



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 281-2006

SAFETY IMPROVEMENTS AT THE NAIRN AVENUE OVERPASS

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PART B - BIDDING PROCEDURES

B1. PROJECT TITLE

B1.1 SAFETY IMPROVEMENTS AT THE NAIRN AVENUE OVERPASS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, September 8, 2006.

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

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

B3. SITE INVESTIGATION

B3.1 Further to GC:3.1, the Contract Administrator or an authorized representative will be available at the Site from 9:00 A.M. to 11:00 A.M. on Monday, August 28, 2006 to provide Bidders access to the Site.

B3.2 The Bidder is advised that Canadian Pacific Railway (CPR) must be notified prior to accessing the site. The Contract Administrator will coordinate flagging with CPR for the time period identified in B3.1.

B3.3 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.

B4. ENQUIRIES

B4.1 All enquiries shall be directed to the Contract Administrator identified in 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 Branch internet site at <http://www.winnipeg.ca/matmgt>.
- B5.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Branch internet site for addenda shortly before submitting his Bid.
- B5.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 9 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B6. SUBSTITUTES

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

- B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative shall base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B14.
- B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B7. BID SUBMISSION

- B7.1 The Bid Submission consists of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices.
- B7.2 All components of the Bid Submission shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely in ink, to constitute a responsive Bid.
- B7.3 The Bid Submission shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.
- B7.3.1 Samples or other components of the Bid Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid Submission.
- B7.4 Bid Submissions submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B7.5 Bid Submissions shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management Branch
185 King Street, Main Floor
Winnipeg MB R3B 1J1

B8. BID

- B8.1 The Bidder shall complete Form A: Bid, making all required entries.
- B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, his name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.

- B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.
- B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B8.4 Paragraph 11 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 shall be printed below such signatures.
- B8.4.2 All signatures shall be original and shall be witnessed except where a corporate seal has been affixed.
- B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid Submission and the Contract, when awarded, shall be both joint and several.

B9. PRICES

- B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.
- B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B10. QUALIFICATION

- B10.1 The Bidder shall:
- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba;
 - (b) be responsible and not be suspended, debarred or in default of any obligation to the City;
 - (c) be financially capable of carrying out the terms of the Contract;
 - (d) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract;
 - (e) have successfully carried out work, similar in nature, scope and value to the Work;
 - (f) employ only Subcontractors who:

- (i) are responsible and not suspended, debarred or in default of any obligation to the City (a list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>); and
 - (ii) have successfully carried out work similar in nature, scope and value to the portion of the Work proposed to be subcontracted to them, and are fully capable of performing the Work required to be done in accordance with the terms of the Contract;
- (g) have a written workplace safety and health program in accordance with The Workplace Safety and Health Act (Manitoba).

B10.2 The Bidder shall be prepared to submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B10.3 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. OPENING OF BIDS AND RELEASE OF INFORMATION

B11.1 Bid Submissions will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Branch, or in such other office as may be designated by the Manager of Materials.

B11.1.1 Bidders or their representatives may attend.

B11.2 After the public opening, the names of the Bidders and their Total Bid Prices as read out (unevaluated and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

B11.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract Amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

B11.4 The Bidder is advised that any information contained in any Bid Submission may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B12. IRREVOCABLE BID

B12.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 10 of Form A: Bid.

B12.2 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 10 of Form A: Bid.

B13. WITHDRAWAL OF BIDS

- B13.1 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.
- B13.1.1 Notwithstanding GC:23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.
- B13.1.2 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 11 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B13.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials shall:
- (a) retain the Bid Submission until after the Submission Deadline has elapsed;
 - (b) open the Bid Submission to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 11 of Form A: Bid; and
 - (c) if the notice has been given by any one of the persons specified in B13.1.3(b), declare the Bid withdrawn.
- B13.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B12.2 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.

B14. EVALUATION OF BIDS

- B14.1 Award of the Contract shall be based on the following bid evaluation criteria:
- (a) compliance by the Bidder with the requirements of the Bid Opportunity (pass/fail);
 - (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B10 (pass/fail);
 - (c) Total Bid Price;
 - (d) economic analysis of any approved alternative pursuant to B6.
- B14.2 Further to B14.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid Submission is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements if the interests of the City so require.
- B14.3 Further to B14.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid Submission or in other information required to be submitted, that he is responsible and qualified.
- B14.4 Further to B14.1(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.
- B14.4.1 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. AWARD OF CONTRACT

- B15.1 The City will give notice of the award of the Contract by way of a letter of intent, or will give notice that no award will be made.
- B15.2 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.
- B15.2.1 Without limiting the generality of B15.2, 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.
- B15.3 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.
- B15.4 The City intends to award this Contract by September 18, 2006.

PART C - GENERAL CONDITIONS

C1. GENERAL CONDITIONS

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

C1.1.1 The *General Conditions for Construction Contracts* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

- D1.1 In addition to the *General Conditions for Construction Contracts*, these Supplemental Conditions are applicable to the Work of the Contract.
- D1.2 The General Conditions are amended by striking out "The City of Winnipeg Act" wherever it appears in the General Conditions and substituting "The City of Winnipeg Charter".
- D1.3 The General Conditions are amended by striking out "Tender Package" wherever it appears in the General Conditions and substituting "Bid Opportunity".
- D1.4 The General Conditions are amended by striking out "Tender Submission" wherever it appears in the General Conditions and substituting "Bid Submission".
- D1.5 The General Conditions are amended by deleting GC:6.16 and GC:6.17. The City of Winnipeg is now within the jurisdiction of the Manitoba Ombudsman pursuant to The Ombudsman Act.

D2. SCOPE OF WORK

- D2.1 The Work to be done under the Contract shall consist of the construction of four (4) reinforced concrete crash walls as shown on the Drawings and stated in the Specifications.

D3. CONTRACT ADMINISTRATOR

- D3.1 The Contract Administrator is Earth Tech (Canada) Inc., represented by:
Mr. Asnee Pochanart, Ph.D., P. Eng.
Project Engineer
1000 Waverley Street, Winnipeg, Manitoba R3T 0P3
Telephone No. (204) 478-8562
Facsimile No. (204) 478-7856
- D3.2 At the pre-construction meeting, Mr. Pochanart 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.

D5. NOTICES

- D5.1 Except as provided for in GC:23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.
- 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 All notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following address or facsimile number:

The City of Winnipeg
Chief Administrative Officer Secretariat
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9
Facsimile No.: (204) 949-1174

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
Corporate Services Department
Legal Services Division
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 three (3) 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. INSURANCE

D7.1 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) all inclusive, with The City of Winnipeg being added as an additional insured, with a cross-liability clause, such liability policy to also contain a contractual liability, an unlicensed motor vehicle liability and a products and completed operations endorsement to remain in place at all times during the performance of the Work and throughout the warranty period;
- (b) automobile liability insurance for owned and non-owned automobiles used for or in connection with the Work in the amount of at least two million dollars (\$2,000,000.00) at all times during the performance of the Work and until the date of Total Performance;
- (c) all risks course of construction insurance in the amount of one hundred percent (100%) of the total Contract Price, written in the name of the Contractor and The City of Winnipeg, at all times during the performance of the Work and until the date of Total Performance.

D7.2 Deductibles shall be borne by the Contractor.

D7.3 The Contractor shall provide the City Solicitor with a certificate of insurance of each policy, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in GC:4.1 for the return of the executed Contract.

D7.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least fifteen (15) Calendar Days prior written notice to the Contract Administrator.

D8. PERFORMANCE SECURITY

D8.1 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.

D8.1.1 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.

SCHEDULE OF WORK

D9. COMMENCEMENT

D9.1 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.

D9.2 The Contractor shall not commence any Work on the Site until:

- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence that the Contractor is in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba;
 - (ii) evidence of the workers compensation coverage specified in GC:6.14;
 - (iii) evidence of the insurance specified in D7;
 - (iv) the performance security specified in D8.
- (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.

D9.3 The Contractor shall not commence the Work on the Site before September 18, 2006.

D10. SUBSTANTIAL PERFORMANCE

D10.1 The Contractor shall achieve Substantial Performance by October 27, 2006.

D10.2 The Contractor shall schedule, undertake, and complete the Work within a continuous three (3) week period between September 18, 2006 and October 27, 2006, in order to minimize disruption of Canadian Pacific Railway (CPR) operations.

D10.3 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for

purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.

- D10.4 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.

D11. TOTAL PERFORMANCE

- D11.1 The Contractor shall achieve Total Performance by November 3, 2006.
- D11.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.
- D11.3 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.

D12. LIQUIDATED DAMAGES

- D12.1 If the Contractor fails to achieve Substantial Performance or Total Performance in accordance with the Contract by the day fixed herein for Substantial Performance, the Contractor shall pay the City five hundred dollars (\$500) per Working Day for each and every Working Day following the day fixed herein for Substantial Performance during which such failure continues.
- D12.2 The amount specified for liquidated damages in D12.1 is based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve Substantial Performance by the day fixed herein for same.
- D12.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

CONTROL OF WORK

D13. JOB MEETINGS

- D13.1 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.
- D13.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

D14. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

- D14.1 Further to GC:6.26, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

MEASUREMENT AND PAYMENT

D15. PAYMENT SCHEDULE

- D15.1 Further to GC:12.7, 12.8, 12.9 and 12.10, the City shall only be required to pay the Contractor for the material and equipment required for the Work upon the installation and total incorporation of the same permanently in the Work.

WARRANTY

D16. WARRANTY

- D16.1 Notwithstanding GC:13.2, the warranty period shall begin on the date of Total Performance and shall expire two (2) years thereafter unless extended pursuant to GC:13.2.1 or GC:13.2.2, in which case it shall expire when provided for thereunder.

SAFETY

D17. CONSTRUCTION SAFETY

- D17.1 The Contractor shall ensure that he and his work crew have studied and understood the "Canadian Pacific Railway - Minimum Safety Requirements for Contractors Working on Railway Property", a copy of which is provided herein following the Supplemental Conditions.

COORDINATION WITH OTHERS

D18. AUTHORIZED WORK ON PRIVATE PROPERTY

- D18.1 Further to GC 6.28, the Contractor shall confine his works to the right-of-way or easements. Where Work is required to be done on private property the Contract Administrator will authorize such work in writing after obtaining the permission of the property owner.
- D18.2 The Contractor shall limit his operations to the minimum area necessary for undertaking the private property work and he shall be responsible for all damages outside the limits of the authorized work, resulting from his work on private property. Particular care shall be taken to prevent damage to buildings, trees and plants. The Contractor shall make provision to maintain full drainage during construction.

D19. COORDINATION WITH CANADIAN PACIFIC RAILWAY

D19.1 General Requirements

- D19.1.1 The Contractor shall be required to notify the Canadian Pacific Railway (CPR) by contacting Mr. Bob Mitchell (204) 946-3439 at least five (5) working days before commencing any work over or adjacent to the tracks and shall be governed by CPR's requirements.
- D19.1.2 The Contractor shall be responsible for any damage, disruptions and/or convenience caused by his equipment or operations of work to the tracks, the Railway's operation or its property. The tracks are CPR main line tracks and are subject to frequent train traffic.
- D19.1.3 The Contractor shall give a minimum of 48 hours notice to request closure of any specific tracks. Request for closures will require submission of a 28-day work plan in accordance with CPR requirements for approval by CPR. Track closure is at the discretion of CPR and may not be granted for any or all of the work.

- D19.1.4 The CPR tracks shall be kept free of obstruction and open to traffic at all times unless prior written permission is obtained by the Contractor from CPR for its closure and written approval granted by the Contract Administrator.
- D19.1.5 At all times, the Contractor shall strictly adhere to the minimum clearance requirements as shown on the drawings for all tracks.
- D19.2 Flagman Requirement
- D19.2.1 When working adjacent to and within 6.0m of active railway tracks, a flagman will be required at all times. Temporary fencing and/or other barriers may be acceptable alternatives to flagging within CPR right-of-way beyond the 6.0m limit. The Contractor shall obtain written permission from CPR and written approval from the Contract Administrator prior to commencing installation of any temporary fencing/barriers. The Contractor's personnel shall observe the instructions of the flagmen at all times. All costs associated with providing flagmen shall be borne by the City.
- D19.2.2 The Contractor shall be required to coordinate flagging with CPR by contacting Mr. Morgan Bonnel (204) 771-0085 at least 48 hours prior to commencing the affected works. The CPR flagman will coordinate the requested track closures and warn of any moving trains.
- D19.3 Underground Utilities
- D19.3.1 A fibre optic communication cable is located along the south-east edge of the rail line in the vicinity of the Work. The Contractor shall be required to notify CPR at (877) 696-8594 and arrange for locating and marking the underground cable prior to commencing excavation works.
- D19.4 Protection of CPR Tracks
- D19.4.1 The Contractor shall take all necessary precautions to prevent construction materials from falling onto the railway's property. The Contractor to the satisfaction of the Contract Administrator shall remove any materials, which fall onto the property.
- D19.5 Crossing over CPR Tracks
- D19.5.1 During the course of the construction, it may be necessary for vehicles to cross over CPR tracks. Should the Contractor require any temporary crossings, he shall submit his written request to CPR, who will then construct these crossings as required. All costs associated with the temporary crossings shall be borne by the Contractor.
- D19.5.2 The Contractor shall enter into a written agreement in accordance with CPR's requirements prior to any use of existing or temporary crossings over the CPR's tracks. The Contractor shall submit a copy of the agreement to the Contractor Administrator. The Contractor will be held liable for any damage to railway property, cars, and locomotives concerning both temporary and existing crossings and their related roadways.
- D19.6 Cost Associated with CPR Coordination
- D19.6.1 All costs associated with the coordination with CPR, as set out in these Bid Opportunity Documents, whether specifically described or not, shall be the responsibility of the Contractor. No separate payment will be made for the coordination.

FORM H1: PERFORMANCE BOND
(See D8)

KNOW ALL MEN BY THESE PRESENTS THAT

_____ ,
(hereinafter called the "Principal"), and

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

_____ dollars (\$_____)

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

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

_____ day of _____, 20____, for:

BID OPPORTUNITY NO. 281-2006

SAFETY IMPROVEMENTS AT THE NAIRN AVENUE OVERPASS

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

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

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

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

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

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

_____ day of _____, 20____ .

SIGNED AND SEALED
in the presence of:

(Witness)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

**FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)**
(See D8)

(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 281-2006
SAFETY IMPROVEMENTS AT THE NAIRN AVENUE OVERPASS

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)

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS, STANDARD DETAILS AND DRAWINGS

- E1.1 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.1.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.
- E1.1.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.1.3 Further to GC:2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.2 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
1	Cover Sheet
2	Overall Plan and Clearance Diagrams
3	Crash Wall Details and Schedule - Pier 5 and Pier 6 North Columns
4	Crash Wall Details and Schedule - Pier 6 and Pier 7 South Columns

E2. SOILS INVESTIGATION REPORT

Available geotechnical information: Construction Report on the Nairn Avenue Overpass by UMA dated December 1967. More current soil investigation report is not available.

E3. MOBILIZATION AND DEMOBILIZATION

E3.1 GENERAL

- E3.1.1 Scope of Work
- (a) Furnishing all superintendence / overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work associated with the mobilization and demobilization.
 - (b) The Work includes items associated with "Construction Safety" stated in Part D Supplemental Conditions.

E3.2 MEASUREMENT AND PAYMENT

- E3.2.1 No measurement will be made for this Work.
- E3.2.2 Mobilization and demobilization, including assembly, transportation and setting up of the Contractor's equipment, tools, supplies and office facilities for the project or incidental thereto; and for the removal of all items when the project is complete; will be paid on a lump sum basis as accepted by the Contract Administrator.
- E3.2.3 Mobilization and demobilization will be paid for at a percentage of the Contract Lump Sum Price for "Mobilization and Demobilization" specified as follows:
- (a) 30% when the Contract Administrator is satisfied that construction has commenced.
 - (b) 50% when substantial performance has been met.

(c) 20% upon completion of the project.

E3.2.4 The full payment shall be considered full compensation for supplying all materials and for performing all operation described in this section.

E4. EXCAVATION AND BACKFILLING

E4.1 Scope of Work

E4.1.1 Excavating and removing of materials necessary for the placement of cast-in-place concrete crash walls.

E4.1.2 Dewatering, shoring, and bracing required for excavations.

E4.1.3 Supplying, placing, and compacting backfill materials to attain indicated grades and density.

E4.1.4 Disposing of surplus excavated material.

E4.1.5 Restoring backfilled areas and areas used for stock piling.

E4.2 Product

E4.2.1 Completed excavation shall provide clean, level, solid, and water-free surfaces at the required elevations, ready for construction to proceed.

E4.2.2 Material used for backfill shall be free of frozen lumps, wood or other degradable matter. It shall be granular material of grading such that the required compaction can be consistently obtained using the compaction methods selected by the Contractor.

E4.3 Execution

E4.3.1 Excavation

- (a) Follow the "Guidelines for Excavation Work" published by Manitoba Labour – Workplace Safety and Health.
- (b) Comply with all applicable rules and regulations of governmental authorities.
- (c) Submit excavation plan to the Contract Administrator for review one week prior to commencement of the Work.
- (d) Before starting Work, locate all utilities crossing the Work Site. Notify all agencies or companies having jurisdiction over the specific utilities. Take all the necessary precautions to avoid damaging the utilities.
- (e) Prevent damaging existing structures, excavations, and injury to personnel by providing all necessary shoring / bracing.
- (f) If shoring / bracing is required, have it designed by a Professional Engineer registered in the Province of Manitoba.
- (g) Erect shoring / bracing independent of utilities and structures.
- (h) Excavate to the limits required for crash walls. When complete, request the Contract Administrator to review the excavations.
- (i) Stockpile material for backfilling on-site as directed by the Contract Administrator.
- (j) Keep excavation, pits, and the entire sub-grade near the Work free of water. Maintain positive surface drainage at all times.

E4.3.2 Backfilling and Compaction

- (a) Ensure areas to be backfilled are free from debris, snow, ice, and water and that ground surfaces are not in a frozen condition.

- (b) Maintain shoring / bracing during backfilling and remove in stages as backfilling progresses.
- (c) Fill and compact to 150 mm (6") below the elevation existing prior to the excavations.
- (d) Backfill in lifts smaller than 200 mm (8") in thickness around the structure and compact each soil layer to at least 95% Standard Proctor Density. Maintain optimum moisture content of materials to permit compaction to specified density.
- (e) The City and the Contract Administrator will appoint an independent firm to conduct testing of compacted backfill. The testing firm will perform the tests in accordance with ASTM D698 for Standard Proctor Density. The Contractor shall cooperate with the firm in allowing access and providing materials for testing.
- (f) Ensure that each layer of compacted fills are tested and accepted before proceeding with placement of subsequent layer or surface materials. During Work tests, if tests indicate that compacted materials do not meet specified required materials, remove defective Work, replace and re-test.
- (g) Remove all shoring / bracing unless otherwise permitted by the Contract Administrator.
- (h) Fill the remaining top 150 mm (6") with excavated material and grade as directed by the Contract Administrator.

E4.3.3 Disposal and Clean-up

- (a) Dispose surplus material not required for backfilling off-site.
- (b) As excavation proceeds, keep roads, streets, and sidewalks clean of dirt and excavated material. Clean-up and wash down to remove all dirt and excavated materials caused by Work of this Section.
- (c) Restore the backfilled areas and areas used for temporary stockpiling to previous existing condition.

E4.4 Measurement and Payment

E4.4.1 No measurement will be made for Work done in this section.

E4.4.2 The Work stated in this section will be paid for at the Contract Lump Sum Price for "Excavation and Backfilling".

E5. CONCRETE FORMWORK

E5.1 Scope of Work

E5.1.1 Supplying, erecting, cleaning and removing forms, falsework and shoring for cast-in-place concrete crashwalls.

E5.2 Products

E5.2.1 Form sheeting plywood shall be exterior Douglas fir, concrete form grade, conforming to CAN/CSA O121 with minimum thickness of 20 mm (3/4").

E5.2.2 Lumber shall conform to CAN/CSA O141.

E5.2.3 Form Release Agent shall be colourless mineral oil that will not stain concrete.

E5.3 Execution

E5.3.1 Preparation

- (a) Before starting this Work, examine the existing conditions that may affect this Work.

- (b) Notify the Contract Administrator of any conditions, which would prejudice proper completion of this Work.
- (c) Commencement of Work implies acceptance of existing conditions.
- (d) Ensure that the design of form, falsework and shoring conform to the National Building Code of Canada, CAN/CSA-A23.1, CAN/CSA S269.1, CAN/CSA S269-3, ACI 347R, and applicable construction safety regulations.

E5.3.2 Erection

- (a) Verify lines, levels, and centres before proceeding with formwork. Ensure dimensions agree with Drawings.
- (b) Construct and erect concrete formwork in accordance with CAN/CSA-A23.1, CAN/CSA S269.3, ACI 347R, and all applicable construction safety regulations for the place of Work.
- (c) Construct formwork to produce concrete with dimensions, lines, and levels as shown on the drawings and within tolerances specified in CAN/CSA A23.1-04.
- (d) Arrange and assemble formwork to permit removal without damage to concrete.
- (e) Align joints and make watertight to prevent leakage of cement paste and disfiguration of concrete. Keep form joints to a minimum and tape as necessary.
- (f) Provide chamfer on all external corners and edges of exposed concrete.
- (g) Provide falsework / shoring to ensure stability of formwork.
- (h) Inspect and check complete formwork, falsework, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and parts are secure.
- (i) Inform the Contract Administrator when formwork is complete and cleaned, to allow for review.
- (j) Check and readjust formwork to required lines and levels during placing of concrete.

E5.3.3 Formwork Preparation and Cleaning

- (a) Clean forms as erection proceeds, to remove foreign matter. Remove cuttings, shavings, and debris from within forms. Flush completely with water to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- (b) During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Use compressed air to remove foreign matter. Do not use water to clean out completed forms, unless formwork and concrete construction proceed within a heated enclosure.
- (c) Apply form release agent in accordance with manufacturer's recommendations, prior to placing reinforcing steel.
- (d) Soak inside surfaces of untreated forms with clean water.
- (e) Keep surfaces moist prior to placing concrete.

E5.3.4 Form Removal and Re-using of Form

- (a) Notify Contract Administrator prior to removing formwork.
- (b) Remove falsework progressively, in accordance with regulatory requirements.
- (c) Loosen forms carefully without damaging concrete surfaces.
- (d) Do not apply tools to exposed concrete surfaces.
- (e) Leave forms loosely in place for protection until curing requirements are complete.

- (f) Allow Contract Administrator to review each section of formwork prior to re-using.

E5.4 Measurement and Payment

- E5.4.1 No measurement will be made for Work done in this section.
- E5.4.2 The Work stated in this section will be considered incidental to and paid for at the Contract Lump Sum Price for "Reinforced Concrete Crash Walls".

E6. CONCRETE REINFORCEMENT

E6.1 Scope of Work

- E6.1.1 Furnishing and placing reinforcing steel bars for the cast-in-place concrete crash walls as shown on the drawings.
- E6.1.2 Anchoring reinforcing steel bars into existing columns and pile-caps using epoxy adhesive as shown on the drawings and stated in this specification.

E6.2 Products

- E6.2.1 Reinforcing Steel shall be deformed billet steel bars conforming to CAN/CSA-G30.18 with minimum yield strength of 400 MPa.
- E6.2.2 Epoxy Adhesive for Anchoring Reinforcing Steel Bars shall be HY150 Adhesive Anchor by HILTI.
- E6.2.3 Tie wire shall be 1.6 mm annealed type, or a patented system as accepted by Contract Administrator.
- E6.2.4 Chairs, Bolsters, Bar Supports, and Spacers shall be adequately sized for strength and support of reinforcing steel during construction.

E6.3 Execution

E6.3.1 Preparation

- (a) Before starting this Work, examine the existing conditions that might affect this Work.
- (b) Notify the Contract Administrator of any conditions that would prejudice proper completion of this Work.
- (c) Commencement of Work implies acceptance of existing conditions.
- (d) If requested by Contract Administrator, submit three (3) certified copies of mill test report of reinforcement supplied, indicating physical and chemical analysis.

E6.3.2 Fabrication and Delivery

- (a) Fabricate reinforcing steel in accordance with CAN/CSA-A23.1 and the drawings.
- (b) Conduct all bar bending using cold bend with a suitable machine accurately producing all lengths, depths and radii shown on the bending details.
- (c) After initial fabrication, do not re-bend or straighten reinforcing steel bars unless so indicated on the drawings.
- (d) Do not heat the reinforcing steel.
- (e) Deliver, handle, and store reinforcement in a manner to prevent damage and contamination.
- (f) Deliver bars in bundles, clearly identified in relation to bar lists.

E6.3.3 Anchoring reinforcing steel bars using epoxy adhesive

- (a) Study the product technical guide for the specified epoxy adhesive and ensure thorough understanding of the installation procedure recommended by the Manufacturer.
- (b) Submit drilling and installation sequence to the Contractor Administrator three (3) days before proceeding. The sequence shall be such that no hole is drilled at approximately same elevation and /or within 3'-0" from a previously drilled hole until the epoxy adhesive in the previously drilled hole has cured and gained its full strength.
- (c) Follow the Manufacturer's recommended installation procedure.
- (d) Use the Manufacturer's recommended installation tools and equipment.
- (e) Ensure thorough cleaning of drilled holes before the injection of the epoxy adhesive.
- (f) Monitor site temperature during installation to help estimating curing time of the epoxy adhesive. Leave previously installed reinforcing bar anchors undisturbed at least sixty (60) minutes beyond the end of its estimated curing time.

E6.3.4 Installation

- (a) Place reinforcing steel in accordance with reviewed placing drawings. Tie reinforcing steel at maximum spacing 600 mm (2'-0").
- (b) Adequately support reinforcing and secure against displacement within tolerances permitted.
- (c) Place reinforcing steel to provide concrete cover as noted on the drawings.
- (d) Maintain alignment as follows:
 - (i) Crash Wall \pm 10 mm (3/8")
 - (ii) Rebar Bends and Ends: \pm 50 mm (2")

E6.3.5 Cleaning

- (a) Ensure that concrete reinforcing is clean and free from oil and deleterious matter.
- (b) Remove all loose scale, loose rust, concrete from prior pours, and other deleterious matter from surfaces of reinforcing.

E6.4 Measurement and Payment

E6.4.1 No measurement will be made for Work done in this section.

E6.4.2 The Work stated in this section will be considered incidental to and paid for at the Contract Lump Sum Price for "Reinforced Concrete Crash Walls".

E7. CAST-IN-PLACE CONCRETE

E7.1 Scope of Work

E7.1.1 Scope of Work includes furnishing, placing, finishing and curing of concrete in the cast-in-place concrete crash walls in accordance with this specification and conforming to the line, grade and dimensions shown on the drawings.

E7.1.2 It also includes patching and curing of concrete imperfections.

E7.2 Products

E7.2.1 The Contractor and his ready-mixed concrete supplier shall be responsible for the mix design. The concrete mix design shall conform to CAN/CSA A23.1-04.

E7.2.2 Ready mixed concrete shall be from a CSA Certified plant and a member of the Manitoba Ready Mixed Concrete Association. All materials used in the concrete mix shall conform to the requirements of CAN/CSA A23.1-04.

- E7.2.3 The Contractor and his concrete supplier shall design the concrete mix to meet the Exposure Class F-2 with minimum 28-day compressive strength of 35 MPa. Air content and maximum water-to-cementing materials ratio shall meet the requirements of Tables 2 and 4 of CAN/CSA A23.1-04. The Contractor shall ensure with his concrete supplier that the concrete mix (at plastic stage) would have workability suitable for his method of placement.
- E7.2.4 Cement shall be Type GU, i.e. General Use hydraulic cement, in accordance with Table 6 of CAN/CSA A23.1-04.
- E7.2.5 Fine aggregate shall be normal density fine aggregate, conforming to Grading Limit FA1 in accordance with Table 10 of CAN/CSA A23.1-04.
- E7.2.6 Coarse aggregate shall be normal density coarse aggregate, conforming to Group I Grading Limit for 20mm-5mm nominal size of aggregate in accordance with Table 11 of CAN/CSA A23.1-04.
- E7.2.7 The Contractor shall ensure with his concrete supplier that the aggregates to be used will not undergo volume change due to alkali reactivity, moisture retention, or other causes.
- E7.2.8 Water shall be potable, clean, and free from injurious amounts of oil, alkali, organic matter, or other deleterious matter.
- E7.2.9 Supplementary cementing materials shall be natural pozzolan (N), low calcium content fly-ash (F) or silica fume (SF) in accordance with Table 8 of CAN/CSA A23.1-04.
- E7.2.10 Air entraining agent shall conform to ASTM C260.
- E7.2.11 Other Chemical admixtures shall conform to ASTM C494 and shall be compatible with the concrete mix.
- E7.2.12 Bonding agent for concrete shall be water-based epoxy modified Portland cement bonding agent TAMMS DURALPREP AC as supplied by Specialty Construction Products or approved equal.
- E7.3 Execution
- E7.3.1 Preparation
- (a) Notify the Contract Administrator at least 48 hours before complete formwork and concrete reinforcement is ready for review prior to closing forms.
 - (b) Allow ample time for notification, review, and corrective work, if required, before scheduling concrete placement.
 - (c) Notify the Contract Administrator at least 24 hours in advance of any concrete placement.
- E7.3.2 Concrete placement in hot or cold weather
- (a) Submit a written procedure for placing concrete in hot weather if expecting to pour concrete at an ambient temperature above 25C.
 - (b) Submit a written procedure for placing concrete in cold weather if expecting to pour concrete at an ambient temperature below 5C.
 - (c) Submit the procedure to the Contract Administrator for review 48 hours before concrete placement.
- E7.3.3 Placing Concrete
- (a) Layout and accuracy of the work is the Contractor's sole responsibility.
 - (b) Notify the Contract Administrator a minimum of 24 hours prior to pouring concrete.

- (c) Deliver concrete to site together with a delivery slip indicating time of completion of mixing, design strength of concrete, air content, and actual water-cement ratio.
- (d) Prepare surface of existing concrete by removing all laitance and loose or unsound materials and apply bonding agent in accordance with manufacturer's recommendations.
- (e) Before placing concrete, clean all equipment for transporting the concrete to remove hardened concrete and foreign materials.
- (f) Immediately before placing concrete, carefully inspect all forms to ensure that they are properly placed, sufficiently rigid and tight, and that all reinforcing steel bars are in the correct position and secured against movement during the placing operation. Also, ensure that forms have been thoroughly cleaned and foreign materials removed.
- (g) Place concrete within 1½ hours of mixing.
- (h) Place concrete in accordance with requirements of CAN/CSA-A23.1-04 and as indicated on the Drawings.
- (i) To prevent separation or loss of the ingredients, use practicable methods to transfer concrete rapidly from ready mixed truck to its final deposit location.
- (j) Deposit concrete in the forms as nearly as practicable to its final position to avoid re-handling or flowing. Do not drop concrete higher than 1500 mm (5 ft) from its final deposit position. Instead, use canvas hoses or galvanized iron chutes. Place concrete as rapidly and evenly as possible to reduce the risk of segregation and cold joints.
- (k) Select appropriate size of equipment to use for vibrating concrete, in accordance with CAN/CSA-A23.1. Check frequency and amplitude of vibrations prior to use. Provide additional standby vibrators in the event of equipment failure.
- (l) During placing operations, use mechanical vibrators to thoroughly compact concrete, work it around the reinforcement, and into the corners of the forms. Do not use vibrators to move concrete. Place concrete at a suitable rate to allow for proper vibration.
- (m) Do not deposit partially hardened concrete in the forms, under any circumstances.
- (n) Maintain accurate records of cast-in-place concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

E7.3.4 Inspection and Testing

- (a) The City and the Contract Administrator will appoint an independent firm to conduct concrete sampling, inspection, and testing, which will conform to CAN/CSA-A23.2-04
- (b) The Contractor is to provide unencumbered access to all portions of Work and cooperate with appointed firm.
- (c) The appointed firm will:
 - (i) Take three (3) concrete test cylinders for every crash wall or every day of concrete placement.
 - (ii) Take one (1) slump test and one (1) air content test for each set of test cylinders.
 - (iii) Take additional slump and air content tests as necessary to verify quality of concrete.
 - (iv) Issue the test results to the Contractor, the Contract Administrator, and the City.
- (d) The Contractor is to pay costs for required retesting due to defective materials or workmanship. If accepted by the Contract Administrator, the Contractor may arrange and pay for additional tests for use as evidence to expedite construction.

- (e) Strength acceptance criteria will be in accordance with Section 4.4.6.7 of CAN/CSA A23.1-04.
- (f) If the strength requirements are not met the contract Administrator shall have the right to require one or more of the following, all costs of which will be the responsibility of the Contractor:
 - (i) Change in the mix proportions of the remainder of the work.
 - (ii) Cores drilled and tested from the areas in question as directed by the Contract Administrator and in accordance with CAN/CSA-A23.2-04. The test results shall be indicative of the strength of the in-place concrete.
 - (iii) Additional curing on those portions of the structure represented by the test specimens that failed and cores drilled and tested in accordance with CAN/CSA-A23.2-04; the strengths shall be indicative of the strength of the in-place concrete.
 - (iv) After the completion of the testing procedure, if the Contract Administrator is not satisfied with the indicated quality of the concrete in the structure, the Contractor may be required to strengthen or replace those portions that he deems to be unsatisfactory.

E7.3.5 Construction Tolerance

- (a) Carefully and accurately, set out the work to be true to the positioning, levels, slopes, and dimensions shown on the Drawings.
- (b) Allowable member cross section variations are in accordance with CAN/CSA-A23.1-04, Section 6.4.2.1.
- (c) Allowable out-of-plumb is in accordance with CAN/CSA-A23.1-04, Section 6.4.3.
- (d) Tolerances for location of reinforcement and variations of concrete cover are CAN/CSA-A23.1-04, Section 6.6.8.
- (e) If these tolerances are exceeded the Contractor may, at the discretion of the Contract Administrator, be required to remove and replace or to modify the placed concrete before acceptance. The costs incurred by the Contract Administrator for such investigation, testing, or review of reconstruction and the cost of reconstruction shall be borne by the Contractor.

E7.3.6 Curing and Protection

- (a) Cure and protect freshly placed concrete in accordance with CAN/CSA-A23.1-04.
- (b) All concrete shall receive moist curing for a period of at least seven days. One of the following methods shall be used as soon as the concrete has hardened sufficiently to prevent marring:
 - (i) Cover concrete surface with canvas or other satisfactory material and keep it thoroughly wet.
 - (ii) Seal concrete surface with polyethylene sheeting and keep thoroughly wet.
 - (iii) Subject to the acceptance of the Contract Administrator, use a liquid, membrane forming, curing compound at the rate recommended by the manufacturer.
 - (iv) Leave formwork in place to protect surface of concrete for seven (7) days.
- (c) At the end of the curing and protection period, gradually reduce the temperature of the concrete, i.e. at a rate not exceeding 10°C per day, until it reaches the ambient temperature.

E7.3.7 Patching of Formed Concrete

- (a) Allow the Contract Administrator to review concrete surfaces immediately upon removal of the forms.

- (b) Remove all exposed metal form ties, nails and wires, break off fins, and remove all loose concrete.
- (c) Patch all voids, stone pockets or other defective areas and tie holes before the concrete is thoroughly dry.
- (d) Chip away honeycombed and other defective surfaces to depth of not less than 25 mm (1") with the edges perpendicular to the surface.
- (e) Thoroughly wet the areas that require patching and their surrounding areas to prevent absorption of water from the patching mortar.
- (f) Patch the areas with the same material and of the same proportions as used for the concrete but omitting the coarse aggregate. Add cement to match the colour of the surrounding concrete.
- (g) Properly cure the patched areas.

E7.3.8 Defective Concrete

- (a) Concrete not meeting the requirements of the Specifications and Drawings will be considered defective concrete.
- (b) At his own expense, the contractor shall modify or replace defective concrete to bring it to conformance with:
 - (i) Lines, details, and grade as shown on the Drawings
 - (ii) Tolerances stated in these specifications
- (c) At his own expense, the contractor shall strengthen or replace concrete failing to meet the strength requirements.

E7.4 Measurement and Payment

- E7.4.1 No measurement will be made for Work done in this section.
- E7.4.2 The work stated in this section will be considered incidental to and paid for at the Contract Lump Sum Price for "Reinforced Concrete Crash Walls".
- E7.4.3 Payment shall be considered full compensation for furnishing all labour, materials, equipment and incidentals, and for doing all the work involved in constructing the concrete Work complete in place, as shown on the drawings.