THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 665-2011

SUPPLY AND INSTALLATION OF UNDERGROUND FUEL STORAGE TANKS AND ALL ASSOCIATED EQUIPMENT AT 552 PLINGUET STREET

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B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 4:00 p.m. Winnipeg time, September 21, 2011.

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.

B3.2 The Bidder is advised that there is an adjacent, existing fuel site at 552 Plinguet that will remain in use during construction and that the new fuel site will be in close proximity to the City of Winnipeg's Aqueduct.

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

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.

B5.2.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 8 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 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.

B6.10 Notwithstanding B6.2 to B6.9, and in accordance with B7.7, deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B14.1(a).

B7. BID COMPONENTS

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

(a) Form A: Bid;

(b) Form B: Prices;

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 Submission may be submitted by mail, courier or personal delivery, or by facsimile transmission.

B7.5 If the Bid Submission is submitted by mail, courier or personal delivery, it shall be enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address, and shall be submitted to:

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

B7.5.1 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.

B7.6 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.

B7.7 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 B14.1(a).

B7.8 If the Bid Submission is submitted by facsimile transmission, it shall be submitted to (204) 949-1178.

B7.8.1 The Bidder is advised that the City cannot take responsibility for the availability of the facsimile machine at any time.

B7.8.2 Bids submitted by internet electronic mail (e-mail) will not be accepted.

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 10 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;

(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.

B8.4.2 All signatures shall be original.

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 the lump sum price in Canadian funds for the Work on Form B: Prices.

B9.1.1 Notwithstanding C12.2.3(c), the price on Form B: Prices shall not include the Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable.

B9.2 Payments to Non-Resident Contractors are subject to 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

(b) be a Licensed Petroleum Technician (LPT) for any Work regulated by the Province of Manitoba, requiring a Licensed Petroleum Technician for specific Work functions.

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/Subcontractors 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. OPENING OF BIDS AND RELEASE OF INFORMATION

B11.1 Bids will not be opened publicly.

B11.2 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/bidopp.asp

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 Division website at http://www.winnipeg.ca/matmgt

B11.4 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.

B12. IRREVOCABLE BID

B12.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 9 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 for the time period specified in Paragraph 9 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 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.

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 10 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 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 10 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.

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 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.

B14.2 Further to B14.1(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.

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 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 lump sum price shown on Form B: Prices.

B15. AWARD OF CONTRACT

B15.1 The City will give notice of the award of the Contract 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, in accordance with B14.

B15.3.1 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.

B15.4 Notwithstanding C4, the City will issue a Purchase Order to the successful Bidder in lieu of the execution of a Contract.

B15.5 The Contract, as defined in C1.1, in its entirety shall be deemed to be incorporated in and to form a part of the Purchase Order notwithstanding that it is not necessarily attached to or accompany said Purchase Order.

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 a new fuelling facility. The general scope of the Work includes supplying and installing the following components: fuel pumps, fuel tanks, fuel islands, lighting, all related details per the enclosed specification, and any other components required to make the site operational.

The new Winnipeg Fleet Management Agency fuel site is to be located at 552 Plinguet Street and shall be configured according to the proposed site plan attached with this Bid Opportunity. Due to close proximity to the aqueduct all precautions noted in this Bid Opportunity will be followed to ensure no impact on the aqueduct.

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

(a) The supply and installation of 2-50,000 Litre split underground fuel tanks, monitoring wells, access manhole covers and frames, piezometers and caps, geomembrane, vent stacks, piping, electrical.

(b) The supply and installation of 2 fuel islands, lighting, and associated infrastructure.

(c) The installation of electrical, hardware, control and monitoring systems, communications, and back-up generator.

(d) The construction of a new concrete approach at Plinguet Street and all necessary concrete paving to and from new fuel islands.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is:

Ajaleigh Williams
Project Coordinator
770 Ross Avenue

Telephone No. (204) 986-7879
Facsimile No. (204) 986-3773

D3.2 At the pre-construction meeting, the Contract Administrator 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 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 facsimile number:

The City of Winnipeg
Chief Financial Officer

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
Legal Services Department
Attn: Director of Legal Services
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1

Facsimile No.: (204) 947-9155

SUBMISSIONS

D6. AUTHORITY TO CARRY ON BUSINESS

D6.1 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.

D7. SAFE WORK PLAN

D7.1 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.

D7.2 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

D8. INSURANCE

D8.1 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 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) 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.

(d) Contractors pollution liability for an amount of not less than $1,000,000 on a claims made basis. Annual evidence of contractors' pollution liability must continue to be provided to the City of Winnipeg for two full years following substantial completion.

D8.2 In addition to the above, the certificate of insurance to state "The operations of the insured covers the removal of underground fuel tanks plus all related apparatus as detailed in Bid Opportunity # 665-2011".

D8.3 Deductibles shall be borne by the Contractor.

D8.4 The Contractor shall provide the Contract Administrator 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 seven (7) Calendar Days from notification of the award of Contract by Purchase Order.

D8.5 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D8.6 The City shall have the right to alter the limits and/or coverage's as reasonable required from time to time during the continuance of this agreement/contract.

D9. PERFORMANCE SECURITY

D9.1 If the Contract Price exceeds twenty-five thousand dollars ($25,000.00), 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.

D9.1.1 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.

D9.2 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 Purchase Order and prior to the commencement of any Work on the Site.

D10. SUBCONTRACTOR LIST

D10.1 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 seven (7) Calendar Days from notification of the award of Contract.

D11. DETAILED PRICES

D11.1 The Contractor shall provide the Contract Administrator with a detailed price breakdown (Form I: Detailed Prices) 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 C4.1 for the return of the executed Contract.

D11.2 The Contractor shall state a price for each item or sub-item of the Work identified on Form I: Detailed Prices. The detailed prices must be consistent with the price(s) provided in the Contractor's Bid.

D12. SUBCONTRACTOR LIST

D12.1 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 C4.1 for the return of the executed Contract.

SCHEDULE OF WORK

D13. COMMENCEMENT

D13.1 The Contractor shall not commence any Work until he is in receipt of a Purchase Order from the Award Authority authorizing the commencement of the Work.

D13.2 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 D6;
  (ii) evidence of the workers compensation coverage specified in C6.15;
  (iii) the Safe Work Plan specified inD7;
  (iv) evidence of the insurance specified in D8;
  (v) the performance security specified in D9;
  (vi) the Subcontractor list specified in D10;
  (vii) the Detailed Prices list specified in D11;
  (viii) Schedule of Work specified in D12;
  (ix) Requirements specified in E16.4 for Protection of the Branch I Aqueduct During Construction are submitted; and
  (x) The detailed plan for penetrating the building envelope of 598 Plinguet Street for the fibre optic network connection specified in E10.1(d).

(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.

D13.3 The City intends to award this Contract by September 28, 2011.

(a) If the actual date of award is later than the intended date, the dates specified for Substantial Performance and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

D14. SUBSTANTIAL PERFORMANCE

D14.1 The Contractor shall achieve Substantial Performance by November 9, 2011.

D14.2 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.

D14.3 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.

D15. TOTAL PERFORMANCE

D15.1 The Contractor shall achieve Total Performance by November 16, 2011.

D15.2 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.

D15.3 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.

D16. LIQUIDATED DAMAGES

D16.1 If the Contractor fails to achieve Substantial Performance in accordance with the Contract by the day fixed herein for Substantial Performance, the Contractor shall pay the City two thousand five hundred dollars ($2,500) per Working Day for each and every Working Day following the day fixed herein for Substantial Performance during which such failure continues.

D16.2 The amount specified for liquidated damages in D16.1 is based on a genuine pre-estimate of the City's damages in the event that the Contractor does not achieve Substantial Performance by the day fixed herein for same.

D16.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D16.1 If the Contractor fails to achieve Total Performance in accordance with the Contract by the day fixed herein for Total Performance, the Contractor shall pay the City two thousand five hundred dollars ($2,500) per Working Day for each and every Working Day following the day fixed herein for Total Performance during which such failure continues.

D16.2 The amount specified for liquidated damages in D16.1 is based on a genuine pre-estimate of the City's damages in the event that the Contractor does not achieve Total Performance by the day fixed herein for same.

D16.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

CONTROL OF WORK

D17. JOB MEETINGS

D17.1 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.

D17.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

D18. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D18.1 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

D19. INVOICES

D19.1 Further to C12, the Contractor shall submit an invoice for each order delivered to:

The City of Winnipeg
Corporate Finance - Accounts Payable
4th Floor, Administration Building, 510 Main Street
Winnipeg MB R3B 1B9

Facsimile No.: (204) 949-0864
Email: CityWpgAP@winnipeg.ca

D19.2 Invoices must clearly indicate, as a minimum:

(a) the City's purchase order number;

(b) date of delivery;

(c) delivery address;

(d) type and quantity of goods delivered;

(e) the amount payable with GST and MRST shown as separate amounts; and

(f) the Contractor's GST registration number.

D19.3 The City will bear no responsibility for delays in approval of invoices which are improperly submitted.

D19.4 Bids Submissions must be submitted to the address in B7.5.

D20. PAYMENT

D20.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor’s banking institution.

D21. PAYMENT SCHEDULE

D21.1 Further to C12, payment shall be in accordance with the following payment schedule:

(a) Progress payments to be submitted upon completion of work.

(b) A holdback of 15% of total project costs until the issuance of a total completion certificate is provided by the Contract (total performance will be considered complete once a permit is issued from the Province of Manitoba to operate the fuel site, the fuel site is fully operational and in compliance with all required regulations and there are no major deficiencies on site).

WARRANTY

D22. WARRANTY

D22.1 Notwithstanding C13.2, the warranty period shall begin on the date of Total Performance and shall expire two (2) years thereafter unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

FORM H1: PERFORMANCE BOND
(See D9)

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. 665-2011

SUPPLY AND INSTALLATION OF UNDERGROUND FUEL STORAGE TANKS AND ALL ASSOCIATED EQUIPMENT AT 552 PLINGUET STREET

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 D9)

_____
(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 665-2011

SUPPLY AND INSTALLATION OF UNDERGROUND FUEL STORAGE TANKS AND ALL ASSOCIATED EQUIPMENT AT 552 PLINGUET STREET

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 D10)

SUPPLY AND INSTALLATION OF UNDERGROUND FUEL STORAGE TANKS AND ALL ASSOCIATED EQUIPMENT AT 552 PLINGUET STREET

Name	Address

FORM I: DETAILED PRICES
(See D11)

SUPPLY AND INSTALLATION OF UNDERGROUND FUEL STORAGE TANKS AND ALL ASSOCIATED EQUIPMENT AT 552 PLINGUET STREET

ITEM NO.	DESCRIPTION	SPEC. REF.	AMOUNT
1.	New Diesel and Gasoline Tanks, Vent Stacks, and Associated Infrastructure	E2	
2.	Geomembrane Installation	E17	
3.	Gasoline & Diesel Dispenser Installation	E3.	
4.	Fuel Tank Monitoring System	E5.	
5.	Fuel Islands	E6	
6.	Lighting	E7	
7.	Site Kiosk	E8	
8.	Stand by Generator installation	E9	
9.	Concrete, including fuel pad, all approaches, and driveways	E4	
10.	Site Landscaping	E15	
11.	Fibre Optic Installation to Kiosk	E10	
12.	Electrical & Communications (exclusive of fibre optic to kiosk installation)	E3-E9; E11-E14	

Note: Items No. 1-11 do not include electrical costs. All electrical costs are to be denoted in item 12.

FORM K: SCHEDULE OF WORK
(See D12)

SUPPLY AND INSTALLATION OF UNDERGROUND FUEL STORAGE TANKS AND ALL ASSOCIATED EQUIPMENT AT 552 PLINGUET STREET

Work	StartDate/End Date

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

E1.1 These Specifications shall apply to the Work.

E1.2 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.

E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/Spec/Default.stm

E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.

E1.2.3 Further to C2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.3 The following are applicable to the Work:

Drawing No.	Drawing Name/Title
207-004	Winnipeg Fleet Agency Site Plan 552 Plinguet
0001	Proposed pathway for Fuel Site Network Connection
0002	Typical Equipment Loading Vs. Branch I Aqueduct Load Capacity

E2. SUPPLY AND INSTALLATION OF UNDERGROUND FUEL STORAGE TANKS

E2.1 Supply and install two (2) fuel tanks in conformance with all applicable regulations and permit requirements whether specifically named below or not. Tanks shall meet the following criteria:

E2.1.1 All Contractor supplied materials shall be new materials.

E2.1.2 Compatible with ultra-low sulphur diesel fuel, bio-diesel fuel (B50 blend), marked diesel fuel, unleaded gasoline, E-85 fuel, and marked gasoline.

E2.1.3 Shall be in compliance with all applicable provisions of the CCME Environmental Code of Practice for Above Ground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products, PN 1326, 2003 (CCME Code) and must be eligible for permitting Manitoba Regulation 188/2001.

E2.1.4 Each fuel storage tank shall have a capacity of 50,000 litres, double wall tank construction in conformance with UL S615-98. The fuel storage tanks shall have two (2) compartments of 20,000 and 30,000 litres respectively.

E2.1.5 The fuel storage tank shall be designed with sufficient fittings for vent and supply piping for each compartment, plus a fitting at the center of each compartment for the installation of tank monitoring equipment.

E2.1.6 The fuel tanks shall be buried to a depth of up to 2.13 meters below grade. The tanks shall be anchored in accordance with the manufacturer's specifications.

E2.1.7 Underground piping designed to convey product shall be 38 mm double walled flexible, piping, in conformance with ULC –ORD-C971-2005. Vent piping shall be constructed in conformance with the National Fire Code of Canada (2010).

E2.1.8 Each tank compartment shall be equipped with a ¾ hp submersible turbine pump, with each pump supplying a separate dispenser location.

E2.1.9 Containment systems shall be provided and installed at the tank and dispensers in conformance with the CCME Code.

E2.1.10 Site Survey:

(a) Survey layout shall be the responsibility of the Contractor to ensure proper elevations specified in the site plan are met. Measurement and grades will be verified by the Contract Administrator.

(b) The Contract Administrator will stake coordinates prior to commencement of Work for reference purposes only.

E2.1.11 As-builts:

(a) Shall be supplied through a separate contract.

(b) Contractor shall be responsible for supplying all critical measurements to the Contract Administrator for as-built purposes, to be verified by the Contract Administrator.

(c) The Contractor shall notify the Contract Administrator 48 hours prior to any critical underground Work for as-built purposes including, but not limited to tank installation, electrical, communication lines, vents, piping, sensors, and geomembrane.

(d) The Contractor shall not continue Work until the Contract Administrator gives approval that the measurements have been verified.

E2.1.12 Construction activities near the existing water tower: All necessary and reasonable precautions shall be taken by the Contractor when Work is being carried out adjacent to the existing water tower, as denoted on the site plan.

E3. RETROFIT AND INSTALL FUEL DISPENSERS SUPPLIED BY THE CITY

E3.1 Install four (4) fuel pumps and dispensers in compliance with all applicable regulations and permit requirements.

E3.2 Three (3) fuel dispensers shall be supplied by the City, ready for installation by the Contractor, and shall be one (1) Gilbarco legacy commercial model JC1100 (gas) and two (2) Gilbarco Legacy commercial model JC1500 (diesel) with electronic register TYPE Eliminator 6.0.

E3.3 One (1) fuel dispenser shall be supplied by the City, for installation by the Contractor once the fuel site is fully operational, including that all required permits, are in place. This dispenser shall be Gilbarco Legacy commercial model JC1100 (gas) with electronic register TYPE Eliminator 6.0. The purpose of this requirement is to ensure continuous fuel site operation for City of Winnipeg vehicles operating on the East side of Winnipeg.

E3.4 All required framing, mounting hardware, insulators shall be supplied and installed by the contractor. Where dissimilar metals may come in contact long life Cathodic Protection shall be provided and installed.

E3.5 A leak/pressure test shall be conducted by the contractor according the requirements of the Manufacturer. A letter or certificate shall be supplied by the Contractor as to the test criteria and the test results.

E3.6 High hose hangers shall be supplied and installed. The high hose hanger shall be an overhead retractor assembly Red Jacket model number 884-034-5 or approved equal in accordance with B6.

E3.7 The fire suppression equipment to be installed is a minimum of two fire extinguishers rated for 2A40BC located inside locked and vandal resistant break-glass front enclosures and with signage to indicate the location of the fire extinguisher from all angles. The cabinets shall be permanently affixed to the light standards with the top of the cabinet at 1500mm above the concrete slab. Turn over keys to the City.

E3.8 Two (2) Spill Containment Kits shall be provided. Acceptable material: Liquitrol Big ‘O’ Model #519/235-0870 or approved equal in accordance with B6.

E3.9 The completed Work and all components required to perform the Work shall comply with all the requirements of Manitoba Environment, Fire Code regulations and other regulations pertaining to fuel sites.

E3.10 All staff assigned to this Project must be experienced in the installation of fuel systems and equipment.

E3.11 All electrical work shall be performed by qualified electricians.

E4. CONCRETE

E4.1 A 250 mm reinforced concrete slab shall be placed over the fifteen (15) metre by nineteen – point-two (19.2) metre storage tank and fuelling area as illustrated on drawing # 207-004. The slab shall be graded in conformance with the drawing also.

E4.2 A 200 mm reinforced concrete drive-way shall be placed as shown on drawing # 207-004. The slab shall be graded in conformance with drawing # 207-004.

E4.3 Two new 200 mm reinforced concrete approaches shall be placed as shown on drawing # 207-004. The slab shall be graded in conformance with drawing # 207-004.

E4.4 The Contractor shall be responsible for obtaining all required approvals and permits Work and shall submit copies of documentation to the Contract Administrator for approval prior to the commencement of any Work.

E4.5 Civil Specifications

E4.5.1 Sub-Grade, Sub-Base and Base Course Construction

(a) Supply materials and carryout work as specified in CW3110-R10 as modified below and in accordance with the drawings.

(i) Sub-base material shall be crushed sub-base material 50 mm MAX.AGG. per TABLE CW3110.1

(ii) Base course material shall be material per TABLE CW3110.2

E4.5.2 Reinforced Concrete

(a) All concrete is to be constructed in accordance with section 5 and 6 of cw3310 and in accordance with the CSA A23.1, Alternative (1) for specifying concrete. The concrete mix shall be proportioned such as to yield concrete having the required strength and workability as follows:

(i) Class of Exposure: C-2

(ii) Minimum Specified Compressive Strength @ 28 days =32 MPa

(iii) Minimum Cementitious Content = 340 kg/m^3

(iv) Maximum Water/Cementitious Ratio = 0.45

(v) Slump = 50 ± 20 mm (for slip form paving) = 70 ± 20 mm (for hand placement)

(vi) Aggregate Size = 20 mm Nominal Air Content = 5.0% to 8.0 %

E4.5.3 The Contractor shall place reinforcing steel in accordance with Section 9 of CW 3310.

E5. SUPPLY AND INSTALLATION OF FUEL TANK MONITORING SYSTEM

E5.1 All tank compartments shall be equipped with a tank monitoring system designed to provide continuous inventory monitoring, leak detection on sumps and interstitial spaces, leak detection via monitoring wells adjacent to the fuel tanks, and periodic leak detection of the storage tank compartment in compliance with unmanned fuel site operation regulations.

E5.2 The tank monitoring system shall be the Veeder Root TLS 350 system with the following features:

E5.2.1 The system shall provide continuous monitoring of liquid (product and water) levels and product temperature in the storage tank.

E5.2.2 The system shall be capable of providing continuous statistical leak detection with the capability of meeting a monthly leak detection performance standard of 0.76 litres/hour with a 95% probability of detection and a 5% probability of a false alarm.

E5.2.3 The system shall be equipped with the required probes to accommodate monitoring of the tank and dispenser containment sumps and the interstitial space of the storage tank.

E5.2.4 The tank monitoring system must be capable of interfacing with the fuel management system described in Section E12.

E5.2.5 The tank monitoring system shall be provided with visual and audible alarms of all system conditions that may be an indication of leakage or equipment malfunction.

E5.2.6 The tank monitoring system shall include a remote display with the ability to display inventory information, delivery data, leak test data, equipment status and alarm history.

E5.2.7 The system shall be capable of generating reports in a screen display or print format.

E5.3 Leak Detection System:

E5.3.1 Leak detection systems shall be provided at the tank and dispenser containment systems and tank interstitial space in conformance with the CCME Code. All leak detection systems on containment sumps and interstitial spaces shall be provided with interlocks to the in-tank monitoring system. A manual leak detector shall be provided for each turbine pump.

E5.3.2 Four (4) monitoring wells shall be installed within the tank nest incorporating the normal monitoring features of 100 mm piezometers within the tank nest backfill (i.e. pea gravel).

(a) Piezometer screen tubing to be 100mm diameter PVC pipe with 0.5mm slots on 6.35mm centers cut into the pipe on the four quadrants. Acceptable material: EBW model 773-200-02 or approved equal in accordance with B6. Extend the upper end up to 50 to 100 mm below grade as required with PVC Schedule 40 solid wall piping. Screened section to be covered with geosock to prevent infiltration of fine-grained particles.

(b) Piezometer top to be plugged with liquid tight compression seal of Buna-N elastomer that is expanded to meet the screen tubing ID by compression. The body of the plug is to be moulded in yellow plastic with the words “CAUTION DO NOT FILL – MONITORING WELL” moulded into the plug top as raised letters with black faces. The capscrew of the compression mechanism is to corrosion resistant plated construction and captive to the plug body. The nut and locking mechanism are to be plated metal construction for corrosion resistance, and secure the locking nut to prevent unauthorized removal of the plug when locked. Acceptable material: EBW Model 772-102-01 or approved equal in accordance with B6.

E5.3.3 Each monitoring well shall be equipped with a vapour sensor compatible with and connected to the leak detection system. Acceptable material: Veederoot Series 7943 Vapor Sensor.

E5.3.4 The tank leak detection monitoring well access manhole with frame and lid is to be a minimum of 400 mm inside diameter, with octagonal walls to permit perpendicular conduit connections, integrally moulded floor, integral lid channel with gasket groove, and be constructed of polyethylene plastic. The lid shall be bolt-down 20mm thick composite lid with Buna-N gasket and three 10mm (3/8”) stainless steel bolts. The lid shall be embossed with a triangular symbol and the words “DO NOT FILL – TEST WELL” Acceptable material: EBW Model 818-402-01 or approved equal in accordance with B6.

E5.3.5 The tank leak detection monitoring well access manhole requires flexible entry boots to seal the riser from the tank and the conduit penetration. These products shall be ordered to suit the 100mm riser pipe. Acceptable material: EBW Model 275-400-XX Flexible entry boots or approved equal in accordance with B6.

E6. SUPPLY AND INSTALL FUEL ISLANDS

E6.1 A 1.52 m wide x 1.83 m long x 0.30 m high metal form reinforced concrete dispenser island shall be installed at each dispenser location.

E6.2 A 20.32 cm U shaped schedule 40 pipe bollard shall be installed at each end of all dispenser islands.

E6.3 The Contractor shall be responsible for obtaining all required approvals and permits Work and shall submit copies of documentation to the Contract Administrator for approval prior to the commencement of any Work.

E7. LIGHTING

E7.1 Two (2) 320 MH Pulse Start bulb luminaires complete with housing and bulbs mounted on one (1) 7.5 meter high pole with a 2 sided cross-arm are to be installed between each pair of dispensers. The cross-arms to be orientated perpendicular to a line connecting the dispensers. The luminaires are to be, controlled by photocell (on) and photocell(off).

E7.2 The luminaire shall either meet the Illumination Engineering Society of North America's (IESNA) full cut-off classification or be approved by the International Dark Sky Association with a Fixture Seal of Approval.

E8. SITE KIOSK

E8.1 Contractor to provide a 3.05m x 3.05m wood frame, metal clad building to house the control equipment for the fuel site as follows:

E8.1.1 Structure to be bolted to the foundation.

E8.1.2 Supply and install 150mm reinforced concrete pad for building.

E8.2 Roof:

E8.2.1 2' x 6' roof joists @ o/c. and sheathed with 7/16 OSB

E8.2.2 Interior to be insulated with R-20 batt insulation, vapour barrier, sheathed with ½ K-3 board and clad with 0.76mm steel cladding, colour to be selected by the City from available standard colours.

E8.3 Walls:

E8.3.1 2" x 4" wood studs @ 16" o/c. and sheathed on the exterior with 7/16 OCB.

E8.3.2 Interior to be insulated with batt insulation, vapour barrier, sheathed with K-3 board and clad with 0.91mm steel cladding, colour to be selected by the City from available standard colours.

E8.4 Floor:

E8.4.1 2" x 6" wood studs @ 16" o/c. Underside of floor to be sheathed with ½ PWF plywood.

E8.4.2 Floor space to be insulated with batt insulation, vapour barrier, and sheathed with 4' x 8' x 5/8" plywood.

E8.5 Finishes:

E8.5.1 Exterior to have metal siding installed on walls and roof c/w all necessary trims.

E8.5.2 Painting of interior walls:

E8.5.3 Supply and installation of VCT floor tile c/w 4" rubber base

E8.5.4 Supply and installation of 2' x 6" x 8' steel door and knock down frame c/w all hardware and weather stripping (metal insulated).

E8.5.5 Painting of door and frame.

E8.5.6 Clean up job site.

E8.5.7 Shelf: Install one 18” x 60” shelf.

E8.6 Kiosk to include the following:

E8.6.1 Thermostatically controlled 1500 watt base board heater.

E8.6.2 Thermostatically controlled 5000 BTU wall mounted Air Conditioner

E8.6.3 Double tube 48” fluorescent light fixture.

E8.6.4 200 amp service panel.

E8.6.5 Duplex outlet locations to be determined during construction.

E8.6.6 Kiosk to be located as shown on Drawing #207-004

E9. DISMANTLE, TRANSPORT, AND INSTALL STAND-BY GENERATOR ANDASSOCIATED INFRASTRUCTURE

E9.1 A CumminsPower Generation DG- series commercial generator set model DGGD-5661144 supplied by the City of Winnipeg shall be installed adjacent to the kiosk and will be capable of providing power to meet all requirements of the fuel facility including communications and lighting.

E9.2 All associated electrical infrastructure for the generator, including the surge protection unit as provided by the City of Winnipeg shall be installed in tandem with the stand-by generator according to manufacturers’ Specifications.

E9.3 The generator and surge protection unit is currently installed at a de-commissioned City of Winnipeg Fuel site (770 Tecumseh Street) and shall be dismantled and transported to its new location at 552 Plinguet by the Contractor.

E9.4 Commercial grade 8’ chain link fence to be installed around the generator set in line with the site kiosk as shown on drawing 207-004. The fence is to be complete with white plastic privacy strips and two (2) 0.914 metre gates, and allow access to all generator components.

E9.5 Generator set to be bolted to a 150mm thick concrete pad.

E10. NETWORK COMMUNICATIONS

E10.1 The Contractor shall install fibre optic network communication lines connecting the fuel site kiosk to an existing connection at 598 Plinguet Street according to the following specifications:

E10.1.1 The Contractor shall notify the Contract Administrator 48 hours prior to any work associated with the fibre optic installation.

E10.1.2 The fibre optic installation pathway shall be in accordance with the approximate pathway illustrated in the Proposed Network Connection drawing #0001. The Contractor may propose an alternative installation pathway to that illustrated, subject to approval from the Contract Administrator.

E10.1.3 The fibre optic network switch panel location is near the north corner of 598 Plinguet Street, via an entrance door on the north east face of the building.

E10.1.4 The Contractor shall conform to all applicable building codes when penetrating the building envelope for the installation of conduit to the network panel. The Contractor shall submit a plan to the Contract Administrator detailing how the building will be penetrated in conformance to applicable building codes prior to commencing this Work.

E10.1.5 The Contractor shall utilize outdoor conduit mounted on the wall of 598 Plinguet Street to connect the communication line to the network switch panel location.

E10.1.6 The communication line shall run underground in HDPE conduit to the South-Western corner of the 598 Plinguet building (Wastewater Services building).

E10.1.7 The Contractor shall cut and cover the existing asphalt roadway or directionally bore underneath the roadway in order to complete the underground connection, subject to the approval of the Contract Administrator.

E10.1.8 Installations will conform to current EIA/TIA standards as well as BICSI Telecommunications Distribution Methods Manual.

E10.1.9 The following criteria shall apply for the fibre optic communication line installation:

(a) The Contractor or Sub-Contractor shall be an experienced fibre optic installer;

(b) The connection shall employ 62.5/125micron core/cladding, multimode, graded index glass fibre. All materials in the cable shall be dielectric.

(c) The cable shall contain a minimum of 12 fibre strands in an outdoor rated gel-filled buffer tube cable;

(d) The 12 strands of fibre optic cable shall be terminated at both ends with ST connectors mounted in a connector panel;

(e) Outdoor in-ground conduit shall be outdoor-rated HDPE;

(f) Cable shall be buried to a minimum depth of 1 metre;

(g) The minimum band radius of the fibre optic cable shall be 10 x outside cable diameter;

(h) The Contractor shall provide Bi-Directional OTDR test results upon installation providing the length and attenuation for each strand of fibre.

(i) Attenuation of any splice or termination shall not exceed 0.75 dB. Total attenuation of any individual strand of fiber shall not exceed 2.0 dB at 850nm, 1.0 dB at 1300nm (excluding end connectors).

E10.1.10 At each end of the cable, a sufficient service coil shall be left to facilitate relocation of the fiber cable. At the 598 Plinguet end this service coil shall be 10 meters. At the fuel kiosk end this service coil shall be 5 meters.

E11. FUEL SITE ELECTRICAL CONNECTION

E11.1 An electrical connection to the fuel site kiosk shall be installed by MB Hydro as a separate contract.

E11.2 The Contractor shall be responsible for coordinating with Manitoba Hydro prior to commencement of any Work and during construction to ensure proper electrical installation is achieved according to the requirements defined by of Manitoba Hydro, to be verified by the Contract Administrator.

E12. FULLY AUTOMATED FUEL MANAGEMENT SYSTEM

E12.1 A fully automated fuel management system shall be supplied by the Contract Administrator and installation, and integration & commissioning of the fuel management system shall be provided by the Contractor.

E12.2 The Fuel Management System to be installed is Computrol Fuel Systems Inc. Model C6000.

E13. SYNCHRONIZATION WITH TOTAL FUEL DISTRIBUTION SYSTEM

E13.1 Synchronization with total fuel distribution system, current IT equipment, technology and architecture will ensure:

E13.1.1 All components for the fuel distribution system will be synchronized, including synchronization between fuel dispensers, fuel tanks, fuel tank monitoring system and the fully automated fuel management system.

E13.1.2 All components supplied and installed will be synchronized with Winnipeg Fleet Management Agency's Information Technology Environment.

E14. SUPPLY AND INSTALL AND OTHER COMPONENTS REQUIRED TO HAVE AN OPERATIONAL FUEL SITE

E14.1 All parts not specifically mentioned but which are required to complete and place the fuel site into successful operation shall be furnished as though specifically mentioned in this proposal.

E15. SITE LANDSCAPING

E15.1 The area designated as LANDSCAPE on drawing 207-004 shall be graded in conformance with the drawing and landscaped according to E15.3.

E15.2 The Contractor shall landscape all areas of previous established vegetation cover not specifically mentioned here, but which are disturbed as a result of construction activities, including adjacent to approaches, driveway areas and above the aqueduct.

E15.3 Landscaped areas shall receive topsoil and seed in conformance with CW3540 – Topsoil and Finish Grading for Establishment of Turf Areas and section E16 – Operating Constraints for Work in Close Proximity to the Branch I Aqueduct, to be verified by the Contract Administrator.

E15.4 Trees designated for removal on the Site Plan drawing 207-004 shall be removed by the Contractor.

E16. OPERATING CONSTRAINTS FOR WORK IN CLOSE PROXIMITY TO THE BRANCH I AQUEDUCT

E16.1 Description

E16.1.1 This Section details operating constraints for all work to be carried out in close proximity to Branch I Aqueduct. Close proximity shall be deemed to be any construction activity within a 5 m offset from the centreline of the Aqueduct.

E16.2 General Considerations for Work in Close Proximity to Branch 1 Aqueduct

E16.2.1 The Branch I Aqueduct is a critical component of the City of Winnipeg Regional Water Supply System and work in close proximity to the pipeline shall be undertaken with an abundance of caution. The pipe cannot be taken out of service to facilitate construction and inadvertent damage caused to the pipe would likely have catastrophic consequences.

Work around the Aqueduct shall be planned and implemented to minimize the time period that work is carried out in close proximity to the pipe and to ensure that the pipeline is not subjected to excessive construction related loads, including excessive vibrations and/or concentrated or asymmetrical lateral loads during backfill placement.

E16.2.2 The Branch I Aqueduct was constructed between 1917 and 1919 from 1676 mm precast reinforced concrete pipe pressure pipe. The pipeline has crimped copper water stop joints which can manifest themselves as leaks if subjected to excessive vibration.

Large diameter pressure pipe generally has limited ability to withstand increased earth and live loading. Therefore, every precaution must be undertaken to ensure that applied loading during all phases of construction is within accepted loading parameters.

Loading limitations and calculated loads associated with typical construction equipment are attached to this specification as drawing #0002 for illustrative purposes. The loading calculations shall be interpreted with caution, however, as many factors can cause applied loads to increase considerably, such as unbalanced loading, variations in wheel base or track width, payload, impact factors due to excessive speed or vibration, etc.

E16.3 Submittals

E16.3.1 Submit proposed construction equipment specifications to the Contract Administrator for review seven (7) days prior to construction. The submissions need to include sufficient data on operational weights, dimensions, and payloads to facilitate assessment that the proposed construction equipment is not in excess of the typical construction loading that this assessment was based on. Submittal shall include:

(a) Equipment operating weight and dimensions including wheel or track base, track length or axle spacing, track widths or wheel configurations

(b) Payload weights

(c) Load distributions in the intended operating configuration

E16.3.2 Submit a construction method statement with proposed construction plan including haul routes, excavation equipment locations, loading positioning and base construction sequencing, to the Contract Administrator for review seven (7) days prior to construction. Do not commence construction until the construction method statement has been reviewed and accepted by the Contract Administrator.

E16.4 Protection of the Branch 1 Aqueduct During Construction

E16.4.1 The Branch I Aqueduct runs directly through the construction site from the air release chamber at the east side of the site to the corner of McTavish and Plinguet Street

E16.4.2 The Contractor carrying out repair work or working in close proximity to Branch I Aqueduct shall meet the following conditions and technical requirements:

(a) Pre-Work, Planning and General Execution

(i) No work shall commence at the site until the equipment specifications and construction method statement have been submitted and accepted, and feedermain locations have been clearly delineated in the field. Work over feedermains shall only be carried out with equipment that has been reviewed and quantified in terms of its loading implications on the pipe. All proposed construction equipment must be submitted to Contract Administrator for review prior to construction. Work in areas in close proximity to Branch I Aqueduct shall only be carried out with equipment that has been reviewed and quantified in terms of its loading implications by the Contract Administrator.

(ii) Notify the Contract Administrator well in advance of construction to coordinate required service interruptions.

(iii) Where work is in close proximity to the Branch I Aqueduct, utilize construction practices and procedures that do not impart excessive vibration loads on the pipeline or that would cause settlement of the subgrade below the pipeline.

(iv) Crossing the Aqueduct is prohibited in the time period from removal of existing roadway structure until the completion of granular base construction. At all times prior to completion of final paving; reduce equipment speeds to levels that minimize the effects of impact loading to the pipe.

(v) For construction work activities either longitudinally or transverse to the alignment of the Aqueduct, work only with equipment and in the manner stipulated in the accepted Construction Method Statement and the supplemental requirements noted herein.

(vi) The Aqueduct elevation relative to the proposed roadway shall be adequately verified. Deviations from the elevations noted herein shall be reported to Contract Administrator for review prior to construction of the subgrade. Confirmation of the pipeline elevation at the air release chamber at Station 277+08.31 (east side of site) will be considered adequate.

(vii) Construction operations should be staged in such a manner as to limit multiple construction loads at one time, (e.g. offset crossings sufficiently from each other, rollers should remain a sufficient distance behind spreaders to limit loads. A reasonable offset distance is 3m between loads).

(viii) The Contractor shall fully acquaint himself with all conditions and work constraints and formally brief all site supervisory personnel and equipment

operators to ensure that they are fully cognizant of the associated restrictions, constraints, and risks associated with working adjacent to and over this pipeline. New personnel introduced after commencement of the project need to be formally orientated as to the significance and constraints associated with working over the Branch I Aqueduct.

(b) Demolition and Excavation

(i) Use of pneumatic concrete breakers within 5 metres of the Branch I Aqueduct is prohibited. Pavement shall be full depth sawcut and carefully removed. Use of hand held jackhammers for pavement removal will be allowed.

(ii) Where there is less than 1.6 metres of earth cover over the Aqueduct and further excavation is required either adjacent to or over the feedermain, utilize only smooth edged excavation buckets, soft excavation or hand excavation techniques. Where there is less than 1 metre of cover over the Aqueduct, carefully expose the pipe by hand excavation to delineate the location and depth of the main, and provide full time supervision of the excavation.

(iii) Offset backhoe or excavation equipment from the Aqueduct a minimum of 3 m from centerline, to carry out excavations.

(iv) Equipment should not be allowed to operate while positioned directly over the Aqueduct.

(v) If Aqueduct inspection is required, expose the top 1/3 of the Aqueduct by hand excavation, for a minimum length of 1 metre, to allow City to inspect condition of the pipe. Notify City a minimum of 24 hours in advance of exposure, and allow a minimum of 2 hours for City to complete inspection works. Backfill test excavation with bedding sand upon completion.

(c) Subgrade Construction

(i) Subgrade compaction shall be prohibited within 3 metres of the Aqueduct. Subgrade compaction within 5 metres of the Aqueduct shall be limited to non vibratory methods only.

(ii) Subgrade, sub-base and base course construction shall be kept in a rut free condition at all times. Construction equipment is prohibited from crossing the Aqueduct if the grade is insufficient to support the equipment without rutting.

(iii) Subgrade conditions should be inspected by personnel with competent geotechnical experience (i.e. ability to adequately visually classify soils and competency of subgrade, subbase, and base course materials). In the event of encountering unsuitable subgrade materials above the Aqueduct, proposed design revisions shall be submitted to the contract Administrator for review to obtain approval from the Contract Administrator relative to any change in conditions.

(iv) Construction operations shall be staged to minimize the time period between excavation to subgrade and placement of granular subbase materials. Should bare subgrade be left overnight, measures shall be implemented to protect the subgrade against inadvertent travel over it and to minimize the impact of wet weather.

(d) Subbase and Base Course Construction

(i) Granular material, construction material, soil or other material shall not be stockpiled on the Aqueduct or within 5 metres of the pipe centerline.

(ii) Subbase or base course materials shall not be dumped directly on the Aqueduct but shall be stockpiled outside of close proximity to the Aqueduct and shall be carefully bladed in-place.

(iii) Subbase compaction within 5 metres of the centreline of the Aqueduct shall be either carried out by static methods (without vibration) or with smaller approved equipment such as hand held plate packers or smaller roller equipment.

E17. GEOMEMBRANE

E17.1 The fuel tank nest shall be enveloped on all sides and underneath with a petroleum-resistant geomembrane according to the specifications herein.

E17.2 The Contractor shall minimize the total excavation area requiring geomembrane installation while adhering to all requirements herein.

E17.3 The geomembrane shall be lined with a geotextile.

E17.4 The geomembrane shall be covered with a layer of backfill where the fuel tanks are to be anchored.

E17.5 References

E17.5.1 ASTM D751 – Standard Test Method for Coated Fabrics

E17.5.2 ASTM D 2136 - Standard Test Method for Coated Fabrics-Low-Temperature Bend Test

E17.5.3 ASTM D4437 - Standard Practice for Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes

E17.5.4 ASTM D4759 – Standard Practice for Determining the Specification Conformance of Geosynthetics

E17.5.5 ASTM 5199 - Standard Test Method for Measuring the Nominal Thickness of Geosynthetics

E17.5.6 ASTM D5641 – Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber

E17.5.7 ASTM D6497 - Standard Guide for Mechanical Attachment of Geomembrane to Penetrations or Structures.

E17.5.8 ASTM 6693 - Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes

E17.5.9 ULC/ORD-C58.9 (1997) – Secondary Containment of Liners for Underground and Aboveground Flammable and Combustible Liquid Tanks.

E17.6 Performance Requirements:

E17.6.1 Contain the following chemicals: ultra-low sulphur diesel fuel, bio-diesel fuel (B50 blend), marked diesel fuel, unleaded gasoline, E-85 fuel, and marked gasoline.

E17.6.2 Remain flexible throughout service life.

E17.6.3 Should meet the ULC ORD-C58.9 (1997) Class 1B requirement for Secondary Containment of Liners for Underground and Aboveground Flammable and Combustible Liquid Tanks.

E17.7 Submittals:

E17.7.1 Product Data:

(a) Provide specification sheets for geomembrane

(b) Provide mill test reports for geomembrane roll stock used to make liner

(c) Provide shop test reports for each fabricated panel produced

(d) Provide field test reports for all welds completed in the field

E17.8 Quality Assurance

E17.8.1 Fabricator to be ISO 9001 registered or follow ISO 9001 compliant procedures.

E17.8.2 Installer to follow documented installation plan and work procedures.

E17.9 Warranty

E17.9.1 Provide a manufacturer's pro-rated backfilled weathering warranty for HAZGARD 1000 for Ten (10) years

E17.10 Materials

E17.10.1 Geomembrane:

(a) Geomembrane material: HAZGARD 1000

(b) Minimum Thickness (ASTM D 5199): 0.68 mm.

(c) Minimum Tensile Properties (ASTM D751): Machine direction and perpendicular to machine direction average values on the basis of five (5) test specimens each direction:
Break Strength : 775 x 1555 N.
Break Elongation: 800%.

E17.10.2 Minimum Tear Resistance (ASTM D751): 667 N.

E17.10.3 Minimum Puncture Resistance (ASTM D751 Mod, Screwdriver Tip): 400 N.

E17.10.4 Adhesion (ASTM D751): 3.1 kN/m

E17.10.5 Hydrostatic Resistance (ASTM D751): 3400 kPa

E17.10.6 Low Temperature (D2136): -43 °C

E17.10.7 Shop Seam Properties (ASTM D6693):
Shear Strength: 17.5 kN/m.
Peel Strength: 2.6 kN/m.

E17.10.8 Field Seam Properties (ASTM D6693):
Shear Strength: 14 kN/m.
Peel Strength: 2.6 kN/m.

E17.11 Fabricator

E17.11.1 Layfield Geosynthetics and Industrial Fabrics Ltd., or; Layfield Plastics Inc. or;
An approved fabricator of Layfield products.

E17.12 Fabrication

E17.12.1 Set Up

(a) Carefully transfer rolls of geomembrane from storage to unwinding rack.

(b) The floor or table must be clean, dry, and free of foreign objects that could damage the liner.

(c) Pull panels to specified length, after double-checking dimensions on the work order.

(d) Ensure seaming equipment is in good repair and functioning properly. Ensure equipment is adjusted to the material.

(e) Follow documented welding procedures.

(f) Qualification Seam

(i) A qualification seam will be run prior to any fabrication.

(ii) The qualification seam must be run using the same material and equipment that will be used for fabrication.

(iii) Machine conditions and operator used for fabrication must be the same as those used for the qualification weld.

(iv) Qualification seam must be tested in shear and peel and meet the specified requirements for the material as stated in the materials section.

(v) A qualification seam must be rerun whenever the operator is changed, the equipment adjusted, shift changed, or if the equipment is idle for more than 2 hours.

(g) Fabrication Seams

(i) Fabrication seams must meet the specified requirements in peel and shear for the material.

(ii) Fabrication seams will be destructively tested in shear and peel according to ASTM D6392.

(iii) Test one specimen each in peel and shear on the first and last welded panel, and,

(iv) Test one specimen each in peel and shear for every 300 lineal meters of welding

(v) A record of the seam test results is maintained on the Shop QC report.

(vi) The seaming process must be constantly supervised by the equipment operator. 100 % of the fabrication seams must be visually inspected during seaming.

(h) Protection from Damage

(i) Protect completed panels from damage

(ii) Handle carefully to avoid damaging the liner

(i) Packaging

(i) Each panel will be accordion folded in one direction, and rolled or folded in the other direction.

(ii) Wrap completed panels in a weather resistant, opaque cover material.

(iii) Hold wrapper securely in place using UV resistant tape or other secure method.

(iv) Label the packaged liner to clearly show, material type, dimensions, stock code, sales order number, QC number, panel number and unfolding and deployment directions.

E17.13 Delivery Storage and Protection

E17.13.1 Shipping

(a) Completed panels will be placed on clean, serviceable pallets, free from exposed nails or other obstructions.

(b) A layer of geomembrane, geotextile, or wood will be placed on all pallets to protect the panel from damage.

(c) Secure panels to the pallet using metal or plastic bands. Use a layer of geomembrane between the packaged liner and the band to prevent damage to the liner as the band is tightened.

(d) The packaged liner must not extend beyond the outer edges of the pallet. Use larger pallets or a layer of plywood to extend the pallet edges to match the liner.

(e) Carefully handle and place on the truck to avoid damage to the liner.

(f) Do not stack panels.

E17.13.2 Delivery

(a) All panels will be inspected for damage on delivery.

(b) Use suitable unloading equipment to handle panels. Do not drag, slide, or drop panels during unloading.

(c) Place panels in a prepared area away from soft ground, standing water, or other deleterious surfaces.

(d) Replace any pallets that may become damaged during shipping or handling.

(e) Store liner panels in a secure area protected from extremes of heat or cold.

(f) Protect panels from damage prior to use.

E17.14 Accessories

E17.14.1 Preformed Pipe Boots will be formed in the field from the same formulation as the geomembrane.

E17.15 Installer

E17.15.1 Layfield Environmental Systems or An installer approved by Layfield.

E17.16 Preparation

E17.16.1 Ensure subgrade is compacted and surface finished to not impair installed membrane.

E17.16.2 Subgrade to provide firm, unyielding surface with no sharp changes or abrupt breaks in grade. A smooth drum rolled surface is preferable.

E17.16.3 Ensure surfaces to be lined are smooth, free of foreign and organic material, sharp objects, or debris of any kind.

E17.16.4 If a suitable sub-grade is not available then a cushion layer of 100mm of clean sand or LP8 non woven geotextile shall be placed prior to liner placement.

E17.16.5 Excavate anchor trench to line, grade, and width indicated on drawings, prior to liner placement. Provide slightly rounded corners in the trench to avoid sharp bends in the geomembrane.

E17.16.6 Prepare mechanical attachments according to ASTM D6497 Standard Guide for Mechanical Attachment of Geomembrane to Penetrations or Structures.

E17.16.7 All concrete surfaces to which the liner will attach shall have “smooth trowel” finish. All the corners should have radius to a minimum 25mm (1 inch) as per the drawing.

E17.16.8 Compaction at pipe penetrations and areas of mechanical attachment will be inspected carefully as these are areas where differential settlement can occur.

E17.16.9 A certificate of subgrade acceptance will be prepared by the liner installation contractor prior to liner installation.

E17.17 Installation

E17.17.1 Installation of the geomembrane shall be performed in a logical sequence.

E17.17.2 Place panels according to the drawings, the panel layout, and the label on each panel.

E17.17.3 Sufficient thermal slack shall be incorporated during placement to ensure that harmful stresses do not occur in service.

E17.17.4 Weather Conditions at Time of Installation:

(a) Site welding may proceed at any temperature providing a suitable qualification weld can be prepared at site conditions using the operator, equipment, and materials intended for the project.

(b) Installation of membrane in winds above <20 km/h> <<12 mph>> can proceed only if the installer can demonstrate that the liner will not be at risk of damage.

(c) Do not install membrane during precipitation or in the presence of excessive moisture.

(d) Do not install in weather conditions that may be detrimental to the function of the membrane.

E17.17.5 Ensure personnel working on geomembrane do not use damaging footwear.

E17.17.6 Protect completed panels from damage; handle carefully to avoid damaging the liner.

E17.17.7 Equipment and methods used to unroll liner panels should not damage the prepared subgrade.

E17.17.8 Ballast used to prevent uplift by wind must not damage the geomembrane. A continuous load is recommended along the edges of panels to eliminate the risk of wind uplift.

E17.17.9 Qualification Seams

(a) A qualification seam will be run prior to any field seams.

(b) A qualification seam is made with separate pieces of geomembrane using the same material and equipment that will be used for production welding.

(c) Machine conditions, and operator used for welding must be the same as those used for the qualification weld.

(d) Qualification seam must be tested in shear and peel, and meet the specified requirements for the material as stated in the materials section.

(e) A qualification seam must be rerun whenever the operator is changed, the equipment adjusted, or at least every 4 hours.

E17.17.10 Field Seams

(a) Field seams will be sampled for testing in a way that does not compromise the installed liner

(b) One sample to be tested for every 150m of field seam

(c) Test samples are to be removed from the ends of seams, from the anchor trench, or other location that does not introduce a defect into the liner.

(d) Samples to be approximately 100 mm long to permit testing of one shear and two peel specimens (ASTM D6392).

(e) Test samples immediately after seaming

(f) Record date, location and pass/fail description

(g) Field seams must meet the specified requirements in peel and shear for the material.

(h) A written record will be maintained for all field seam tests.

(i) All completed field seams will be 100% non-destructively tested using an air lance test (ASTM D4437 method 7.2).

E17.18 Tolerances

E17.18.1 Seam Tests:

(a) Follow the procedure in ASTM D6392

(b) Test three specimens per sampling point, one in shear and two in peel.

(i) All specimens to meet seam strength requirements

(c) Procedures for Destructive Test Failure:

(i) Cut out seam and re-weld; or,

(ii) Retrace welding path to 3 m from location of failed test. Take sample for additional test. If passed - cap strip or extrusion weld between failed location and original failed location.

E17.19 Repair

E17.19.1 Inspect seams and non-seam areas for defects, holes, blisters, undispersed raw materials.

E17.19.2 Identify any sign of foreign matter contamination.

E17.19.3 Repair all through-thickness defects.

E17.19.4 Defective Seams: Cap strip or replace.

E17.19.5 Small Holes: Repair by extrusion welding using a bead of extruded material over hole. Patch if hole is larger than 6 mm.

E17.19.6 Tears: Patch and seal round sharp ends of tears on slope or stressed area prior to patching.

E17.19.7 Repair blisters, large cuts and undispersed raw materials with patch.

E17.19.8 Secure Patches by Extrusion Welding or Hot Air Welding:

E17.19.9 Hot Air Welding

(a) Hand hot air welding is permitted for patching HAZGARD 1000.

(b) Clean area to be patched.

(c) Hand weld the patch with a hot air gun and suitable roller.

E17.19.10 Extrusion Welding.

(a) Clean area to be patched.

(b) Tack patch in place with hot air welding or with double sided tape.

(c) Prepare patch area by roughening with a wire brush.

(d) Extrude all the way around patch.

(e) Patches: Round or oval, of same geomembrane. Extend minimum 75 mm beyond the edge of the defect.

E17.19.11 Verification of Repairs: All repairs to be non-destructively tested using

(a) Air Lance Test, ASTM D4437 Method 7.2

(b) Vacuum Box Test ASTM D5641

E17.19.12 Redo failed repairs and re-test.

(a) Keep records of all repairs and the results of repair testing.

E17.20 Cleaning

(a) Cleaning solvents shall not be used unless product is approved by membrane manufacturer.

(b) Use water and rags for all cleaning. If soap is used for cleaning rinse with clean water and dry before welding.

E17.21 Protection of Finished Work

(a) Protect finished Work from damage. See instructions on backfilling if applicable.