D13.2 The detailed Work schedule shall consist of a Gantt chart for the Work acceptable to the Contract Administrator.

D13.3 Further to D13.2, the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each trade. The time shall be on the horizontal axis, and the type of trade shall be on the vertical axis.

D14. WATER MANAGEMENT PLAN

D14.1 The Contractor shall provide the Contract Administrator with a water management plan at least two (2) Business Days prior to 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.

D14.2 The Water Management Plan should be prepared and submitted in a format that clearly identifies how the Contractor will undertake dewatering activities at the Site during construction.

SCHEDULE OF WORK

D15. COMMENCEMENT

D15.1 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.

D15.2 The Contractor shall not commence any Work on the Site until:

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

(i) Evidence of authority to carry on business specified in D7;

(ii) Evidence of the workers compensation coverage specified in C6.15;

(iii) The Safe Work Plan specified in D8;

(iv) Evidence of the insurance specified in D9;

(v) The Performance Security specified in D10;

(vi) The Subcontractor List specified in D11;

(vii) The Environmental Protection Plan specified in D12;

(viii) The Detailed Work Schedule specified in D13; and

(ix) The Water Management Plan specified in D14.

(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.

(c) The Contractor has provided proof of CN Contractor Safety Training for each individual proposed to Work on the Site. Contractor to contact Christina Cusson at (204) 231-7805 for CN Right of Entry and Safety Training requirements.

(d) The Contractor has attended a Transit safety meeting to be arranged by Tony Dreolini at 986-5574.

D15.3 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the letter of intent.

D16. CRITICAL STAGES

D16.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

(a) All Work for the Land Drainage Pumping Station except for installation of new pumps and control gate must be completed by August 31, 2009.

(b) The Land Drainage Pumping Station must be operational by April 30, 2010 (new pumps and control gate must be ordered immediately upon Contract award as long delivery periods are anticipated).

D17. HOURS OF WORK

D17.1 All Work shall be carried out between the hours of 07:00 and 22:00 Monday to Friday and between 09:00 and 21:00 Saturday.

D17.2 No Work shall be performed outside the hours stated in D75.1 or on Sunday or statutory or civic holidays without written permission from the Contract Administrator. Approval will only be granted if it is in the best interests of the City to do so.

D18. WORK BY OTHERS

D18.1 Work by others on or near the Site will include but not necessarily limited to:

(a) Land Drainage Sewers;

(b) Manitoba Hydro.

D19. SUBSTANTIAL PERFORMANCE

D19.1 The Contractor shall achieve Substantial Performance by August 31, 2009.

D19.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D19.3 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.

D20. TOTAL PERFORMANCE

D20.1 The Contractor shall achieve Total Performance by April 30, 2010.

D20.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D20.3 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.

D21. LIQUIDATED DAMAGES

D21.1 If the Contractor fails to achieve critical stages, Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Calendar Day for each and every Calendar Day following the days fixed herein for same during which such failure continues:

(a) All Work (except pumps and control gate) – one thousand dollars ($1,000.00);

(b) Pumping Station Operational – one thousand dollars ($1,000.00);

(c) Substantial Performance – one thousand dollars ($1,000.00); and

(d) Total Performance – one thousand dollars ($1,000.00).

D21.2 The amounts specified for liquidated damages in D21.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve critical stages, Substantial Performance or Total Performance by the days fixed herein for same.

D21.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D22. SCHEDULED MAINTENANCE

D22.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

(a) Dewatering as specified in D14;

(b) Landscape maintenance as specified in CW 3510.

D22.2 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

D23. JOB MEETINGS

D23.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City and the Contractor respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.

D23.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

D24. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D24.1 Further to C6.24, 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).

MEASUREMENT AND PAYMENT

D25. PAYMENT

D25.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

D26. PAYMENT SCHEDULE

D26.1 Further to C12, payment shall be in accordance with the following payment schedule:

(a) Control Gate and Propeller Pumps

(i) 10% payment on approval of shop drawings

(ii) 65% payment on delivery to site

(iii) 25% payment on commissioning

WARRANTY

D27. WARRANTY

D27.1 Warranty is as stated in C13.

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 for

BID OPPORTUNITY NO. 96-2009

SOUTHWEST RAPID TRANSIT CORRIDOR - STAGE 1: LAND DRAINAGE PUMPING STATION AND ASSOCIATED 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 as to Principal if no seal)

_____
(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
Internal Services Department
Legal Services Division
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 96-2009

SOUTHWEST RAPID TRANSIT CORRIDOR - STAGE 1: LAND DRAINAGE PUMPING STATION AND ASSOCIATED 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)

SOUTHWEST RAPID TRANSIT CORRIDOR - STAGE 1: LAND DRAINAGE PUMPING STATION AND ASSOCIATED WORKS

Name	Address

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

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

E1.1.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/Spec/Default.stm

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

E1.1.3 Further to C2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.2 The following are applicable to the Work:

Specification No.	Specification Title
DIVISION 04 - MASONRY	
040500	Common Work Results for Masonry
040512	Masonry Mortar and Grout
040519	Masonry Anchorage and Reinforcing
040523	Masonry Accessories
042200	Concrete Unit Masonry
DIVISION 06 - WOOD COMPONENTS	
061753	Shop - Fabricated Wood Trusses
DIVISION 07 - THERMAL & MOISTURE PROTECTION	
072113	Board Insulation
072711	Air Barriers - Performance
074100	Metal Roof and Wall Panels
079210	Joint Sealing
DIVISION 08 - OPENINGS	
081114	Metal Doors and Frames
087110	Door Hardware - General
DIVISION 09 - FINISHES	
099123	Interior Painting
099650	Graffiti-Resistant Coatings
DIVISION 23 - MECHANICAL	
230500	Mechanical General Provisions
230510	Supply Process Propeller Pumps
230530	Piping and Pump Installation
233114	Metal Ducts - Low Pressure to 500 PA
233400	HVAC Fans
233720	Louvres, Intakes and Vents
238240	Unit Heaters
DIVISION 25 - INTEGRATED AUTOMATION	
250501	Controls: General Requirements
250554	Controls: Identification
253002	Controls: Instrumentation
DIVISION 26 - ELECTRICAL	
260501	Common Work Results - For Electrical
260520	Wire and Box Connectors 0-1000 V
260521	Wires and Cables (0-1000 V)
260528	Grounding - Secondary

260529	Hangers and Supports for Electrical Systems
260531	Splitters, Junction, Pull Boxes and Cabinets
260532	Outlet Boxes, Conduit Boxes and Fittings
260534	Conduits, Conduit Fastenings and Conduit Fittings
260544	Installation of Cables in Trenches and in Ducts
260573	Short Circuit/Coordination Study and Arc Flash Hazard Study
261217	Dry Type Transformers up to 600 V Primary
262417	Panelboards Breaker Type
262726	Wiring Devices
262821	Moulded Case Circuit Breakers
262823	Disconnect Switches – Fused and Non-Fused
262910	Motor Starters to 600 V
262921	Reduced Voltage Starter (Solid-State)
265000	Lighting

City Drawing No.	Consultant Drawing No.	Drawing Name/Title	Size
GENERAL			
LD-5300	C2-G100-P	Cover Sheet	A1
LD-5301	C2-G101-P	Drawing List	A1
LD-5302	C2-G102-P	Legend	A1
LD-5303	C2-G103-P	Pump Station Site Plan	A1
BUILDING			
LD-5304	C2-B2000-P	Building Floor Plan and Elevations	A1
LD-5305	C2-B2001-P	Building Section and Details	A1
STRUCTURAL			
LD-5306	C2-B2100-P	Structural General Layout	A1
LD-5307	C2-B2101-P	Structural Sections	A1
LD-5308	C2-B2102-P	Foundation Details	A1
LD-5309	C2-B2103-P	Wall Layout	A1
LD-5310	C2-B2104-P	Wall Details Sheet 1	A1
LD-5311	C2-B2105-P	Wall Details Sheet 2	A1
LD-5312	C2-B2106-P	Wall Details Sheet 3	A1
LD-5313	C2-B2107-P	Top Slab Details	A1
LD-5314	C2-B2108-P	Miscellaneous Details - Sheet 1	A1
LD-5315	C2-B2109-P	Miscellaneous Details - Sheet 2	A1
ELECTRICAL			
LD-5316	C2-B2200-P	Electrical Floor Plans and Section	A1
LD-5317	C2-B2201-P	Electrical Single Line Diagram	A1
LD-5318	C2-B2202-P	Electrical Flood Pump FP-1 Schematic/Wiring Diagram	A1
LD-5319	C2-B2203-P	Electrical Flood Pump FP-2 Schematic/Wiring Diagram	A1
LD-5320	C2-B2204-P	Electrical Control Indication and Alarm Schematic/Wiring Diagram	A1
LD-5321	C2-B2205-P	Electrical Flood Pumping Station Miscellaneous Details	A1
LD-5322	C2-B2206-P	Electrical Details and Schedules	A1
MECHANICAL			
LD-5323	C2-B2300	Mechanical Piping	A1
LD-5324	C2-B2301	Mechanical Heating and Ventilating	A1

E2. SOIL INVESTIGATION REPORTS

E2.1 Further to C3.1, a portion of the geotechnical reports are provided to aid the Contractor's evaluation of the existing soil conditions. The National Testing Laboratories Limited and Klohn

Crippen geotechnical reports are contained in Appendix 'A' and 'B' respectively. The information presented is considered accurate at the locations and time of drilling as outlined in the appendices. However, variations in soil conditions may exist between test holes and fluctuations in groundwater levels can be expected seasonally and may occur as a result of construction activities. The nature and extent of variations may not become evident until construction commences. The complete National Testing Laboratories Limited and Klohn Crippen geotechnical reports may be viewed at the Contract Administrator's Office upon request.

GENERAL REQUIREMENTS

E3. GRAVITY SEWERS

E3.1 Further to CW 2130 clause 3.3, Class B bedding shall be used.

E3.1.1 Class B bedding shall be as follows:

(a) For SDR-35 PVC sewer installation, the bedding and initial backfill material shall be Type 2 as specified in table CW 2030.1 "Grading requirements for Imported Backfill";

(b) For C76 concrete sewer installation, the bedding and initial backfill material shall be sand.

E3.2 Excavations for manhole installations to be supported as per CW 2130 with shoring to be left in place for the LDS Contractor (Contract 1).

E4. SHOP DRAWINGS

E4.1 Description

(a) This Specification provides instructions for the preparation and submission of shop drawings.

(i) The term 'shop drawings' means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, including Site erection drawings which are to be provided by the Contractor to illustrate details of a portion of the Work.

(ii) The Contractor shall submit specified shop drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be show on all submissions for Contract Administrator review.

(b) Shop Drawings

(i) Original drawings are to be prepared by Contractor, SubContractor, supplier, distributor, or manufacturer, which illustrate appropriate portion of Work; showing fabrication, layout, setting or erection details as specified in appropriate sections.

(ii) Shop drawings for the following structural components shall bear the seal of a registered Engineer of Manitoba.

(a) Metal Fabrications

(b) Shoring

(c) Contractor's Responsibilities

(i) Review shop drawings, product data and samples prior to submission and stamp and sign drawings indicating conformance to the Contract requirements.

(ii) Verify:

(a) Field Measurements

(b) Field Construction Criteria

(c) Catalogue numbers and similar data

(iii) Coordinate each submission with requirements of Work and Contract Documents. Individual shop drawings will not be reviewed until all related drawings are available.

(iv) Notify Contract Administrator, in writing at time of submission, of deviations from requirements of Contract Documents.

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

(vi) Responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.

(vii) The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the required number of corrected copies of Shop Drawings. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on previous submission.

(viii) After Contract Administrator's review and return of copies, distribute copies to subtrades as appropriate.

(ix) Maintain one (1) complete set of reviewed shop drawings, filed by Specification Section Number, at the Site of the Work for use and reference of the Contract Administrator and SubContractors.

(d) Submission Requirements

(i) Schedule submissions at least fourteen (14) Calendar Days before dates reviewed submissions will be needed, and allow for a fourteen (14) Calendar Day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.

(ii) Submit two (2) paper prints of shop drawings. The Contractor is advised that the Contract Administrator will retain one (1) copy of all submittals and return one (1) copy to the Contractor.

(iii) Accompany submissions with transmittal letter, containing:

(a) Date

(b) Project title and Bid Opportunity number

(c) Contractor's name and address

(d) Number of each shop drawing, product data and sample submitted

(e) Specification Section, Title, Number and Clause

(f) Drawing Number and Detail/Section Number

(g) Other pertinent data

(iv) Submissions shall include:

(a) Date and revision dates.

(b) Project title and Bid Opportunity number.

(c) Name of:

(i) Contractor

(ii) SubContractor

(iii) Supplier

(iv) Manufacturer

(v) Separate detailer when pertinent

(d) Identification of product of material.

(e) Relation to adjacent structure or materials.

(f) Field dimensions, clearly identified as such.

(g) Specification section name, number and clause number or drawing number and detail/section number.

(h) Applicable standards, such as CSA or CGSB numbers.

(i) Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.

(e) Other Considerations

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

(ii) Material and equipment delivered to the Site of the Works will not be paid for at least until pertinent shop drawings have been submitted and reviewed.

(iii) Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.

(iv) No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of shop drawings.

E5. STAINLESS STEEL SLIDE GATES

E5.1 Description

E5.1.1 This Specification shall cover the supply and installation of fabricated stainless steel slide gates, operators, stems, wall brackets and mechanical accessories.

E5.2 Materials

E5.2.1 General

(a) Slide gates shall be a fabricated stainless steel flush bottom gate. The slide gate shall be complete with frame suitable for attaching directly to a concrete wall, gaskets, rising stem, stem guides, geared operator, operator pedestal, anchor bolts and all mechanical accessories.

(b) The fabricated stainless steel slide gate shall meet the following leakage rates.

(i) Under seating head leakage not to exceed 0.60 litres per minute per meter (0.05 USgpm per foot) of seating perimeter.

(ii) Under unseating head leakage not to exceed 1.25 litres per minute per metre (0.1 USgpm per foot) of perimeter.

(c) The gates shall be capable of withstanding seating and unseating heads of up to 6 meters (19.7 feet).

E5.2.2 Materials of Construction

(a) Gate: ASTM A-276 Type 304 Stainless Steel

(b) Frame and Extensions: ASTM A-276 Type 304 Stainless Steel

(c) Guides: ASTM A-276 Type 304 Stainless Steel

(d) Fasteners: ASTM A-276 Type 316 Stainless Steel

(e) Wall Thimble: ASTM A-276 Type 304 Stainless Steel

(f) Stem: ASTM A-276 Type 304 Stainless Steel, Solid Round Bar

(g) Bottom Seal: Neoprene Grade 2BC 510

(h) Wall gasket: Full face, resilient Neoprene, minimum 10 millimetres thick

(i) Lateral and Top Seals: ASTM D-2000 UHMW Polyethylene and Neoprene

(j) Threaded Stem Nut: Manganese Bronze, ASTM B584, Alloy 432

(k) Stem Block: ASTM A-276 Type 304 Stainless Steel

(l) Stem Coupling: ASTM A-276 Type 304 Stainless Steel

(m) Stem Guide: ASTM A-276 Type 304 Stainless Steel

(n) Stem Cover: ASTM A-276 Type 304 Stainless Steel with ASTM A-707 Clear Polycarbonate sight glass

(o) Pedestal: Tenzaloy Aluminium

(p) Anchor Bolts: ASTM A-276 Type 316 Stainless Steel suitable for fastening the slide gate to a concrete wall.

E5.2.3 Manufacturer's Experience

(a) The slide gate, and manual geared operator is to designed and manufactured by a company having at least seven years prior experience in manufacturing these types of products in the size and to the heads specified.

E5.3 Construction Methods

E5.3.1 Slide Gate Construction

(a) General

(i) The gates shall be open frame with rising stem. All structural parts shall be sized and apportioned to withstand the structural loads to which they will be subject without buckling, warping, bending, or otherwise failing. Welding shall be done in accordance with ASME Standards Section IX. Gates and shall be water and sand blasted after fabrication to remove all weld splatter and to polish scratches. After blasting the entire surface shall be of uniform colour and sheen.

(b) Frame

(i) The frame shall be of structural members or formed plate welded to form a rigid one piece unit. The frame shall be of the flange back design suitable for mounting on a concrete wall with extra wide flange. The guide slot shall be of UHMWPE and engage the slide plate a minimum width of 25 millimetres.

(ii) The frame configuration shall be of the flush bottom type and shall allow for the replacement of the top and side seals without removing the gate frame from the wall.

(c) Slide

(i) The slide shall consist of flat plate reinforced with formed plates or structural members to limit its deflection to 1/720 of the span of the gate under the design head.

(d) Guides and Seals

(i) The guides shall be of such length as to retain and support at least two thirds of the vertical height of the slide in the full open position.

(ii) UHMWPE side and top seals shall be of the self adjusting type and shall maintain an efficient seal in any position of the slide.

(iii) The resilient neoprene bottom seal shall be fastened to the face of the bottom edge of the slide and extend 6 millimetres beyond the bottom edge to make a watertight seal with bottom channel when fully closed. The bottom seal shall be readily replaceable by removing the fasteners.

(iv) Holes in wall gasket to be pre-punched to match the gate frame and form a seal on either side of the anchor bolts.

(e) Stem and Couplings

(i) The operating stem shall be sized and designed to transmit in compression at least two times the rated output of the manual geared operator with an 18 kg (40lb) effort on the crank.

(ii) The stem shall be solid and have a slenderness ratio (L/r) of less than 100 and be able to transmit at least two times the loads and torque applied to it.

(iii) The threaded portion of the stem shall be furnished with right-hand, 29 degree modified Acme single threads of sufficient length to allow for full opening of the gate.

(iv) The bottom end of the stem shall be threaded to a connection block on the gate and fitted with double bolts of ample proportion to resist at least two times the loads applied to the stem during opening and closing operation. The connection hall be of greater strength than the stem.

(v) Connect all multi-sectioned stems with a solid coupling. The coupling shall be internally threaded or grooved, keyed and fitted with bolts for locking. Couplings shall be of greater strength than the stem.

(vi) Fit the stem above the operator with an adjustable stop for the fully closed position.

(f) Stem Guides

(i) Fabricate stem guides of Type 304 Stainless Steel with UHMW Polyethylene bushings and be adjustable in both the horizontal and vertical directions.

(ii) Spacing to be as recommended by the gate manufacturer with a minimum of two stem guides provided.

(g) Stem Cover

(i) Provide a 50 millimetre wide slot in the stem extension cover to allow viewing of the position of the gate stem. Fit the slot with a clear polycarbonate cover and clear mylar position indicating tape. Apply the tape in the field after the gate has been installed and positioned.

(ii) Provide a cap and condensation vents on the stem extension cover.

(h) Thrust Nut

(i) Provide a thrust nut at the operator collar.

(i) Enclosed Manual Geared Operator

(i) Provide a pedestal mounted, hand crank operated, enclosed gear operator for the gate.

(ii) All bearings and gears shall be grease lubricated enclosed in a watertight housing. Provide suitable nipples on the housing for the addition of grease.

(iii) Construct pinion shaft of stainless steel and support by roller or needle bearings.

(iv) Design the operator to operate the gate under the maximum seating or unseating condition by not more than a 18 kg (40 lb.) effort on the crank and be able to withstand without damage, an effort of 36 kg (80 lb.).

(v) Provide standard 50mm x 50mm square AWWA operating nut on the operator to facilitate use of portable electric operators.

(vi) Provide removable crank to fit over 50mm x 50mm operating nut. Handle to be corrosion resistant. The maximum crank radius shall be 380 millimetres.

(vii) Indicate the direction of rotation to open the gate on the operator housing in a permanent manner.

(j) Acceptable Product

(i) H. Fontaine Series 20 (CWX) fabricated stainless steel slide gate with Type MNEP operator or approved equal in accordance with B6.

(k) Shop Drawings

(i) Submit Shop Drawings of the gate, operator and accessories to the Contract Administrator for review prior to manufacture. Submit Drawings in accordance with E4.

(ii) Drawings shall clearly indicate general design, materials and arrangement complete with mounting details and dimensions, materials list for gate, frame, stem, seals, slides, operator and all other parts and complete details of operators including type, torque, capacity, gear ratio and number of turns to close.

(l) Operating and Maintenance Manuals

(i) Provide five (5) copies of all the manufacturer's brochures and technical literature detailing correct installation procedure and recommended operating and maintenance instructions.

(ii) Manuals shall be bound with the project title and gate description identified on the front cover.

(iii) Final payment for slide gates will not be made until the above information has been provided to the Contract Administrator.

E5.3.2 Shop Testing

(a) Shop inspect, adjust and test each fully assembled slide gate for operation and leakage at the design head before shipping.

(b) Provide the following information to the Contract Administrator prior to delivery of the gate and operator:

(i) A certified copy of the Chemical and Physical Analysis on all materials used in the manufacture of the gate, operator and accessories or certification that the materials used are in strict accordance with this specification.

(ii) Copies of the test reports for Performance and Leakage Tests. Included in the report shall be the signature of the official who is responsible for the gate assembly and testing.

E5.3.3 Inspection of Slide Gates Before Installation

(a) Arrange with the Contract Administrator for inspection of the slide gates immediately after delivery.

(b) The Contract Administrator will examine the gates, operators and accessories and will reject any equipment that is found to be damaged to the extent that, in the Contract Administrator's opinion, it cannot be put to the use for which it was intended.

(c) Arrange with the gate supplier to repair any superficially damaged equipment to the satisfaction of the Contract Administrator.

(d) Arrange to have any rejected equipment replaced as soon as possible so as to not hold up the project schedule at no extra expense to the City.

E5.3.4 Installation of Slide Gate, Operator and Accessories

(a) Install gates, operators, stem guides, stems and accessories as shown on the drawings and in accordance with the manufacturer's recommendations.

(b) Ensure slide gates are installed plumb, square and centred on opening.

(c) Install anchor bolts in accordance with the manufacturer's written instructions. Anchor bolts should not become loose under repeated installation and removal of the slide gate.

(d) Make arrangements to have a qualified field representative of the gate supplier/manufacturer inspect the gate installations during and after completion and provide a Certificate of Satisfactory Installation to the Contract Administrator.

E5.3.5 Field Testing

(a) Perform leakage tests at the design head for seating conditions in the Contract Administrator's presence once the gates have been installed to ensure compliance with the allowable leakage rate.

(b) Ensure that a qualified field representative of the gate manufacturer is present for the testing to assist in correcting any deficiencies to the satisfaction of the Contract Administrator.

(c) Use water from deep pond, tanker, City hydrant or other source approved by Contract Administrator for field testing of slide gates.

(d) Perform seating head tests by closing the gate, and filling the wetwell chamber with water to the specified head.

(e) Measure the leakage rate through the gate by determining the volume of the fill water and calculating how much fill water leaked through the gate over a period of 1 hour.

(f) Any deficiencies shall be corrected as soon as possible by the Contractor to the satisfaction of the Contract Administrator and retested as described in this specification.

E5.4 Measurement And Payment

(a) Supply, installation and field testing of fabricated stainless steel slide gates, operators and mechanical accessories will be measured and paid for at the Contract Lump Sum Price for "Supply, Installation and Field Testing of Control Gate and Operator".

E6. OFFICE FACILITIES

E6.1 Office facilities are not required for this project.

E7. PROTECTION OF EXISTING TREES

E7.1 The Contractor shall take the following precautionary steps to prevent damage from construction activities to existing trees as shown on the Site Plan:

(a) The Contractor shall not stockpile materials and soil or park vehicles and equipment within 2 meters 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 preformed 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 (measure 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 does occur, they shall be neatly pruned.

E7.2 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.

E7.3 No separate measurement or payment will be made for the protection of trees.

E7.4 Elm trees cannot be trimmed between April 1 and July 31, inclusive.

E8. SITE DEVELOPMENT AND RESTORATION

E8.1 Description

E8.1.1 This Specification shall cover all aspects of the Site Development and restoration Work, including erection, maintenance and removal of safety fencing, snow clearing, access development, access maintenance and removal, and Site restoration.

E8.2 Materials

E8.2.1 Equipment

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

E8.3 Construction Methods

E8.3.1 Field Excavation

(a) A Field Excavation to verify the extent and location of building foundations at the proposed location of the Pump Station was conducted on March 23, 2009. A 2 meter wide x 4 meter long x 3 meter deep pit was dug at the proposed location of the Pump Station to determine the existing building foundations below grade. The Field Excavation revealed the following:

(i) 200 mm thick concrete slab lies just below the existing grade;

(ii) Foundation wall extending approximately 2.5 meters deep below the existing grade along the existing east retaining wall (as shown on the Drawings); and

(iii) Miscellaneous construction debris (abandoned steel and clay pipes).

(b) The Field Excavation information is provided to aid the Contractor's evaluation of the existing building foundation conditions. Photographs of the Field Excavation are contained in Appendix "C". The information presented is considered accurate at the locations and time of excavation. However, variations in existing conditions may exist outside the limits of the field excavation. The nature and extent of variations may not become evident until construction commences.

E8.3.2 Site Inspection

(a) Inspect Site with Contract Administrator and verify extent and location of items designated for removal, disposal, salvage and items to remain.

E8.3.3 Site and Construction Access

(a) The Contractor shall be responsible to develop suitable Site access. This includes but is not limited to, temporary removal and reinstallation of safety fencing, any landscaping and grading repairs, restoration of vegetation, etc. necessary to restore any Site and construction access areas to their pre-existing condition.

E8.3.4 Existing Fence

(a) The existing fence around the property shall be reconstructed if damaged during construction. New fence materials used for the reconstruction shall be consistent with the existing fence.

(b) The Contractor shall ensure that the existing gates are closed and locked at the end of each Work day.

E8.3.5 Vegetation Removal

(a) Some vegetation (small trees and sod) removal will be permitted in order to facilitate construction. Existing vegetation shall not be removed without prior approval from the Contract Administrator. The Contractor shall load and haul any removed vegetation, and dispose of the material off Site immediately upon collection. Stockpiling shall not be permitted.

E8.3.6 Environmental Regulations

(a) The Contractor shall adhere to all relevant Federal and Provincial environmental regulations.

E8.3.7 Snow and Ice Removal

(a) Snow cover shall be cleared from the construction Site prior to commencement of the Work. The methodology to clear the snow shall be subject to the approval of the Contract Administrator.

E8.3.8 General Site Cleanup and Restoration

(a) All areas of the construction Site shall be restored to a condition at least equivalent to its original condition prior to initiation of Work. This may include, but is not necessarily limited to the Contractor's lay down area and removal of all temporary fencing.

E8.3.9 Topsoil and Sod

(a) All existing grassed areas disturbed by the Contractor during construction, which are not designated for construction of items to be permanently incorporated into the Work, shall be restored by the Contractor to existing condition or better using topsoil and sod at his own cost.

E8.4 Method of Measurement and Payment

E8.4.1 Site Development and Restoration

(a) The Site development and restoration will be measured and paid for at the Contract Lump Sum Price for "Site Development and Restoration", which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification.

E9. CHAINLINK FENCING

E9.1 Description

E9.1.1 General

(a) This specification covers the removal of existing chain fencing in the NE portion of the Site, and the installation of 2.1m high chain link fencing along the same alignment with a gate at the new Pump Station access adjacent the Transit Garage.

(b) Referenced Standard Construction Specifications

(i) CW 3550 – Chain Link Fencing.

E9.1.2 General

(a) All new materials as per CW 3550.

E9.1.3 Gate

(a) Materials as per CW-3550. Furnish as double gate with drop bolts.

(b) The Contractor shall supply shop drawings of gate to be supplied prior to manufacture for the Contract Administrator's approval.

E9.2 Construction Methods

E9.2.1 General

(a) New fence and gate construction as per detail in Contract Drawings and as per CW 3550.

E9.2.2 Remove Existing Fence

(a) Remove existing chain fencing and dispose off-site.

(b) Remove any concrete piles/bases within 0.3 metres of the ground surface. Backfill holes with soil.

E9.3 Method of Measurement

E9.3.1 Chainlink fencing and gate will be paid for on a Lump Sum basis, as accepted by the Contract Administrator, and no measurement will be made for this Work.

E9.4 Basis of Payment

E9.4.1 Chainlink fencing and gate shall be included in the Contract Lump Sum Price for "Site Development and Restoration", which price will be payment in full for performing all

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

Items of Work:

Chainlink Fence

i. Remove Chainlink Fencing

ii. Install 2.1m High Chainlink Fencing

iii. Install 2.1m High Chainlink Gate

E10. DEMOLITION AND REMOVALS

E10.1 Description of Work

E10.1.1 The Work required under this section shall include, but is not limited to, the following:

(a) Demolition and removal of existing retaining wall

(b) Demolition and removal of existing rubble piles

(c) Demolition and removal of existing building foundations

(d) Removal and disposal of construction debris

E10.1.2 The Work required under this section shall include, but is not limited to, the following: Removal of existing concrete, removal of existing steel, removal of existing construction debris, demolition, protection of services to be maintained, demolition and disposal of existing concrete, demolition and disposal of existing steel, and clean up of Work Site in anticipation of new Work for the limits of the contract as shown on the drawings.

E10.1.3 The Work to be done by the Contractor under this Section shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Works as described hereinafter.

E10.2 References

E10.2.1 CSA S350-M1980, Code of Practice for Safety in Demolition of Structures.

E10.2.2 Manitoba Workplace Safety and Health Act, and all applicable National, Provincial, and Municipal regulations.

E10.3 Protection

E10.3.1 Prevent movement, settlement or damage of adjacent structures. Make good damage caused by demolition.

E10.4 Execution

E10.4.1 Inspection

(a) Inspect Site with Contract Administrator and verify extent and location of items designated for removal, disposal, salvage and items to remain.

(b) Locate and protect utilities.

(c) Notify and obtain approval of Contract Administrator before starting demolition.

E10.4.2 Preparation

(a) Do not disrupt active or energized utilities.

E10.4.3 Safety Code and Requirements

(a) Unless otherwise specified, carry out demolition Work in accordance with the City of Winnipeg Safety Directives and Guidelines.

(b) Blasting operations shall not be permitted during demolition unless reviewed and approved by the Contract Administrator.

E10.4.4 Demolition

(a) Demolish structures to permit construction of new Work as indicated.

(b) At end of each day's Work, leave Work in safe condition so that no part is in danger of toppling or falling.

(c) Do not sell or burn materials on Site.

E10.4.5 Disposal of Demolished Material

(a) The Contractor shall be responsible for removal of debris and waste from the Work area to the location to an appropriate solid waste disposal area approved by the contract administrator.

(b) Metal debris, which may include structural steel, miscellaneous inserts, and reinforcing steel, shall be removed from Site and disposed of by the Contractor.

E10.5 Measurement and Payment

E10.5.1 Concrete Demolition

(a) Demolition of concrete will be measured on a unit basis and paid for at the Contract Unit Price per tonne for “Demolition and Removals”.

(b) No payment shall be made for demolition beyond the limits specified, or those otherwise approved by the Contract Administrator. The separation, as necessary of embedded and structural steel shall be considered incidental to the Work. Removal of construction debris shall be considered incidental to the Work.

E11. VERIFICATION OF WEIGHTS

E11.1 All Material which is paid for on a weight basis shall be weighed on a scale certified by Consumer & Corporate Affairs, Canada.

E11.1.1 All weight tickets shall have the gross weight and the time and date of weighing printed by an approved electro/mechanical printer coupled to the scale.

E11.1.2 The tare weight and net weight may either be hand written or machine printed. All weights, scales and procedures shall be subject to inspection and verification by the Contract Administrator. Such inspection and verification may include, but shall not be limited to:

(a) Checking Contractor’s scales for consumer & Corporate Affairs certification seals;

(b) Observing weighing procedures;

(c) Random checking of either gross or tare weights by having such trucks or truck/trailer(s) combinations as the Contract Administrator shall select weighed at the nearest available certified scale;

(d) Checking tare weights shown on delivery tickets against a current tare.

E11.2 The contractor shall ensure that each truck or truck/trailer(s) combination delivering Material which is paid for on a weight basis carries a tare not more than one (1) month old.

E11.2.1 The tare shall be obtained by weighing the truck or truck/trailer(s) combination on a certified scale and shall show:

(a) Upon which scale the truck or truck/trailers(s) combination as weighed;

(b) The mechanically printed tare weight;

(c) The license number(s) of the truck and trailer(s);

(d) The time and date of weighing.

E12. SUPPLYING AND PLACING REINFORCING STEEL

E12.1 Description

E12.1.1 This Specification shall cover the supply, fabrication and placement of plain reinforcing steel.

E12.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Works as hereinafter specified.

E12.2 Materials

E12.2.1 General

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

(b) All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with the latest edition of CSA Standard CAN3-A23.1, Storage of Materials, except as otherwise specified herein.

E12.2.2 Reinforcing Steel

(a) All reinforcing steel shall conform to the requirements of CSA Standard G30.18, Grade 400, Billet-Steel Bars for concrete reinforcement. If, in the opinion of the Contract Administrator, any reinforcing steel provided for the concrete works exhibits flaws in manufacture or fabrication, such material shall be immediately removed from the Site and replaced with acceptable reinforcing steel.

(b) All reinforcing steel shall be straight and free from paint, oil, mill-scale, and injurious defects. Surface seams or surface irregularities will not be cause for rejection, provided that the minimum dimensions, cross section area, and tensile properties of a hand wire-brushed specimen are not less than the requirements of CSA Standard G30.18.

E12.2.3 Bar Accessories

(a) Bar accessories shall be of a type approved by the Contract Administrator. They shall be made from a non-rusting material, and shall not stain, blemish, or spall the concreted surface for the life of the concrete.

(b) Bar accessories shall include bar chairs, spacers, clips, wire ties, wire (18 gauge minimum), or other similar devices that may be approved by the Contract Administrator.

E12.2.4 Reinforcing Steel Shop Drawings

(a) The Contractor will be responsible to produce the detailed drawings for the fabrication and placement of the reinforcing steel. Submit shop drawings for the supply and placement of reinforcing steel in accordance with E4.. Shop drawings shall consist of bar bending details, lists, placing drawings and mass tabulations. On placing drawings, indicate sizes, spacing, location, and quantities of reinforcement. Prepare drawings in accordance with ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures. Detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise indicated. Provide drawing in AutoCAD or other suitable electronic format.

E12.3 Construction Methods

E12.3.1 Fabrication of Reinforcing Steel

(a) Reinforcing steel shall be fabricated in accordance with CSA Standard G30.18 to the lengths and shapes as shown on the Drawings.

E12.3.2 Placing of Reinforcing Steel

(a) Reinforcing steel shall be placed accurately in the positions shown on the Drawings and shall be retained in such positions by means of a sufficient number of bar accessories to that the bars shall not be moved out of alignment during or after the depositing of concrete. The Contract Administrator's decision in this matter shall be final.

(b) Reinforcing steel shall be free of all foreign material in order to ensure a positive bond between the concrete and steel. The Contractor shall also remove any dry concrete, which may have been deposited on the steel from previous concrete placement, before additional concrete may be placed. Intersecting bars shall be tied positively at each intersection.

(c) Splices in reinforcing steel shall be made only where indicated on the Drawings. Prior approval of the Contract Administrator shall be obtained where other splices are to be made. Welded splices shall conform to CSA Standard W186, and are subject to prior written approval of the Contract Administrator.

(d) Reinforcing steel shall not be straightened or rebent in a manner that will injure the metal. Bars with bends not shown on the Drawings shall not be used. Heating of reinforcing steel will not be permitted without the prior approval of the Contract Administrator. A minimum of twenty-four (24) hours advance notice shall be given to the Contract Administrator prior to placing of any concrete to allow for inspection of the reinforcement.

E12.4 Quality Control

E12.4.1 Inspection

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

E12.4.2 Access

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

E12.4.3 Quality Testing

(a) Quality control testing will be used to determine the acceptability of the reinforcing steel supplied by the Contractor.

(b) The Contractor shall provide, without charge, the samples of reinforcing steel required for quality control tests and provide such assistance and use of tools and construction equipment, as is required.

E12.5 Method of Measurement

E12.5.1 Supplying and placing reinforcing steel will be measured on a Lump Sum basis as accepted by the Contract Administrator and no measurement will be made for this Work.

E12.6 Basis of Payment

E12.6.1 Supplying and placing reinforcing steel shall be included in the Contract Lump Sum Price for the "Structural Excavation, Shoring, Dewatering and Structural Concrete", measured as specified herein, which price will be payment in full for supplying all materials and for

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

E13. STRUCTURAL CONCRETE

E13.1 Description

E13.1.1 This Specification shall cover the preparation of Portland Cement Structural Concrete for, and all concreting operations related to, the construction of Portland Cement Structural Concrete Works as specified herein.

E13.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Works as hereinafter specified.

E13.2 Materials

E13.2.1 General

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

E13.2.2 Handling and Storage of Materials

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

E13.2.3 Testing and Approval

(a) All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.

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

E13.2.4 Bonding Agents

(a) The Contractor shall identify the product(s) and submit product information to the Contract Administrator for review and approval.

E13.2.5 Curing Compound

(a) If permitted for use, curing compound shall be liquid membrane-forming and conform to the requirements of ASTM Standard C309 and the proposed standard ASTM P198. Rate of application shall be 1.5 times the rate required to meet the requirements of ASTM P198 for the texture of concrete to which the curing compound is being applied.

(b) Curing compounds shall be resin-based and white-pigmented.

E13.2.6 Patching Mortar

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

E13.2.7 Non-Shrink Cementitious Grout

(a) Where non-shrink cementitious grout is used, it shall be Sternson M-bed Standard, Specialty Construction Products CPD Non-Shrink Grout, Sika 212 Non-Shrink Grout, Meadows CG-86, or equal as accepted by the Contract Administrator. The minimum compressive strength of the grout at 28 days shall be 40 MPa.

E13.2.8 Formwork

(a) Formwork materials shall conform to CSA Standard CAN/CSA-A23.1, and American Concrete Publication SP:4, “Formwork for Concrete”.

(b) No “stay-in-place” formwork or falsework is permitted.

(c) Form sheeting plywood to be covered with form liner or to be directly in contact with soil shall be exterior Douglas Fir, concrete form grade, conforming to CSA Standard O121-M1978, a minimum of 20 mm thick.

(d) Where form liner is not being used, form sheeting shall be Douglas Fir, overlay form liner type conforming to CSA Standard O121-M1978. Approved manufacturers are “Evans” and “C-Z”.

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

(f) No formwork accessories will be allowed to be left in place within 50 mm of the surface following form removal. Items to be left in place, must be made from a non-rusting material or galvanized steel; and they shall not stain, blemish, or spall the concrete surface for the life of the concrete.

(g) Forms for exposed concrete surfaces that do not require a form liner may be either new plywood or steel as authorized by the Contract Administrator.

(h) Studding shall be spruce or pine and shall have such dimensions and spacing that they shall withstand distortion from all the forces to which the forms will be subjected. Minimum dimensions shall be 50 mm x 150 mm.

(i) Walers shall be spruce or pine, with minimum dimensions of 100 mm x 150 mm.

(j) All forms are incidental to these Works and must be removed by the Contractor once adequate strength and curing of the concrete has been achieved.

E13.2.9 Concrete

(a) General

(i) Concrete repair material shall be compatible with the concrete substrate.

(b) The Contractor shall be responsible for the design and performance of all concrete mixes supplied under this specification. Either ready mix concrete or proprietary repair mortars, where applicable, may be used having the following minimum properties in accordance with CSA A23.1-04:

(i) Class of Exposure: C-1

(ii) Compressive Strength @ 28 days = 35 MPa

(iii) Water / Cementing Materials Ratio = 0.4

(iv) Air Content: Category 1 per Table 4 of CSA A23.1-04

(c) Mix design for ready mix concrete shall be submitted to Contract Administrator at least two weeks prior to concrete placing operations.

(d) The workability of each concrete mix shall be consistent with the Contractor’s placement operations. Self compacting concrete may be used for abutment and pier cap repairs.

(e) Any proposed proprietary repair mortar shall be subject to the approval of the Contract Administrator and must meet or exceed the properties of the ready mix concrete.

(f) The temperature of all types of concrete shall be between 15˚C and 25˚C at discharge. Temperature requirements for concrete containing silica fume shall be

between 10˚C and 18˚C at discharge unless otherwise approved by the Contract Administrator.

(g) Concrete materials susceptible to frost damage shall be protected from freezing.

E13.2.10 Aggregates

(a) The Contractor shall be responsible for testing the fine and coarse aggregates to establish conformance to these specifications, and the results of these tests shall be provided to the Contract Administrator if requested. All aggregates shall comply with CSA A23.1.

(b) Coarse Aggregate

(i) The maximum nominal size of coarse aggregate shall be sized to suit the Contractor's mix design. Gradation shall be in accordance with CSA A23.1, Table 11, Group 1. The coarse aggregate shall satisfy the Standard Requirements specified in CSA A23.1, Table 12, "Concrete Exposed to Freezing and Thawing".

(ii) Coarse aggregate shall consist of crushed stone or gravel or a combination thereof, having hard, strong, durable particles free from elongation, dust, shale, earth, vegetable matter or other injurious substances. Coarse aggregate shall be clean and free from alkali, organic or other deleterious matter; and shall have an absorption not exceeding 2.25%.

(iii) The aggregate retained on the 5 mm sieve shall consist of clean, hard, tough, durable, angular particles with a rough surface texture, and shall be free from organic material, adherent coatings of clay, clay balls, and excess of thin particles or any other extraneous material.

(iv) Coarse aggregate when tested for abrasion in accordance with ASTM C131 shall not have a loss greater than 30%.

(v) Tests of the coarse aggregate shall not exceed the limits for standard for requirements prescribed in CSA A23.1, Table 12, for concrete exposed to freezing and thawing.

(c) Fine Aggregate

(i) Fine aggregate shall meet the grading requirements of CSA A23.1, Table 10, Gradation FA1.

(ii) Fine aggregate shall consist of sand, stone, screenings, other inert materials with similar characteristics or a combination thereof, having clean, hard, strong, durable, uncoated grains free from injurious amounts of dust, lumps, shale, alkali, organic matter, loam, or other deleterious substances.

(iii) Tests of the fine aggregate shall not exceed the limits for standard requirements prescribed in CSA A23.1, Table 12.

E13.2.11 Cementing Materials

(a) Cementing materials shall conform to the requirements of CSA A3001.

(b) Silica Fume

(i) Should the Contractor choose to include silica fume in the concrete mix design, it shall not exceed 8% by mass of cement.

(c) Fly Ash

(i) Fly ash shall be Type C1 or Type F and shall not exceed 25% by mass of cement.

(d) Cementitious materials shall be stored in a suitable weather-tight building that shall protect these materials from dampness and other destructive agents. Cementitious materials that have been stored for a length of time resulting in the hardening or formation of lumps shall not be used in the Work.

E13.2.12 Admixtures

(a) Air entraining admixtures shall conform to the requirements of ASTM C260.

(b) Chemical admixtures shall conform to the requirements of ASTM C494 or C1017 for flowing concrete.

(c) All admixtures shall be compatible with all other constituents. The addition of calcium chloride, accelerators, and air-reducing agents will not be permitted, unless otherwise approved by the Contract Administrator.

(d) Appropriate low range water reducing and/or superplasticizing admixtures shall be used in concrete containing silica fume. Approved retarders or set controlling admixtures may be used for concrete containing silica fume.

(e) An aminocarboxylate based migrating corrosion inhibitor admixture shall be used in concrete that will be used as a repair material that will either be in contact with or adjacent to reinforcing steel in existing concrete. Proposed admixtures shall be subject to the approval of the Contract Administrator.

E13.2.13 Water

(a) Water to be used for mixing and curing concrete or grout and saturating substrate shall conform to the requirements of CSA A23.1 and shall be free of oil, alkali, acidic, organic materials or deleterious substances.

E13.2.14 Concrete Supply

(a) Concrete shall be proportioned, mixed, and delivered in accordance with the requirements of CSA A23.1, except that the transporting of ready mixed concrete in non-agitating equipment will not be permitted unless prior written approval is received from the Contract Administrator.

(b) Unless otherwise directed by the Contract Administrator, the discharge of ready mixed concrete shall be completed within 120 minutes after the introduction of the mixing water to the cementing materials and aggregates.

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

E13.2.15 Flexible Joint Sealant

(a) Flexible joint sealant for all horizontal, vertical, and sloping joints shall be guaranteed non-staining grey polyurethane, approved by the Contract Administrator and applied in strict accordance with the manufacturer's instructions, including appropriate primers. Approved products are Vulkem 116 by Mameco; Sonolastic NP1 by Sonneborne; RC-1 by Permapol; and Sikaflex by Sika; or equal in accordance with B6.

E13.2.16 Fibre Joint Filler

(a) Fibre joint filler shall be rot-proof and of the preformed, non-extruding, resilient-type, made with a bituminous fibre such as "Flexcell," and shall conform to the requirements of ASTM Standard D1751, or equal in accordance with B6.

E13.2.17 Expanding Joint Filler

(a) Expanding joint filler shall be compressed to 20 percent of its expanded width and be a polyurethane foam, impregnated throughout with a latex modified asphalt. An approved product is "Emseal," by Emseal Corporation. Expanding joint filler to be installed as per Manufacturer's instructions.

E13.2.18 Benchmark

(a) Benchmark plugs as supplied by the City of Winnipeg.

E13.2.19 Waterproofing

(a) Waterproofing shall be Bituthene 3000 as distributed by Grace Construction Products, or equal in accordance with B6.

E13.2.20 Insulation

(a) Insulation shall be Foamular® 150 Rigid Foam Insulation as distributed by Owens Corning, or equal in accordance with the Drawings.

E13.2.21 Miscellaneous Materials

(a) The Contractor shall supply all materials, as approved by the Contract Administrator, to ensure the satisfactory completion of the concrete repair works.

E13.3 Equipment

E13.3.1 General

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

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

E13.3.2 Vibrators

(a) The Contractor shall have sufficient numbers of internal concrete vibrators and experienced operators on-site to properly consolidate all concrete in accordance with ACI 309. The type and size of vibrators shall be appropriate for the particular application, the size of the pour, and the amount of reinforcing and shall conform to standard construction procedures.

(b) The Contractor shall use rubber coated vibrators for consolidating concrete.

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

E13.3.3 Miscellaneous Equipment

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

E13.4 Construction Methods

E13.4.1 General

(a) The Works involving Structural Concrete include the construction of:
  (i) Foundation Slab;
  (ii) Exterior Substructure Walls;
  (iii) Interior Substructure Walls;
  (iv) Top Slab.

E13.4.2 Concrete Working Base

(a) Upon completion of all excavation, the bottom of the excavation shall be inspected by the Contract Administrator. Concrete working base shall be installed where shown on the Drawings. Under no circumstances shall the Contractor place the concrete working base without the prior approval from the Contract Administrator. The supply and installation of working base will be considered incidental to the Lump Sum cost for “Structural Excavation, Shoring, Dewatering and Structural Concrete”, and no separate payment will be made.

E13.4.3 Form Work and Shoring

(a) Formwork shall be designed, erected, braced, and maintained to safely support all vertical and lateral loads until such loads can be supported by the concrete.

(b) As a maximum, the following spacings shall apply, for studding and whaling:
  (i) 20 mm plywood: studding - 450 mm centre to centre
  (ii) walers - 760 mm centre to centre

(c) Forms shall be clean before use. Plywood and other wood surfaces shall be sealed against adsorption of moisture from the concrete by a field-applied form coating or a factory-applied liner.

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

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

(f) Slots, recesses, chases, sleeves, inserts, bolts, hangers, and other items shall be formed or set in coordination and cooperation with the trade concerned. No openings shall be made in structural members that are not shown on the structural drawings without the prior approval of the Contract Administrator.

(g) Shores shall be provided with positive means of adjustment (jacks or wedges). All settlement shall be taken up before or during concreting as required.

(h) Mud sills of suitable size shall be provided beneath shores, bedded in sand or stone, where they would otherwise bear on soil. The soil below shores must be adequately prepared to avoid settlements during or after concreting. Shores must not be placed on frozen ground.

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

(j) The loads and lateral pressures are outlined in Part 3, Section 102 of "Recommended Practice for Concrete Formwork," (ACI 347). Additional design considerations concerning factors of safety for formwork elements and allowable settlements outlined in Section 103 of the above reference shall apply.

(k) Formwork shall have sufficient strengths and rigidity so that the resultant finished concrete conforms to the shapes, lines, and dimensions of the members shown on the Drawings.

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

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

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

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

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

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

E13.4.4 General Curing

(a) The use of curing compound will not be allowed on concrete areas that are to receive additional concrete or waterproofing.

(b) Unformed concrete surfaces shall be covered and kept moist by means of wet polyester blankets for seven (7) consecutive days immediately following finishing operations or otherwise approved by the Contract Administrator and shall be

maintained at above 10°C for at least seven (7) consecutive days thereafter. Construction joints shall only be covered and kept saturated by means of wet polyester curing blankets for the curing period.

(c) If permitted for use, curing compounds shall be applied at the rate of not less than 4 m^2/L. The compound must be applied uniformly and by roller. Spraying of the compound will not be permitted.

(d) Concrete shall be protected from the harmful effects of sunshine, drying winds, surface dripping, or running water, vibration, and mechanical shock. Concrete shall be protected from freezing until at least twenty-four hours after the end of the curing period.

(e) Changes in temperature of the concrete shall be uniform and gradual and shall not exceed 3° in anyone hour period or 20° in any twenty-four hour period.

(f) Formed surfaces shall receive, immediately after stripping and patching, the same application of curing compound as finished surfaces.

(g) After completing the finishing of unformed surfaces, where curing compound is not permitted, the surfaces shall be promptly covered with a minimum of a single layer of clean, damp polyester curing blanket and 6 mil polyethylene.

(h) Care shall be exercised to ensure that the polyester curing blanket is well drained and that it is placed as soon as the surface will support it without deformation. The Contractor shall ensure that water from the polyester curing blankets does not run into areas where concrete placement and finishing operations are underway. If this occurs, concrete placement shall stop until the problem is corrected satisfactory to the Contract Administrator.

E13.4.5 Placing Concrete

(a) The Contract Administrator must be notified at least 24 hours prior to concrete placement so that an adequate inspection may be made of formwork, shoring, reinforcement, and related works. Placement without required prior notification will not be allowed.

(b) Equipment for mixing or conveying concrete shall be thoroughly flushed with clean water before and after each pour. Water used for this purpose shall be discharged outside the forms.

(c) Concrete shall be conveyed from the mixer to the place of final deposit by methods that will prevent segregation and a marked change in consistency.

(d) Before depositing any concrete, all debris shall be removed from the space to be occupied by the concrete and any mortar splashed upon the reinforcement or forms shall be removed.

(e) Placing of concrete, when started, shall be continuous. No concrete shall be placed against concrete that has sufficiently hardened to cause the formation of seams or “cold joints” within the section. If placing must be interrupted, construction joints shall be located where shown on the Drawings or as approved.

(f) Concrete shall be placed as nearly as possible to its finish position. Rakes or mechanical vibrators shall not be used to transport concrete.

(g) The maximum drop of free concrete into the forms shall not be greater that 1.5 m; otherwise, rubber tubes or pouring ports spaced not more than 1.5 m vertically and 2.5 m horizontally shall be used.

(h) All concrete, during and immediately after deposition, shall be consolidated by mechanical vibrators so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into the corners of the forms; eliminating all air or stone pockets that may cause honeycombing, pitting or planes of weakness. Mechanical vibrators, when immersed, shall have a minimum frequency of 7,000 revolutions per minute.

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

(j) Concrete shall not be placed in rain or snow, unless adequate protection is provided for formwork and concrete surfaces.

E13.4.6 Finishing of Unformed Surfaces

(a) Screeding of all unformed concrete surfaces shall be performed by the sawing movement of a straight edge along wood or metal strips or form edges that have been accurately set at required elevations.

(b) Screeding shall be done on all concrete surfaces as a first step in other finishing operations. Screeding shall be done immediately after the concrete has been vibrated.

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

E13.4.7 Form Removal

(a) All forms shall remain in place for a minimum of seven (7) days. The Contract Administrator must be notified at least 24 hours prior to any form removal. The Contractor must receive approval from the Contract Administrator prior to beginning Work.

(b) The minimum strength of concrete in place for safe removal of soffit forms for horizontal or inclined members, as well as vertical forms shall be 20 MPa, with the added provisions that the member shall be of sufficient strength to carry safely its own weight, together with superimposed construction loads, and that the forms shall stay in place a minimum of three days unless otherwise approved by the Contract Administrator.

(c) Field-cured test specimens, representative of the in-place concrete being stripped, may be tested to verify the concrete strength.

E13.4.8 Patching of Formed Surfaces

(a) Immediately after forms have been removed, but before any repairing or surface finishing is started, the concrete surface shall be inspected by the Contract Administrator. Any repair or surface finishing started before this inspection may be rejected and required to be removed.

(b) All formed concrete surfaces shall have bolts, ties, struts, and all other timber or metal parts not specifically required for construction purposes cut back fifty (50) mm from the surface before patching.

(c) Minor surface defects caused by honeycomb, air pockets greater than 5 mm in diameter, and voids left by strutting, and tie holes shall be repaired by removing the defective concrete to sound concrete, dampening the area to be patched and then applying patching mortar. A slurry grout consisting of water and cement, shall be thoroughly brushed onto the area to be patched. When the slurry grout begins to lose the water sheen, the patching mortar shall be applied. It shall be struck-off slightly higher than the adjacent surface and left for one hour before final finishing to permit initial shrinkage of the patching mortar and it shall be touched up until it is satisfactory to the Contract Administrator. The patch shall be cured as specified in this Specification, and the final colour shall match the surrounding concrete.

(d) All objectionable fins, projections, offsets, streaks, or other surface imperfections shall be removed by approved means to the Contract Administrator's satisfaction. Cement washes of any kind shall not be used.

(e) Concrete shall be cast against forms that will produce plane surfaces with no bulges, indentations, or protuberances other than those shown on the Drawings. The arrangement of panel joints shall be kept to a minimum. Panels containing worn edges, patches, or other defects that will impair the texture of concrete surfaces shall not be used. All fins on the concrete surfaces shall be removed.

E13.4.9 Hot Weather Concreting

(a) The requirements of this section shall be applied during hot weather, i.e. air temperatures above 25°C during placing.

(b) Concrete shall be placed at as low a temperature as possible, preferably below 15°C but not above 27°C. Aggregate stockpiles may be cooled by water sprays and sun shades.

(c) Ice may be substituted for a portion of the mixing water, providing it has melted by the time mixing is completed.

(d) Form and conveying equipment shall be kept as cool as possible before concreting by shading them from the sun, painting their surfaces white and/or the use of water sprays.

(e) Sun shades and wind breaks shall be used as required during placing and finishing.

(f) Work shall be planned so that concrete can be placed as quickly as possible to eliminate the possibility of "cold joints" from occurring at any location.

(g) The Contract Administrator's acceptance is necessary before the Contractor may use admixtures such as retardants to delay setting, or water-reducing agents to maintain workability and strength, and these must then appear in the Mix Design Statement submitted to the Contract Administrator.

(h) Curing shall follow immediately after the finishing operation.

(i) When the air temperature is at or above 25°C, or when there is probability of its rising to 25°C during the placing period, facilities shall be provided for protection of the concrete in place from the effects of hot and/or drying weather conditions. Under severe drying conditions, as defined below the formwork, reinforcement, and concreting equipment shall be protected from the direct rays of the sun or cooled by fogging and evaporation.

(j) The temperature of the concrete as placed shall be as low as practicable and in no case greater than that shown below for the indicated size of the concrete section.

Thickness of Section, m	Temperatures °C	
	Minimum	Maximum
Less than 0.3	10	27
0.3 - 1	10	27
1.2	5	25

(k) Moderate Drying Conditions:

(i) When surface moisture evaporation exceeds 0.75 kg/m^2/h, windbreaks shall be erected around the sides of the structural element.

(l) Severe Drying Conditions:

(i) When surface moisture evaporation exceeds 1.0 kg/m^2/h, additional measures shall be taken to prevent rapid loss of moisture from the surface of the concrete. Such additional measures shall consist of the following:

(a) Erecting sunshades over the concrete during finishing and placing operations.

(b) Lowering the concrete temperature.

(c) Applying fog spray immediately after placement and before finishing. Care shall be taken to prevent accumulation of water that may reduce the quality of the cement paste.

(d) Beginning the concrete curing immediately after trowelling.

(m) The nomograph, Figure D1, Appendix D of CSA Standard CAN/CSA A23.1-2000 shall be used to estimate surface moisture evaporation rates.

E13.4.10 Cold Weather Concreting

(a) The requirements of this section shall be applied to all concreting operations during cold weather; i.e., if the mean dally temperature falls below 5°C during placing or curing.

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

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

(d) Formwork and reinforcing steel shall be heated to at least 5°C before concrete is placed.

(e) The temperature of the concrete shall be maintained at not less than 10°C for seven days or 15°C for five days or 20°C for three days after placing. The concrete shall be kept above freezing temperature for at least a period of seven days. In no case shall the heating be removed until the concrete has reached a minimum compressive strength, which will be specified by the Contract Administrator for Work under construction, and as determined from compressive strength tests for specimens secured under the same conditions as the concrete works in question.

(f) Aggregates shall be heated to a temperature of not less than 20°C and not more than 55°C. Water shall be heated to a temperature between 55°C and 55°C. The temperature of the concrete at the time of placement shall be within the range specified in CSA Standard CAN/CSA-A23.1 for the thickness of the section being placed.

(g) When the mean dally temperature may fall below 5°C, a complete hoarding of the Work, together with supplementary heat, shall be provided.

(h) When the ambient temperature is below -15°C, the hoarding shall be constructed so as to allow the concrete to be placed without the hoarding having to be opened. If the mixing is done outside of the hoarding, the concrete shall be placed by means of hoppers installed through the hoarding. The hoppers are to be plugged when not in use.

(i) When the ambient temperature is equal to or above -15°C, the Contractor will be permitted to open small portions of the hoarding for a limited time to facilitate the placing of the concrete.

(j) Before depositing any of the concrete, the Contractor shall show that enough heating equipment is available to keep the air temperature surrounding the forms within the specified range. This shall be accomplished by bringing the temperature inside of the hoarding to the specified 20°C, at least 12 hours prior to the start of the concrete placing.

(k) The Contractor shall supply all required heating apparatus and the necessary fuel. When dry heat is used, a means of maintaining atmospheric moisture shall be provided. The relative humidity within the heated enclosure shall be maintained at a minimum of 40 percent during concrete placing and finishing operations. Following finishing operations, exposed concrete surfaces shall be protected from excessive drying by applying curing compound, covering the surfaces with polyethylene, or providing water curing.

(l) Sufficient standby heating equipment must be available to allow for any sudden drop in outside temperatures and any breakdowns that may occur in the equipment.

(m) Combustion-type heaters may be used if their exhaust gases are vented outside the enclosures and not allowed to come into contact with concrete surfaces. Fire extinguishers must be readily at hand wherever combustion-type heaters are used.

(n) The Contractor shall keep a curing record of each concrete pour. The curing record shall include: date and location of the pour, mean daily temperature, hoarding relative humidity, temperatures above and below the concrete surface at several points, and notes regarding the type of heating, enclosure, unusual weather conditions, etc. This record shall be available for inspection by the Contract Administrator at the end of the concrete operations.

E13.4.11 Construction Joints

(a) Construction joints shall be located only where shown on the Drawings or as otherwise approved in writing by the Contract Administrator. Construction joints shall be at right angles to the direction of the main reinforcing steel. All reinforcing steel shall be continuous across the joints. Bevelled shear keys, as shown on the Drawings or approved by the Contract Administrator, shall be provided at all joints.

(b) In lieu of shear keys, the Contractor may roughen the surface as follows. The surface shall be rough, with a minimum amplitude of 6 mm. Acceptable procedures to obtain this rough surface are as follows:

(i) By removing the mortar from between the larger aggregate particles with a water jet and soft brush when the concrete is in a semi-hardened state (green-cut).

(ii) By first applying a chemical retarder to the surface and then removing the mortar from the larger aggregate particles with a water jet and brush.

(c) The face of joints shall be cleaned of all laitance and dirt, after which the cementitious grout or an approved bonding agent shall be applied. Forms shall be retightened, and all reinforcing steel shall be thoroughly cleaned at the joint prior to concreting.

E13.4.12 Clean Up

(a) The Contractor shall maintain the Sites of Work in a tidy condition and free from the accumulation of waste and debris.

E13.5 Quality Control

E13.5.1 Inspection

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

E13.5.2 Access

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

E13.5.3 Materials

(a) All materials supplied under this Specification shall be subject to testing and approval by the Contract Administrator.

E13.5.4 Concrete Quality

(a) Quality control tests will be used to determine the acceptability of the concrete supplied by the Contractor.

(b) The Contractor shall provide, without charge, the samples of concrete and the constituent materials required for quality control tests and provide such assistance and use of tools and construction equipment as is required.

(c) The frequency and number of concrete quality control tests shall be in accordance with the requirements of CSA Standard CAN/CSA-A23.1.

(d) Compressive strength tests on specimens cured under the same conditions as the concrete works will be made to check the strength of the in-place concrete and the adequacy of curing. Backfilling or subsequent concreting operations will not be allowed until the in-place concrete has achieved a compressive strength of 25 MPa.

E13.5.5 Corrective Action

(a) If the results of the tests indicate that the concrete is not of the specified quality, the Contract Administrator shall have the right to implement additional testing, as required, to further evaluate the concrete at the Contractor's expense.

(b) The Contractor shall, at his own expense, correct such Work or replace such materials found to be defective under this Specification in an approved manner to the satisfaction of the Contract Administrator.

E13.6 Method of Measurement

E13.6.1 Structural Concrete

(a) Structural Concrete will be measured on a Lump Sum basis as accepted by the Contract Administrator and no measurement will be made for this Work.

E13.6.2 Heating and Hoarding

(a) Heating and hoarding of concrete will be measured on a Lump Sum basis as accepted by the Contract Administrator and no measurement will be made for this Work.

E13.7 Basis of Payment

E13.7.1 Structural Concrete

(a) Supplying and placing structural concrete shall be included in the Contract Lump Sum Price for the "Structural Excavation, Shoring, Dewatering and Structural Concrete", measured as specified herein, which price will be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification.

E13.7.2 Heating and Hoarding

(a) Heating and hoarding of concrete shall be included in the Contract Lump Sum Price per for "Structural Excavation, Shoring, Dewatering and Structural Concrete", measured as specified herein, which price will be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification.

E14. BACKFILL

E14.1 Description

E14.1.1 This Specification shall cover all operations related to supply, placement and compaction of backfill materials as herein specified.

E14.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all works as hereinafter specified.

E14.2 Materials

E14.2.1 General

(a) The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

E14.2.2 Suitable Site Backfill

(a) Suitable Site backfill material shall be of a type approved by the Contract Administrator.

E14.2.3 Granular Backfill

(a) Granular backfill material shall be sound, free from organic material, and meet the following gradation requirements:

Canadian Metric Sieve Size	Percent Total Dry Weight Passing
50,000	100%
20,000	75%-100%
5,000	45%-85%
2,500	35%-55%
315	15%-35%
160	5%-20%
80	0%-7%

(b) In lieu of the above granular backfill, in the winter, crushed limestone of 50 mm maximum aggregate size conforming to CW 3110-R10, may be used.

E14.2.4 Crushed Limestone Base Course Material

(a) Crushed limestone base course material shall be supplied in accordance with City of Winnipeg Specification CW 3110-R10 with maximum 20 mm size.

E14.2.5 Free Draining Granular Backfill Material

(a) Free draining granular backfill shall consist of hard crushed stone, free from organic material meeting the following gradation requirements (concrete coarse aggregate) or approved equal.

Canadian Metric Sieve Size	Percent Total Dry Weight Passing
40,000	95%-100%
20,000	35%-70%
10,000	10%-30%
5,000	0%-5%

(b) In addition to the above granular material, the drainage material specified in Section 5.2 of CW 3120 is also approved for this project.

E14.2.6 Clay Borrow Material

(a) Clay borrow material shall be of a type approved by the Contract Administrator.

E14.2.7 Working Base

(a) Working base shall be concrete of minimum compressive strength of 20 MPa.

E14.3 Construction Methods

E14.3.1 General

(a) The Work shall comprise of supply and placement of:
   (i) A 300 thick free draining granular foundation slab base;
   (ii) A 75 mm thick concrete working base;

(iii) 2 m wide substructure granular backfill;

(iv) Embankment slope backfill.

E14.3.2 Free Draining Granular Foundation Slab Base

(a) Supply and place a 300 mm thick layer of free draining granular material below the working base of the culvert. Place to a minimum of one hundred percent (100%) Maximum Standard Proctor Density.

E14.3.3 Working Base Concrete

(a) Following approval of the granular culvert base, place a 75 mm thick concrete working base.

E14.3.4 Substructure Backfill

(a) All backfill of the substructure is to be unfrozen granular backfill and placed on unfrozen base. Granular backfill only shall be used within the 2 metre zone surrounding the structure as shown on the Drawings. Other backfill may be used outside of the 2 metre zone surrounding the structure. Place the backfill in accordance with the preparation of sub-base in Specification CW3110-R10. That is in layers not exceeding 150 mm in compacted thickness and to a minimum of 100% Maximum Standard Proctor Density.

(b) Place the backfill up to the elevation as shown on the Drawings.

E14.3.5 Embankment Slope Backfill

(a) Backfill the embankment slopes where required producing the embankment grades shown on the Drawings. Use suitable Site backfill or clay backfill compacted to a minimum of 98% Maximum Standard Proctor Density.

E14.4 Method of Measurement

E14.4.1 Backfill will be paid for on a Lump Sum basis, as accepted by the Contract Administrator, and no measurement will be made for this Work.

E14.5 Basis of Payment

E14.5.1 Backfill shall be included in the Contract Lump Sum Price for “Structural Excavation, Shoring, Dewatering and Substructure”, which price will be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification.

DIVISION 01 - GENERAL REQUIREMENTS

DIVISION 04 - MASONRY

DIVISION 06 - WOOD COMPONENTS

DIVISION 07 - THERMAL & MOISTURE PROTECTION

DIVISION 08 - OPENINGS

DIVISION 09 - FINISHES

DIVISION 23 - MECHANICAL

DIVISION 25 - INTEGRATED AUTOMATION

DIVISION 26 - ELECTRICAL