



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY 327-2008

**CONSTRUCTION OF A NEW FUELING FACILITY
DISTRICT 6 PUBLIC WORKS YARD, 1539 WAVERLEY ST.**

TABLE OF CONTENTS

PART A - BID SUBMISSION

Form A: Bid	1
Form B: Prices	4
Form G1: Bid Bond and Agreement to Bond	5
Form G2: Irrevocable Standby Letter of Credit and Undertaking	7

PART B - BIDDING PROCEDURES

B1. Contract Title	1
B2. Submission Deadline	1
B3. Site Investigation	1
B4. Enquiries	1
B5. Addenda	1
B6. Substitutes	2
B7. Bid Components	3
B8. Bid	3
B9. Prices	4
B10. Qualification	4
B11. Bid Security	5
B12. Opening of Bids and Release of Information	6
B13. Irrevocable Bid	6
B14. Withdrawal of Bids	6
B15. Evaluation of Bids	7
B16. Award of Contract	7

PART C - GENERAL CONDITIONS

C0. General Conditions	1
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PART D - SUPPLEMENTAL CONDITIONS

General

D1. General Conditions	1
D2. Scope of Work	1
D3. Contract Administrator	1
D4. Contractor's Supervisor	1
D5. Notices	1
D6. Furnishing of Documents	2

Submissions

D7. Authority to Carry on Business	2
D8. Safe Work Plan	2
D9. Insurance	2
D10. Performance Security	3
D11. Detailed Prices	3
D12. Subcontractor List	3

Schedule of Work

D13. Commencement	4
D14. Substantial Performance	4
D15. Total Performance	4
D16. Liquidated Damages	5

Control of Work

D17. Job Meetings	5
D18. Prime Contractor – The Workplace Safety and Health Act (Manitoba)	5

Measurement and Payment

D19. Payment	5
--------------	---

Warranty

D20. Warranty	5
Form H1: Performance Bond	6
Form H2: Irrevocable Standby Letter of Credit	8
Form I: Detailed Prices	10
Form J: Subcontractor List	11

PART E - SPECIFICATIONS

E1. Applicable Specifications and Drawings	1
E2. Work Specifications	1

PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

- B1.1 CONSTRUCTION OF A NEW FUELING FACILITY
- B1.2 DISTRICT 6 PUBLIC WORKS YARD, 1539 WAVERLEY ST.

B2. SUBMISSION DEADLINE

- B2.1 The Submission Deadline is 12:00 noon Winnipeg time, May 22, 2008.
- B2.2 Bids determined by the Manager of Materials to have been received later than the Submission Deadline will not be accepted and will be returned upon request.
- B2.3 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. SITE INVESTIGATION

- B3.1 Further to C3.1, the Bidder may view the Site without making an appointment.

B4. ENQUIRIES

- B4.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.
- B4.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.
- B4.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator to all Bidders by issuing an addendum.
- B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.
- B4.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.

B5. ADDENDA

- B5.1 The Contract Administrator may, at any time prior to the Submission Deadline, issue addenda correcting errors, discrepancies or omissions in the Bid Opportunity, or clarifying the meaning or intent of any provision therein.
- B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
 - B5.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management 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 regularly and shortly before the Submission Deadline, as may be amended by addendum.

B5.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 0 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 in accordance with B6 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 in accordance with B6, 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 in accordance with B6" 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 in accordance with B6", any Bidder may use the approved equal in accordance with B6 in place of the specified item.

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

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

B7. BID COMPONENTS

- B7.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices;
 - (c) Form G1: Bid Bond and Agreement to Bond, or Form G2: Irrevocable Standby Letter of Credit and Undertaking, or a certified cheque or draft;
- B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.
- B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.
- B7.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.
- B7.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.
- B7.5 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.
- B7.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, may result in the Bid being determined to be non-responsive.
- B7.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B7.8 Bids shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management 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 0 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 should 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 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.

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 Branch internet site at <http://www.winnipeg.ca/matmgt>).
- 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 three (3) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the

Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

- (a) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association or by the Manitoba Heavy Construction Association's Safety, Health and Environment Program; or
- (b) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt.>)

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

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

B11. BID SECURITY

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

- (a) a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond); or
- (b) an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Bid Price, and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form included in the Bid Submission (Form G2: Irrevocable Standby Letter of Credit and Undertaking); or
- (c) a certified cheque or draft payable to "The City of Winnipeg", in the amount of at least fifty percent (50%) of the Total Bid Price, drawn on a bank or other financial institution registered to conduct business in Manitoba.

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

B11.1.2 All signatures on bid securities shall be original, and shall be witnessed or sealed as required.

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

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

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

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

B12. OPENING OF BIDS AND RELEASE OF INFORMATION

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

B12.1.1 Bidders or their representatives may attend.

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

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

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

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

B13. IRREVOCABLE BID

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

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

B14. WITHDRAWAL OF BIDS

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

B14.1.1 Notwithstanding C23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.

B14.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 0 of Form A: Bid, and only such person, has authority to give notice of withdrawal.

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

- (a) retain the Bid until after the Submission Deadline has elapsed;
- (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 0 of Form A: Bid; and
- (c) if the notice has been given by any one of the persons specified in B14.1.3(b), declare the Bid withdrawn.

B14.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B13.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative

Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B15. EVALUATION OF BIDS

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

- (a) compliance by the Bidder with the requirements of the Bid Opportunity (pass/fail);
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B10 (pass/fail);
- (c) Total Bid Price;
- (d) economic analysis of any approved alternative pursuant to B6.

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

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

B15.4 Further to B15.1(c), the Total Bid Price shall be the lump sum price shown on Form B: Prices.

If there is any discrepancy between the lump sum price written in figures and the lump sum price written in words, the price written in words shall take precedence.

B16. AWARD OF CONTRACT

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

B16.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.

B16.2.1 Without limiting the generality of B16.2, the City will have no obligation to award a Contract where:

- (a) the prices exceed the available City funds for the Work;
- (b) the prices are materially in excess of the prices received for similar work in the past;
- (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
- (d) only one Bid is received; or
- (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.

B16.3 Subject to B16.2, 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.

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

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for Construction* (Revision 2006 12 15) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.
- 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 construction of a new fueling 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.

D2.2 The new Winnipeg Fleet Management Agency fuel site is to be located at 1539 Waverly Street and shall be configured according to the proposed site plan attached with this bid opportunity.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is:

Ajaleigh Williams
Project Coordinator
770 Ross Avenue Winnipeg Manitoba R3E 1C6

Telephone No. (204) 986-7879

Facsimile No. (204) 986-2749

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 All notices of appeal to the Chief Administrative Officer shall be sent to the following address or facsimile number:

The City of Winnipeg
Chief Administrative Officer Secretariat
Attn: Chief Administrative Officer
Administration Building, 3rd Floor
510 Main Street

Winnipeg MB R3B 1B9
Facsimile No.: (204) 949-1174

- D5.4 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following address or facsimile number:

The City of Winnipeg
Corporate Services Department
Legal Services Division
Attn: City Solicitor
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1
Facsimile No.: (204) 947-9155

D6. FURNISHING OF DOCUMENTS

- D6.1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Bid Opportunity. If the Contractor requires additional sets of the Bid Opportunity, they will be supplied to him at cost.

SUBMISSIONS

D7. AUTHORITY TO CARRY ON BUSINESS

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

D8. SAFE WORK PLAN

- D8.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.
- D8.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

D9. INSURANCE

- D9.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, such liability policy to also contain a cross-liability clause, contractual liability, unlicensed motor vehicle liability (contractor's equipment cover), 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) an all risks Installation Floater carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation;
- D9.2 The Certificate of Insurance to expressly state: "Operations of the insured covers construction of a fuel site including underground fuel tanks as detailed in Bid Opportunity number 327-2008.
- D9.3 Deductibles shall be borne by the Contractor.
- D9.4 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4.1 for the return of the executed Contract.
- D9.5 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.

D10. PERFORMANCE SECURITY

- D10.1 The Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:
 - (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or
 - (b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or
 - (c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.
- D10.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.
- D10.2 If the bid security provided in his Bid was not a certified cheque or draft pursuant to B11.1(c), the Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D11. 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 the General Conditions 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 letter of intent 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:
 - (1) evidence of authority to carry on business specified in D7;
 - (2) evidence of the workers compensation coverage specified in C6.15;
 - (3) the Safe Work Plan specified in D8;
 - (4) evidence of the insurance specified in D9;
 - (5) the performance security specified in D10;
 - (6) the Detailed Prices specified in D11
 - (7) the Subcontractor list specified in D12;
 - (8) the Contractor has supplied a schedule of work which has been approved by the Contract Administrator.
 - (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 Contractor shall not commence the Work on the Site before the contract administrator provides approval.
- D13.4 The City intends to award this Contract by June 1, 2008.
- D13.4.1 If the actual date of award is later than the intended date, the dates specified for Critical Stages, 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 August 1, 2008.
- 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 re-inspected.
- 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 September 1, 2008.
- 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 re-inspected.
- 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 Total Performance in accordance with the Contract by the day fixed herein for Total Performance, the Contractor shall pay the City two thousand dollars (\$2,000) 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 monthly 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. PAYMENT

- D19.1 Further to C12, effective January 1, 2007 the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D20. WARRANTY

- D20.1 Notwithstanding C13.2, the warranty period shall begin on the date of Total Performance and shall expire two (2) years thereafter, except where longer warranty periods are specified in the respective Specification sections, unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for there-under.

FORM H1: PERFORMANCE BOND
(See D10)

KNOW ALL MEN BY THESE PRESENTS THAT

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

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

_____ dollars (\$_____)

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

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

_____ day of _____, 20____, for:

BID OPPORTUNITY NO. 327-2008

**CONSTRUCTION OF A NEW FUELING FACILITY
DISTRICT 6 PUBLIC WORKS YARD, 1539 WAVERLEY ST.**

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

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

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

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

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

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

_____ day of _____, 20____.

SIGNED AND SEALED
in the presence of:

(Witness)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

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

(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. **327-2008**

CONSTRUCTION OF A NEW FUELING FACILITY
DISTRICT 6 PUBLIC WORKS YARD, 1539 WAVERLEY ST.

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 I: DETAILED PRICES
(See D11)

CONSTRUCTION OF A NEW FUELING FACILITY

DISTRICT 6 PUBLIC WORKS YARD, 1539 WAVERLEY ST.

ITEM NO.	DESCRIPTION	SPEC. REF.	AMOUNT
1.	Gasoline & Diesel Pumps	E2.2 (z)	
2.	New Diesel and Gasoline Tanks	E2.2 (bb)	
3.	Piping	E2.2 (cc)	
4.	Fuel Tank Monitoring System	E2.2 (dd)	
5.	Standby Generator	E2.2 (ff) and E2.4.13	
6.	Concrete	E2.3 (a), (b), (c)	
7.	Site Kiosk	E2.3 (e)	
8.	Electrical	E2.4	

NOTE: ITEMS NO. 1-7 DO NOT INCLUDE ELECTRICAL COSTS. ALL ELECTRICAL COSTS ARE TO BE DENOTED IN ITEM 8.

PART E - SPECIFICATIONS

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 Branch internet site at <http://www.winnipeg.ca/matmgt>.
- 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:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
	Cover Sheet
01-M-0001	Mechanical Legend, Schedules and General Notes
01-M-0002	Mechanical Site Plan
01-M-0003	Mechanical Plan of Fueling Pad and Details
01-M-0004	Mechanical Sections
01-M-0005	Mechanical Sections and Details
01-M-0006	Mechanical Kiosk Plan, Section and Control Diagram
01-S-0001	Structural Site Plan
01-S-0002	Structural Sections and Details
01-E-0001	Electrical Site Plan
01-E-0002	Electrical Fueling Facility and Electrical Kiosk
01-E-0003	Electrical Partial Single Line Diagram and Panel Schedule
01-E-0004	Electrical Control Wiring Diagrams

E2. WORK SPECIFICATIONS

The following is a general list of all work to be completed:

E2.1 SCOPE OF WORK

- (a) Site supervision, mark-out, safety and signage.
- (b) Asphalt and concrete pavement removal.
- (c) Excavation, disposal of spoil and dewatering of excavations.
- (d) Protection of existing buried services and features.
- (e) Removal and demolition of existing fence and gate, salvage of material, and removal of ONE-WAY sign.
- (f) Supply and installation of new fence using salvaged material and new posts and hardware.
- (g) Supply and installation of underground fuel storage tanks c/w approved granular backfill.
- (h) Supply and installation of double wall underground suction and single wall vent piping, the dispenser sumps, and related conduit, fittings, and test connections.
- (i) Supply and installation of underground electrical cable systems, conduits, seals and breakers to feed power to the electrical kiosk, pumps, fuel management system, Veeder Root tank monitoring system, leak detection system, site lighting and standby generator.
- (j) Supply and installation of access manhole covers and frames, piezometers and caps.

- (k) Supply and installation of the concrete slabs for the fueling area, its approach and departure slabs, and the foundation of the electrical kiosk.
- (l) Supply and installation of the concrete islands and steel island forms.
- (m) Supply and installation of shear valves and steel piping for the relocation and installation of four existing suction pump dispensers from the existing fueling site west of the Maintenance Garage.
- (n) Supply and installation of steel bollards, barriers and their anchor bolt systems for vehicular impact protection.
- (o) Supply and installation of the Veeder Root tank monitoring system, its probes and sensors and the interface with the new fuel management system that will be installed through a separate Bid Opportunity.
- (p) Supply and installation of a wood-framed steel clad kiosk building to house the standby generator, electrical panels, Veeder Root panel, fuel management system components, communications equipment, site security equipment, ventilation system, and assorted building electrical services.
- (q) Supply and installation of overhead site lighting systems.
- (r) Supply and installation of a diesel engine driven standby generator, its exhaust system, sub-base fuel tank, control panel, radiator ductwork system, and transfer switch in new Kiosk.
- (s) Supply and installation of fire extinguishers, safety signage, and warning labels per the National Fire Code of Canada 2005 as referenced by the Manitoba Fire Code Regulation 216/2006. Supply and install C.P.P.I. Product Identification tags on the tank fill connections.
- (t) Supply and installation of asphalt pavement repair, transition to new pavement and as required for site drainage per the drawings.
- (u) Supply training and demonstration, commissioning of systems provided under this Contract, and assistance in commissioning of systems provided by others.
- (v) Supply Contractor as-built mark-ups on a clean set of construction drawings to the Contract Administrator for preparation of record drawings.
- (w) Supply a certificate of guarantee/warranty good for a period of one year from the date of substantial completion.
- (x) Turn over all maintenance materials and spares as specified in the following specifications to the Contract Administrator complete with transmittal. Transmittal to be signed and dated by the recipient.
- (y) Include the first twelve monthly exercise tests and first annual load test of the standby generator in the work.

E2.2

- (a) Provide all labour, material and equipment necessary to complete the work as specified and shown on drawings, and as may be required, for a complete and fully operative mechanical system.
- (b) All necessary permits shall be obtained and all fees shall be paid to carry out the specified work. Registration of the new tank and notice of removal for the existing gasoline and diesel fuel UST's are to be filed with the Manitoba Petroleum Storage Tank Program administrator at the Manitoba Conservation offices and is the responsibility of the Contractor.
- (c) All work must be performed with good workmanship, in accordance with good trade practice and in conformance with all applicable codes. Only competent mechanics skilled in their trades shall be employed. The Contractor shall furnish the services of an experienced superintendent, who will be constantly in charge of the erection of the work, until completed and accepted. The Contractor must be a licensed petroleum technician.
- (d) All equipment shall be installed in accordance with manufacturer's recommendations.

- (e) Any cutting or patching in existing structures required for the installation or relocation of mechanical equipment or demolition work shall be the Contractor's responsibility. Ensure that no damage is caused to the City's equipment and premises due to improper location and execution of work in this Contract. Protect and maintain all work until work has been completed and accepted by the City. Store all hazardous materials in accordance with regulations governing such materials, and clean up all refuse caused by the work.
- (f) Provide for the safety and good condition of all materials and equipment until final acceptance by the City. Protect all materials and equipment from damage. Provide adequate and proper storage facilities during the progress of the work.
- (g) All equipment, piping, finished surfaces and equipment shall have all grease, adhesive shipping labels and foreign materials removed.
- (h) Remove from the premises all unused material and debris resulting from the performance of work.
- (i) Instruct the City in the operation and maintenance of each system and equipment item. Provide an aggregate minimum of 16 hours of training time for training on systems use and maintenance.
- (j) Unless otherwise specified herein, all breakers, disconnects, signal and power wiring shall be furnished and installed under the electrical portion of the Contract.
- (k) All control and interlock wiring shall be furnished under the electrical Contract unless noted otherwise elsewhere in these specifications. Termination of all cables is to be done by the electrical Subcontractor only after the conductors have been verified and the loop/circuit tested. Make connections to existing components as required by code and these specifications.
- (l) The Contractor shall furnish and install all minor items which are obviously and reasonably necessary to complete the installation and usually included in similar work even though not specifically mentioned in the Contract documents. Such items are bolts, nuts, anchors, gaskets, brackets, sleeves, drains, air vents, minor offsets in piping because of unforeseen obstructions, etc.
- (m) The Contractor, before submitting his bid for the work, may optionally visit the site and familiarize himself with all visible existing conditions. As a result of having or having not visited the premises, the Contractor shall be responsible for the installation of the work as it relates to existing conditions.
- (n) Provide all demolition, excavation and backfill required for work shown. All work shall be carefully protected from injury due to frost, water or other causes, and any work impact shall be promptly and properly repaired. Coordinate disposition of building materials to avoid interference with all walls, footings and other work, and the City's operation.
- (o) This Contractor shall cooperate with the work to be done under other sections and the other Contracts identified to be working on the site concurrently by providing information as to openings required in walls, slabs and footings for all piping and equipment, including sleeves where required.
- (p) After final installation of all piping and tanks, perform a precision leakage testing of the tanks and piping in accordance with clauses 4.3.15 and 4.4.6 of the National Fire Code of Canada 2005 (NFC) and in the presence of the Engineer at the worksite and /or the Winnipeg Fire Service.
- (q) Provide Transportation of Dangerous Goods (TDG) placards to indicate the flammable, combustible, explosion and handling precautions and the product number on the respective vent riser pipes from the UST and on the panels of the dispensers. Provide C.P.P.I. Product Identification tags mechanically fastened to the tank fill connections.
- (r) Provide a sign on each side of each of the site lighting poles that warns the users to turn off vehicle ignition and that smoking is prohibited in both English and French (bilingual), or using the international symbols for no smoking, turn ignition off as permitted by the NFC.
- (s) Provide a bilingual sign that prohibits sources of ignition being used or located within 7.5 meters of the tank vent or dispenser as per NFC.

- (t) Paint all pipe, fittings, bollards, metal fabrications and uncoated metallic parts other than aluminum or stainless steel with one coat of corrosion resistant primer and two coats of polyurethane enamel, Dupont Imron or Akzo Sikkens.– colours as indicated below. Prepare all surfaces by wire brush, scraper and solvent wash in accordance with SSPC-SP2 prior to applying primer.
- (1) miscellaneous brackets & supports: silver
 - (2) bollards: safety yellow
 - (3) diesel fuel piping: pantone yellow as per C.P.P.I recommendations
 - (4) gasoline piping: gloss white
- (u) Bollard protection and support of vent risers and dispensers is required wherever the risk of vehicle impact exists. Bollards are to be constructed and installed according to the details shown on Structural Drawings and Specifications.
- (v) All new fuel and vent pipe that is accessible within sumps or extends above ground on the tank vents is to be schedule 80 galvanized ERW steel pipe conforming to ASTM-A53/A53M-07, "Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless". Engine exhaust piping for the standby generator shall be schedule 40 black steel with welded/flanged connections.
- (w) All pipe fittings are to be Class 300 galvanized malleable iron threaded castings conforming to ANSI/ASME-B16.3-2006, "Malleable-Iron Threaded Fittings".
- (x) All pipe threads are to be cut with new sharp dies conforming to ANSI/ASME-B1.20.1-1983 (R1992), "Pipe Threads, General Purpose (Inch)".
- (y) Thread sealant used will be anaerobic pipe sealant conforming to CAN/ULC-S642-M87, "Compounds and Tapes for Threaded Pipe Joints" and compatible with 50% biodiesel blend, clear diesel and marked diesel fuel, regular unleaded gasoline and gasohol (up to 85% ethanol) blends.
- (z) Remove, Relocate and Reinstall Existing Gasoline and Diesel Fuel Pumps**
- (1) Supply labour and materials to remove the four existing Gilbarco Series 1300 suction pumps and dispensers from the existing fueling location and to reinstall them at the new fueling location. Pumps shall be resheaved for flows of maximum 80 litres per minute for diesel fuel and 38 litres per minute for either grade of gasoline per hose if they exceed these flow rates once reinstalled. Clean glazing and display bezel, and identify any maintenance or replacement requirements found during the relocation process. The intent is that the existing pumps will be fully functional with safe and operative components, including lights, hoses and nozzles when relocated/reinstalled.
 - (2) Provide each of the existing pumps that are relocated with a polyethylene dispenser sump to suit the pump base dimensions and including the shear valve stabilizer bars with fasteners. Sumps shall conform to ULC/ORD-C107.21-1992, "Under-Dispenser Sumps". Acceptable material: APT Model LMM-2407 sump with APT Model SBK-1 stabilizer bar kits or approved equal in accordance with B6.
 - (3) Supply and install a 38mm diameter shear valve for installation on the fuel suction line from the tank to each of the relocated pumps. The valve shall be double popped to prevent leakage from the suction line or the dispenser inlet in case the valve gets sheared off at impact. The valve shall also have a fusible link that will close the valve in the case of fire. The valve shall be ULC listed and meet ULC-S651-00, "Standard for Emergency Valve for Flammable and Combustible Liquids. The valve body is to be zinc plated cast iron, and have a stainless steel shaft, spring and disc holder, Viton O-Ring seated poppets, 10mm test plug, 38mm female NPT inlet connection, and 38mm female NPT union discharge connection. Acceptable material: APT Model EBW Model 662-440-04 or approved equal in accordance with B6.

- (4) Retrofit high hose hangers onto all four Gilbarco Legacy 1300 suction pump/dispensers.

(aa) **Supply and Install New Fuel Tank Fittings and Accessories**

- (1) Normal vent for the gasoline tank compartments: 50Ø cast aluminum ULC listed, C.A.R.B. approved pressure/vacuum vent with NPT inlet threads, bronze flame arresting screen, weather resistant cap with drainage channels, opening pressure setting of 750 PaG positive, vacuum setting of 99 kPa absolute. Acceptable material: EBW part no. 802-308-01 or approved equal in accordance with B6.
- (2) Normal vent for diesel fuel tank compartment: 50Ø cast aluminum ULC listed updraft vent top c/w weather resistant cap with drainage channels, flame arresting bronze screen and set screw mounting to OD of pipe. Acceptable material: EBW part no. 800-207-02 or approved equal in accordance with B6.
- (3) Vent Conversion Box to be a polyethylene octagonal shaped enclosure of maximum 325mm x 325mm x 200mm high with male barbed nylon 50mm hose nipple on the inlet, and 50mm galvanized steel riser stub with 50mm galvanized union. Acceptable material: APT VCF-200 or approved equal in accordance with B6.
- (4) Vapour tight locking vapour recovery cap to fit on a 100 mm male cam and groove quick connector of the vapour recovery connection. Body to be orange coloured epoxy coated aluminum to indicate the vapour recovery use. Handle to be lockable, push down to lock and lift to remove. Acceptable material: EBW Model 304-301-01 on Regular unleaded gasoline, clear diesel and marked diesel, Model 304-301-03 for Biodiesel or E85 Ethanol-gasoline blends, or approved equal in accordance with B6.
- (5) Vapour recovery connection from the tanks is to be a swivel style poppet check valve in a cam and groove coupler housing to prevent accidental use for filling or vapour leakage when not in use. Coupler to be standard 100mm diameter and have female pipe thread inlet for connection on the top of a riser pipe. Swivel to be constructed with dual rows of chromium steel ball bearings and triple fluorocarbon seals for vapour tight construction. Acceptable material: EBW Phil-tite Model SWV-101-B on Regular unleaded gasoline, clear diesel and marked diesel, Model SWV-101-5 for Biodiesel or E85 Ethanol-gasoline blends, or approved equal in accordance with B6.
- (6) 100mm diameter extractor vent fitting without cage for support of float vent valve. Body to be zinc coated iron casting with internal threads to allow plugging during tank testing. 100mm male NPT inlet for connection to tank, 100mm female NPT connection for riser to vapour recovery connection, and 50mm female NPT side connection for piping to vent rack above grade. Provide extractor wrench and four plugs for use in testing tanks. Turn over to the City at the completion of testing. Acceptable material: EBW Model 310-400-01 on Regular unleaded gasoline, clear diesel and marked diesel, Model 330-400-11 for Biodiesel or E85 Ethanol-gasoline blends, or approved equal in accordance with B6. Permanently plug extra 75mm diameter connection on Model 330-400-11. Test plugs to be EBW Model 391-201-01 and extractor wrench to be EBW Model 321-100-01.
- (7) Vapour recovery connection and vent riser access manhole frame and lid is to be a minimum of 300 mm diameter, with 300mm steel skirt depth, with cast iron ring frame and cover. The lid and frame are to be painted black with a non-skid finish. The cover shall have a textured finish. Acceptable Material: EBW Model 781-212-12 or approved equal in accordance with B6.
- (8) 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.
- (9) 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 OD and the size of conduit/cable listed in the electrical section. Acceptable material: EBW Model 275-400-XX Flexible entry boots or approved equal in accordance with B6.
 - (10) Fill connection spill container and manhole to be a minimum containment volume of 56.8 litres, with cast iron base fitting, integral drain valve and chain operator, flexible polyethylene bellows shell to isolate the riser pipe from settlement strain, and integrally moulded polyethylene throat and frame. The cover shall be a fibre reinforced composite construction and snap-on design. The cast iron base shall have 100mm diameter female NPT threads both inside and out for direct mounting on the fill riser and installation of the Phil-TITE connector inside. Acceptable material: EBW Model 715-472-65 or approved equal in accordance with B6.
 - (11) Top seal swivel fill connection to the tanks is to be a 100mm diameter cam and groove coupler housing to match common fuel hauler equipment. Coupler to have 100mm diameter female pipe thread inlet for connection on the top of a riser pipe within the spill container. Swivel to be constructed with dual rows of chromium steel ball bearings and triple fluorocarbon seals for vapour tight construction. Acceptable material: EBW Phil-tite Model SWF-100-B on Regular unleaded gasoline, clear diesel and marked diesel, Model SWF-100-E for Biodiesel or E85 Ethanol-gasoline blends, or approved equal in accordance with B6.
 - (12) Fill connection top seal cap to fit on a 100mm male cam and groove quick connector of the fill connection. Body to be aluminum with stainless steel latches including a padlock hasp and nitrile rubber gasket. T shaped handle to be push down to seal and lift to remove. Acceptable material: EBW Model 777-201-01 or approved equal in accordance with B6.
 - (13) The drop tube and overflow limiter shall be a three piece assembly of an upper drop tube section mechanically fastened to a float actuated shut-off valve, and then a lower drop tube that is threaded onto the discharge of the float operated valve. The drop tubes and the valve body are to be constructed of aluminum and have an outside diameter that will slip inside of schedule 80 wall 100mm diameter pipe. The lengths of the upper and lower drop tubes are to be adjusted on site by cutting the drop tube length and redrilling the screw holes where the drop tube fits onto the float valve. The lower drop tube shall be cut on a 45 degree angle such that the tip of the drop tube is 150mm above the invert of the tank when the assembly is installed. The float valve shall be operated by polyethylene floats with stainless steel linkages such that at the point where the tank is 90% full, the first stage zinc flapper valve reduces the flow to 10% of its full flow rate. At 95% full, the second stage acetal flapper reduces the flow rate to 5% of the full flow condition. Acceptable material: EBW Autolimiter II Model 708-491-21 or approved equal in accordance with B6.
 - (14) Tank sump access manhole is to be via a 1067mm diameter fibre reinforced composite manhole and frame with bolted cover and integral lifting handle. Cover and frame are to be designed for AASHTO H20 wheel loadings and tested to 22.6 tonne loading. The cover is to weight no more than 43 kg and shall have a permanently affixed nameplate that indicates the product in the tank that the manhole is covering according to API standards. The frame is to have a 6.3mm thick rolled steel angle of 1143 mm OD and a 2.0mm thick x 305mm tall steel sheet skirt welded to the angle ring. The skirt is to have lugs formed into the skirt that will anchor the skirt and ring into the concrete. Acceptable material: EBW Model 781-443-13 frame and 781-445-01 cover or approved equal in accordance with B6.
 - (15) 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 100mm below grade as required with PVC Schedule 40 solid wall piping.

- (16) 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.
- (17) Piezometer access manhole frame and lid is to be a minimum of 250 mm diameter, and be constructed of cast iron with painted non-skid finish. The lid shall be bolt-down gasketed construction 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 810-302-01 or approved equal in accordance with B6.

(bb) Supply and Install New Diesel and Gasoline Fuel Tanks

Supply and install two fuel tanks in conformance with all applicable regulations and permit requirements whether specifically named or not below. The tanks shall meet the following criteria:

- (1) One fuel tank shall be compatible with biodiesel fuel up to a B50 blend (50% biodiesel to 50% diesel fuel), ultra low sulphur diesel fuel and marked diesel fuel. The fuel storage tank capacity shall be a 50,000 litre double-walled tank constructed in conformance with ULC-S615-98,"Standard for Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids". The fuel storage tank shall be a two compartment tank with compartment sizes of 20,000 and 30,000 litres respectively.
- (2) One fuel tank shall be compatible with gasoline fuel and ethanol fuel up to a E85 blend (85% ethanol to 15% gasoline). The fuel storage tank capacity shall be a 50,000 litre double-walled tank constructed in conformance with ULC-S615-98,"Standard for Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids". The fuel storage tank shall be a two compartment tank with compartment sizes of 20,000 and 30,000 litres in each compartment.
- (3) Both tanks shall be in compliance with all applicable provisions of the CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products, PN 1326, 2003 (CCME Code) and must be eligible for permitting under Manitoba Regulation 188/2001.
- (4) Both tanks shall be designed with six 100mm diameter female threaded nozzles sufficient fittings for vents, fill lines, the Veeder Root sensor, suction piping and a spare connection for each compartment will be required. Three of the connections for each compartment shall be located in an integrally moulded 1245mm OD sump with an extension piece that is to be field bonded to the sump and include an 813mm ID manhole with watertight lid. A centrally located leak detection monitoring reservoir shall provide access for the installation of a leak detection cable into the dry secondary containment interstitial space.
- (5) All tanks shall be capable of burial with up to 2.13 metres of cover below grade level. The tanks shall each be anchored by a dedicated concrete counterweight system in accordance with the manufacturer's specifications.
- (6) Acceptable material: ZCL Model P86DW-50000L-2 or approved equal in accordance with B6.

(cc) Supply and Install Secondary Contained and Single Wall Underground Piping

- (1) All underground piping designed to convey product shall be 38mm double walled flexible piping constructed in conformance with ULC/ORD-C971-2005," Standard for Non-metallic Underground Piping for Flammable and Combustible Liquids". All fittings required for a complete installation, including but not limited to test boots, clamps, swivel pipe unions, male IPS NPT thread adapters, swivel male IPS NPT thread adapters, swage collars, and 100mm corrugated conduit with nitrile rubber mechanically fastened ducted entry boots are to be provided. Acceptable material: APT Model XP-150-SC c/w DCT-400 duct and DEB-400 boots.
- (2) Vent piping underground to the Vent Conversion Box shall be constructed using 50mm single wall reinforced nylon piping for flammable and combustible materials in conformance with ULC/ORD-C971-2005," Standard for Non-metallic Underground Piping for Flammable and Combustible Liquids". All fittings required for a complete installation, including but not limited to clamps, swivel pipe unions, male IPS NPT thread adapters, swivel male IPS NPT thread adapters, swage collars, and flexible entry boots are to be provided. Acceptable material: APT Model XP-200-D c/w FEB-200-D boots.
- (3) Provide similar flexible nitrile rubber entry boots with clamps to seal all penetrations of the dispenser sumps, tank sumps and tank monitoring well manhole penetrations by electrical cables. Acceptable material: EBW FEB series boots.
- (4) All connections are to be made and fittings installed by trained personnel. Pipe and fittings are to be tested and comply with the National Fire Code of Canada (2005).

(dd) Supply and Install Fuel Tank Monitoring System

Each primary tank cell tank compartment shall be equipped with a tank monitoring system designed to provide continuous inventory monitoring, leak detection and periodic leak testing of the storage tank compartment in compliance with unmanned site operation fuel regulations. Leak detection systems shall be provided at the tank, on sumps, 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.

The tank monitoring system shall have the following features and capabilities:

- (1) The system shall provide continuous monitoring of liquid (product and water) levels and product temperature in the storage tank using multi-function magnetostrictive probes in each tank compartment.
- (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 L/hr with a 95% probability of detection and 5% probability of false alarm.
- (3) The system shall be equipped the required probes to accommodate monitoring of tank and dispenser containment sumps and the interstitial space on the storage tank.
- (4) The tank monitoring system must be capable of interfacing with the fuel management system described below.
- (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
- (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
- (7) The system shall be capable of generating reports in a screen display or print format.
- (8) Acceptable material: Veeder Root TLS 350 + system panel Model 0848290-022, with one Ethernet-TCP/IP Communications Module Model 0330020-425, two diesel fuel float kits Model 0846400-001, two gasoline float kits Model 0846400-000, one 4-input probe/thermal monitoring input module Model 0329356-002, two 8-input

interstitial/sump liquid leak detection modules Model 0329358-001, four Mag Plus magnetostrictive probes with thermal monitoring Model 0846391-307, eight sump leak detection sensors Model 0794380-208, two interstitial leak detection sensors Model 0794390-409, two interstitial sensor riser adaptors and caps Model 0312020-928, four probe riser adaptors and caps Model 0312020-952, and minimum of eight universal sensor mounting kits Model 0330020-012.

(ee) Fire Protection and Spill Containment Equipment

- (1) Fire Suppression Equipment shall be included. 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.
- (2) Supply and install two petroleum spill kits rated for containment of up to a 95 litre spill of flammable or combustible liquids, and secure the drum to the light standard base using a bolt and fender washers through the drum near the upper lip, galvanized 10mm passing link chain, and a Hilti T316 stainless steel Kwik bolt into the concrete base. The spill kit shall consist of a minimum: 11.34 kg (25 lbs) of granular sorbent, thirty sorbent pads (432 x 483 x 9.5 mm) (17" x 19" x 3/8"), one neoprene drain cover, five 914 x 1219 mm (3' x 4') sorbent socks, three recovery bags and ties, one pair of nitrile gloves and one pair of goggles. These materials should be contained within a labelled overpack drum container. Acceptable material: Seton #t4502 95 l spill response kit or approved equal in accordance with B6.

(ff) Supply and Install Standby Diesel Engine Ventilation, Temperature Control and Exhaust Systems

- (1) Louver type L-1: welded aluminum extrusions consisting of 30° sloped 101mm thick louver blade core, blades on 101mm centers, flanged aluminum channel extrusion frame, and 13x13mm mesh aluminum wire mesh bird screen on back of louver opening. finish to be natural aluminum. Acceptable material: Price/Aiolite K630X
- (2) Ductwork: sheet metal ductwork, fittings, and transitions are to be fabricated using galvanized steel sheet material conforming to ASTM-A653M-94, "Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process" and ASTM-A621M-92 (1993), "Specification for Steel Sheet and Strip, Carbon, Hot-Rolled, Drawing Quality". Fabricate in conformance with the latest edition of SMACNA low velocity duct construction standards and the ASHRAE guide and data book.
- (3) Duct sealant: seal all joints air -tight using a brush or grove applied coat of duct sealer. Acceptable material: Duro-Dyne type S-2
- (4) Fasteners: indoors, use plated self tapping sheet metal screws. For fasteners of ductwork into exterior openings, use T316 stainless steel No. 8 Robertson head self-tapping sheet metal screws.
- (5) Dielectric isolation: provide self-adhesive neoprene rubber strip gaskets to separate dissimilar metals and prevent galvanic corrosion. minimum 50 mm wide and 6 mm thick neoprene (uncompressed).
- (6) Exhaust fan F-1 centrifugal belt drive SISW fan c/w spun aluminum housing, discharge screen, motor weather cover, gravity backdraft damper and mounting frame. Acceptable material: refer to fan schedule on drawings. Verify operation of fan on site by measuring the differential pressure, fan shaft rpm, motor amperage, and voltage once fan has been confirmed to be moving the specified airflow via TAB

work. Provide additional belts and sheaves as required to meet specified performance, to be installed on site by TAB Contractor. Provide one spare set of belts for the fan's final drive arrangement.

- (7) Exhaust fan F-2: centrifugal direct drive DIDW fan in cabinet c/w internal isolation, integral backdraft damper on rectangular discharge connection, and intake grille. Acceptable material: refer to fan schedule on drawings. Verify operation by measuring differential pressure, fan shaft rpm, motor amperage and voltage once fan has been confirmed to be moving the specified airflow.
- (8) TAB contractor: a licensed member of CAABC is to perform testing, adjusting and balancing (tab) on the exhaust fans F-1, F-2, and the generator discharge ductwork in full exhaust mode to determine compliance with specified airflow and performance. Provide three bound copies of the TAB report to the Contract Administrator.
- (9) Engine exhaust piping and muffler is to be insulated with a 75 mm thickness of Fibrex Coreplus 1200 mineral fibre insulation. Bevel the insulation terminations at unions, flanges and valves away at a 45% angle and finish with insulating cement to protect the insulation from damage related to tool use.
- (10) Dampers in exterior walls: insulated and thermally broken aluminum blade and frame, self lubricating blade bearings, direct coupled master blade with concealed linkage in jamb of frame, silicone rubber blade tip and edge seals, low-leakage dampers. Damper action to be opposed blade for dampers associated with DM-1 and DM-2, and parallel blade action for damper associated with DM-4. Acceptable material: Tamco 9000 BF.
- (11) Dampers associated with DM-3: hollow airfoil aluminum blade and extruded aluminum frame, self lubricating blade bearings, direct coupled master blade with concealed linkage in jamb of frame, opposed blade action, neoprene rubber blade tip and edge seals, low-leakage dampers. Acceptable material: Tamco 1000.
- (12) Provide 0.25 mm thick aluminum jacketing over insulation on exhaust piping and muffler.
- (13) Provide a complete temperature control system to maintain the space temperature in the Electrical Kiosk at minimum of 20°C during heating and generator operation in cold weather, and a maximum of 35°C during generator operations and throughout design summer weather conditions. The following Sequence of Control shall be provided:
- (14) Controls specifications
 - (i) Damper motor DM-1: two-position spring return shaft mounted damper motor, to operate on 24 vac power and produce a 15nm torque output. Acceptable material: Johnson Controls model M9220-AGA-3 or Belimo AF24US
 - (ii) Damper motors DM-2 and DM-3: modulating spring return shaft mounted damper motor to operate on 24 vac power, proportional positioning according to a 0-10 VDC signal, and produce a 6 n-m torque output. Damper motor function as direct acting (cooling) or reverse acting (heating) is to be field selectable, and travel and stop positions are to be field adjustable. Acceptable material: Johnson Controls model M9206-AGA-2 or Belimo NF24-SRUS.
 - (iii) Temperature controller TC-1: on/off temperature controller with remote temperature sensor, field selectable direct acting (cooling) or reverse acting (heating) function, field adjustable differential potentiometer and setpoint dial. Relay output to be rated for 10 a non-inductive load at up to 120vac. Thermostat to be suitable for operation on 24 vac power, range to be -35°c to 55°c. Acceptable material: Johnson Controls model A350BA-1C c/w A99BC-25C sensor(T-1).
 - (iv) Temperature controller TC-2: proportional output temperature controller with remote temperature sensor, field selectable direct acting (cooling) or reverse acting (heating) function, field adjustable offset, throttling range and setpoint dial. Voltage output proportionally set to signal varies from 0-10 VDC, controller is to be suitable for operation on 24 vac power input, and range is to be -35°c to

- 55°C. Acceptable material: Johnson Controls model A350PS-1C c/w A99BC-25C sensor(T-2)
- (v) Relays: industrial quality form C plug-in relays with screw terminals, coil voltage to suit controls, pilot duty, CSA certified.
 - (vi) Transformer: 120 vac primary, 24 vac secondary, open winding, air cooled, CSA certified.
 - (vii) Fuses: snap-in frame, size per CSA standards.
 - (viii) DC power supply: 12VDC 55 watt, Acceptable material: Weidmuller 9927480012
- (15) Controls Sequence of Operation:
- (i) When the generator is in standby mode, recirc damper motor DM-3 will be driven to the recirc (open) position against its spring return. The exhaust damper motor DM-2 on the radiator exhaust damper will be driven closed against its spring return. The damper motor DM-1 on the exhaust fan/combustion air intake damper will be powered closed against its spring return provided the auxiliary cooling fan F-1 is de-energized.
 - (ii) Upon solar or internal heat gain temperature rise in the generator room reaching 28°C, thermostat T-1 will energize the auxiliary cooling fan F-1 on low speed. Auxiliary contacts in the starter of F-1 will de-energize damper motor DM-1 allowing the intake damper to open on spring return. F-1 will run until the space temperature is reduced to 25°C and then be de-energized, the cooling/combustion air intake damper DM-1 will be energized to close.
 - (iii) When the normal power is interrupted, damper motor DM-1 will be de-energized and will automatically open the cooling/combustion air intake damper on spring return to provide combustion air intake for the emergency generator for start-up and operation. Upon restoration of the normal power, the damper will remain open if either the emergency generator or the auxiliary cooling fan F-1 are in operation.
 - (iv) Upon start-up of the emergency generator, damper motor DM-1 will be de-energized and will automatically open the cooling/combustion air intake damper on spring return to provide combustion air intake for the emergency generator for start-up and operation and the temperature controls for the mixing dampers will be energized and Fan F-2 will be started on high speed. Upon space temperature rise above the setpoint of 22°C, the thermostat T-2 will modulate the radiator exhaust damper through DM-2 and the recirc damper through DM-3 to maintain the space temperature within +/-3°C of 22°C.
 - (v) All controls (damper motors, thermostats, relays etc.) and the auxiliary cooling fan F-1 will be on emergency power.
 - (vi) Exhaust fan F-2 will be energized by normal power and operate continuously to prevent accumulation of flammable vapours. Upon loss of normal power, F-2 will be de-energized and remain off during emergency generator operation.

(gg) Fully Automated Fuel Management System (FMS)

- (1) A fully automated fuel management system shall be installed under a separate Bid Opportunity. The contractor for this bid opportunity will be expected to cooperate and coordinate with this separate Contractor in the installation, provision of power, support, integration and commissioning of the fuel management system.

(hh) Supply and install any other components required to have an operational fuel site

- (1) All parts not specifically mentioned but which are required to complete and place the fuel station into successful operation shall be furnished as though specifically mentioned in this proposal with the exception of any computer infrastructure

including computer servers and modems, which will be supplied and installed by the City of Winnipeg.

(ii) Execution

- (1) Submit 2 copies of shop drawings on tanks, pump and dispenser, meter, hoses, nozzles, pulsers, Veeder Root system, shear valves, vent caps, sumps, manholes and covers, fittings, pipe, spill kit, dampers, damper actuators, controls, louvers, fire extinguisher cabinets, fire extinguishers and exhaust fan. Include transmittal with copies of all shop drawings. One copy of all shop drawings will be returned to the Contractor for his/her reproduction, use and distribution.
- (2) Before commencing work the Contractor shall establish the location and extent of all underground service lines, utilities and structures and notify the Contract Administrator of the findings. Special care shall be taken in the excavation of UST-T1 and UST-T2 due to the proximity of the adjacent natural gas line, buried telephone service lines, and underground electrical lines.
- (3) During excavation activities, the Contractor shall provide the necessary temporary shoring, barriers, hoarding and/or fencing around the excavations to make it safe from pedestrian and vehicular traffic.
- (4) The Contractor shall avoid excavating below the groundwater table if quick condition or heave is likely to occur.
- (5) The Contractor shall protect open excavations against flooding and damage due to surface runoff. Prior to backfilling, the Contractor shall ensure the excavations are free of standing water. Water shall be disposed of in accordance with all Federal and Provincial Acts, Regulations and Guidelines, and in a manner not detrimental to public and private property.
- (6) The tank excavations shall be backfilled with pea gravel consisting of 100% of a sample passing a 19.0 mm sieve size with 20% - 55% passing the 12.7mm sieve, up to 15% of the sample passing the 9.5mm sieve, up to 5% of the sample passing the 4.8mm sieve, and less than 3% passing the 2.4 mm sieve. This pea gravel granular fill must be used within 300mm of the bottom of the tank, 450mm of the sides and top of the tank, and the tank must have a total of 890mm of granular cover over the tank shell to the bottom of the concrete pavement above. Do Not use mechanical compaction means on the granular backfill in this zone, only manual tamping. Refer to the Civil specifications for granular specifications and compaction outside of this zone.
- (7) Upon completion of backfilling the Contractor shall restore all excavated areas to match existing surrounding ground conditions. Asphalt surfaced areas shall be repaired according to the Civil specifications, and to promote drainage.
- (8) Areas requiring landscape restoration shall be completed at the appropriate time to promote full germination of seeding. The Contractor shall install and prepare topsoil or growing medium similar to existing site conditions. Turf grass or other seed mix shall be installed to match the existing site ground cover.
- (9) A leak/pressure test shall be conducted by the Contractor according to the requirements specified by the Manufacturer. A letter or certificate shall be supplied by the Contractor as to the test criteria and the test results.
- (10) The completed Work and all components required to perform the Work shall comply with all the requirements of Manitoba Environment Regulation 188/2001, Manitoba Fire Code regulation 216/2006, and Plan Winnipeg zoning regulations pertaining to fuel sites.
- (11) Submit 4 copies of operation and maintenance data in binders. Include information and shop drawings on tanks, pump and dispenser, meter, hoses, nozzles, pulsers, Veeder Root system, shear valves, sumps, manholes and covers, fittings, pipe, spill kit, dampers, damper actuators, controls, louvers, exhaust fan, fire extinguisher cabinets, fire extinguishers and MSDS information on the fire extinguisher agent. Provide supplier names, addresses and parts lists for materials supplied. Include copies of all shop drawings.

- (12) Provide spare parts, including but not limited to 2 extra keys for padlocks and spare fuses (one set for each size of fuse used).

E2.3 CIVIL SPECIFICATIONS

(a) Sub-Grade, Sub-Base and Base Course Construction

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

- (1) Sub-base material shall be crushed sub-base material 50 mm MAX.AGG. per TABLE CW3110.1
- (2) Base course material shall be material per TABLE CW3110.2

(b) Portland Cement Concrete Works

Supply materials and carryout works as specified in CW3310-R12 as modified below and in accordance with the drawings.

- (1) Revise 2.1 as follows:
2.1 Reinforced Concrete Pavement and Slabs-On-Grade
A Portland Cement Concrete Pavement or Slab-On-Grade with steel reinforcement in the slab and with smooth dowels across the construction and control joints.

- (2) Revise 5.4.1 as follows:
5.4.1 **Hot Poured Joint Sealant**

Hot poured joint sealant in the joints in the concrete shall be low modulus Type III Material Conforming to the requirements of ASTM Standard D7116, Specification for Joint Sealants Hot Applied, Jet Fuel Resistant Types, for Portland Cement Concrete Pavements. Use Crafcoc Superseal Low-Mod or accepted equal.

Hot poured joint sealer in joints in asphalt or in joints between concrete and asphalt shall be low modulus Type IV Material Conforming to the requirements of ASTM Standard D 6690-01, Specifications for Joint and Crack Sealants, Hot-poured, for Concrete and Asphalt Pavements. Use only those materials listed as Approved Products for Surface Works. The Approved Products are available in Adobe Acrobat (.pdf) format at the City of Winnipeg, Corporate Finance, Material Management Internet Site at :<http://www.winnipeg.ca/matmgt/info.stm>.

- (3) 6.2(a) shall include all concrete for this project and 6.2(b) is deleted.

(c) Asphaltic Concrete Pavement Works

Supply materials and carryout work as specified in CW3410-R7 as modified below and in accordance with the drawings.

- (1) All asphaltic concrete used for this project shall meet the requirements of Type 1A in CW3410-R7.

(d) Chain Link Fencing

Supply materials and carryout work as specified in CW3550-R2 as modified below and in accordance with the drawings for an 1830 mm fence height with concrete piles at each post.

- (1) Add 5.12 as follows:

5.12 Gates

Existing gates shall be salvaged, restored/repared and reused.

- (2) Replace 9.7 as follows:

9.7 Gates

Install salvaged restored/repared gates. Adjust as required to operate smoothly and to be aligned properly for latching and locking.

(e) Site Kiosk

(1) Rough Carpentry

- i. All Roof Joists and Lintels shall be D-Fir #2 or Better, Wall Studs and Plates shall be SPF #2 or Better. All wood to be kiln dried.
- ii. All walls to be adequately braced until roof structure is installed.
- iii. Bottom plate at main floor to be PWF treated and to be bolted to the foundation with minimum 13 mm diameter bolts x 200 mm long spaced at 1200 mm O.C. maximum.
- iv. Nailing patterns and lengths to conform to the requirements of part 9 of the national Building Code of Canada.
- v. Plywood sheathing shall be exterior grade Douglas Fir Plywood conforming to CSA-O121-M1978 (R2001) Douglas Fir Plywood.

(2) Batt Insulation

- i. Material: Fibreglass, Friction Fit, Unfaced.
- ii. Vapour Barrier: 6 Mil (0.15 mm) Polyethylene. Tape seal all joints and junctions.
- iii. Install insulation to maintain continuity of thermal barrier, fit tight to penetrations, do not compress.
- iv. Install vapour barrier on warm side of insulation and completely seal by taping all joints and patching all tears and penetrations.

(3) Metal Cladding

- i. Design of System: Provide for thermal movement caused by temperature range of +40 C to -40 C.
- ii. Provide for moisture drainage to exterior.
- iii. Sub-Girts 1.21 mm steel, zinc wibe coated, "Z" shaped.
- iv. Wall Cladding: 0.91 mm thick steel, galvanized, factory prefinished, male and female precaulked lapping edges, Vicwest profile 6025R, and colour to be selected by The City form standard colour charts.
- v. Roof Cladding System: 0.76 mm steel core thickness, galvanized, factory prefinished (colour to be selected by The City form standard colour charts), Vicwest Profile Traditional 150-4 System complete with hidden fastening system with clips fabricated from a minimum 0.91 mm steel core thickness and spaced at a maximum spacing of 600 mm. Provide all accessories required such as but not limited to flashings, closures, sealants and snap caps.
- vi. Flashings: Of same material as cladding.
- vii. Screws for Wall Cladding: Gasketted, self drilling screws, head colour to match wall cladding.
- viii. Wall and roof cladding systems shall be finished free form rattles, wind whistles or noise due to thermal movements.
- ix. Sealants: Dow Corning 790 Silicone Sealant. Sealant colour to match adjacent surfaces where exposed in finished assembly.

(4) Doors and Frames

- i. Exterior Doors: 45 mm steel door 914 x 2134 mm with polyurethane insulation fill.
- ii. Frame: 16 gauge pressed steel frame, batt insulation fill, fixed to wall with 5 anchors per jamb.
- iii. Threshold: extruded aluminum
- iv. Weatherstrip jamb and head: neoprene bulb in aluminum keeper
- v. Sweep: neoprene sheet in aluminum holder
- vi. Hardware: 1 ½ pair steel butts, locking knobset, arm type stop, and closer

(5) Painting

- i. Steel Doors and Frames
 - 1 Coat Primer
 - 2 Coats Semi-Gloss Alkyd Enamel
 - Colours to be selected by The City from standard colour charts
- ii. Wood
 - 1 Coat Primer
 - 2 Coats Semi-Gloss Alkyd Enamel
 - Colours to be selected by The City from standard colour charts

(6) Miscellaneous

- i. Provide one 350 x 1830 x 25 mm thick laminated plywood self complete with 4 heavy duty support brackets secured to the wall at the studs. Location to be determined on site by The City.

E2.4 ELECTRICAL

E2.4.1 Electrical General Requirements

- (a) Do complete installation in accordance with CSA C22.1-2006 except where specified otherwise.
- (b) Abbreviations for electrical terms: to CSA Z85-193.
- (c) Instruct The Contract Administrator and operating personnel in the operation, care and maintenance of equipment.
- (d) Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components.
- (e) Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.
- (f) Submit to electrical inspection department with City of Winnipeg and the supply authority with Manitoba Hydro the necessary number of drawings and specifications for examination and approval prior to commencement of work.
- (g) Pay associated fees.
- (h) The Contract Administrator will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost.
- (i) Notify The Contract Administrator of changes required by electrical inspection department with the City of Winnipeg prior to making changes.
- (j) Furnish Certificates of Acceptance from authorities having jurisdiction on completion of work to The Contract Administrator.

- (k) Equipment and materials to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from electrical inspection department with the City of Winnipeg.
- (l) Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- (m) Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.
- (n) Identify electrical equipment including receptacles, light switches, splitters, main pull boxes, disconnect switches, contactors, and HVAC equipment as follows:
- (i) 2 inch high labels for panelboards and switchboards;
 - (ii) ½ inch high labels for remainder;
 - (iii) Acceptable label products: Brady HandiMark printer with Reflective Tape. Colour: Black on White.
- (o) Labels for terminal cabinets and junction boxes to indicate system and/or voltage characteristics. This shall include power, data, access control and fire alarm systems.
- (p) Conduit marking:
- (i) Colour code conduits.
 - (ii) Code with plastic tape at points where conduit enters wall, ceiling, or floor, and at 50 ft. intervals.
 - (iii) Colours: 1 inch wide prime colour and ¾ inch wide auxiliary colour:

	<u>Prime</u>	<u>Auxiliary</u>
Up to 250 V	Yellow	
Telephone	Green	
Other	Green	Blue
Communication Systems Voice		
- (q) Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders, branch circuit wiring and all control wiring.
- (r) Maintain phase sequence and colour coding throughout.
- (s) Colour code: to CSA C22.1.
- (t) Use colour coded wires in communication cables, matched throughout system.
- (u) Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.
- (v) Provide compression type lugs for all service feeders including panelboards, generator, etc.
- (w) All circuits shall be installed with dedicated green insulated ground wire.
- (x) All circuits shall be installed with dedicated white insulated neutral wires.
- (y) Manufacturers and CSA Labels shall be visible and legible after equipment is installed.
- (z) Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
- (aa) Insulation resistance testing:
- (i) Megger circuits, feeders and equipment up to 350 V with a 500 V instrument;
 - (ii) Check resistance to ground before energizing.
- (bb) Carry out tests in presence of the engineer at the worksite.

- (cc) Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- (dd) Submit test results for The Contract Administrator's review.

E2.4.2 Fastenings and Supports

- (a) Support channels shall be minimum U shape, size 41 mm x 41 mm x 12 gauge, surface mounted suspended.
- (b) Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.
- (c) Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- (d) Fasten exposed conduit or cables to building construction or support system using straps.
 - (i) One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - (ii) Two-hole steel straps for conduits and cables larger than 50 mm.
 - (iii) Beam clamps to secure conduit to exposed steel work.
- (e) Suspended support systems.
 - (i) Support individual cable to conduit runs with 6 mm dia threaded rods and spring clips.
 - (ii) Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.
- (f) For surface mounting of two or more conduits use channels at 2.0 m oc spacing.
- (g) Provide metal brackets, fames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- (h) Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- (i) Do not use wire lashing or perforates strap to support or secure raceways or cables.
- (j) Do not use supports of equipment installed for other trades for conduit or cable support except with permission of other trade and approval of The Contract Administrator.
- (k) Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.
- (l) Support hangers from metal channel mounted to underside of ceiling metal joist. Do not fasten to the undersigned of roof structure.
- (m) All connections and penetrations of existing hollow core floor to be reviewed by hollow core supplier and modified, reinforced or cut in accordance with approved shop drawings.

E2.4.3 Wires & Cables 0 – 1000 V

- (a) Building Wires
 - (i) Copper conductors: size as indicated with 600 V insulation of chemically cross-linked thermosetting polyethylene material rated RW90 and 600V power circuit min. #12 AWG).
- (b) Armoured Cables
 - (i) Conductors: insulated, copper size as indicated.
 - (ii) Type: AC90.
 - (iii) Armour: interlocking type fabrication from aluminum strip.

- (iv) For use in partition drywall walls or fixture drops in t-bar ceilings.
- (c) TECK Cable
 - (i) Conductors:
 - ◆ Grounding conductor: copper
 - ◆ Circuit conductors: copper, sized as indicated
 - (ii) Insulation
 - ◆ Type: ethylene propylene rubber
 - ◆ Chemically cross-linked thermosetting polythethylene rated Type RW90.
 - (iii) Inner jacket: polyvinyl chloride material.
 - (iv) Armour: interlocking aluminum.
 - (v) Overall covering: thermoplastic polyvinyl chloride material.
 - (vi) Fastenings:
 - ◆ One hole malleable iron straps to secure surface cables 2 inches and smaller. Two hole steel straps for cables larger than 2 inches.
 - ◆ Channel type supports for two or more cables at 30 inch centres.
 - ◆ One-quarter inch diameter threaded rods to support suspended channels.
 - (vii) Connectors:
 - ◆ Watertight, approved for TECK cable.

E2.4.4 Junction, Pull Boxes and Cabinets

- (a) Junction and pull boxes shall be welded steel construction with hinged, screwed-on flat covers for surface mounting.
- (b) Junction boxes in hazardous classified areas shall be rated for that environment.
- (c) Install pull boxes in inconspicuous but accessible locations.
- (d) Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 50' of conduit run between pull boxes.

E2.4.5 Outlet Boxes, Conduit Boxes and Fittings

- (a) Size boxes in accordance with CSA C22.1.
- (b) Blank cover plates for boxes without wiring devices.
- (c) Combination boxes with barriers where outlets for more than one system are grouped.
- (d) For interior boxes: electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 3" x 2" x 2" or as indicated. 4" square outlet boxes when more than one conduit enters one side with extension and plaster rings as required. 4 11/16" square boxes where indicated.
- (e) Bushing and connectors with nylon insulated throats for all fittings.
- (f) Knock-out fillers to prevent entry of debris.
- (g) Conduit outlet bodies for conduit up to 27 mm and pull boxes for larger conduits.
- (h) Double locknuts and insulated bushings on sheet metal boxes.
- (i) Support boxes independently of connecting conduits.
- (j) Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- (k) Provide correct size of openings in boxes for conduit connections. Reducing washers are not allowed.

E2.4.6 Conduits, Conduit Fastenings and Conduit Fittings

- (a) Electrical metallic tubing (EMT) shall be used inside Electrical Kiosk: to CSA C22.2 No. 83, with couplings with expanded ends.

- (b) RGS conduit shall be used in all underground and hazardous location applications, unless noted otherwise. RGS conduit to be sealed with EYS fittings at both ends. Level and leak sensors in fueling area to be connected to RGS conduit by Crouse Hinds GRFX-139 or Appleton JBDX junction boxes.
- (c) One hole steel straps to secure surface conduits 2" and smaller. Two hole steel straps for conduits larger than 2".
- (d) Beam clamps to secure conduits to exposed steel work.
- (e) Fittings: manufactured for use with conduit specified. Coating: same as conduit.
- (f) Factory "ells" where 90° bends are required 1" and larger conduits.
- (g) Watertight connectors and couplings for EMT. Set-screws are not acceptable.
- (h) Install all conduit connectors with insulated bushings. All conduits dead ended for telephone/data cables to have insulated end bushings.
- (i) Polypropylene in all empty conduits.
- (j) Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- (k) Conceal conduits except in areas where this is not practical.
- (l) Surface mount conduits in unfinished areas.
- (m) Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- (n) Mechanically bend steel conduit over ¾"mm dia.
- (o) Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- (p) Dry conduits out before installing wire.
- (q) Run parallel or perpendicular to building lines.
- (r) Run conduits in flanged portion of structural steel.
- (s) Group conduits wherever possible on suspended or surface channels.
- (t) Do not pass conduits through structural members except as indicated.

E2.4.7 Wiring Devices

- (a) 15 A, 120 V, single pole, double pole, three-way switches, commercial grade, toggle style.
 - (i) Manually operated general purpose ac switches with following features:
 - (ii) Terminal holes approved for No. 10 AWG wire.
 - (iii) Silver alloy contacts.
 - (iv) Urea or melamine molding for parts subject to carbon tracking.
 - (v) Suitable for back and side wiring.
 - (vi) White toggle.
- (b) Toggle operated, fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.
- (c) Switches of one manufacturer throughout project.
- (d) Acceptable manufacturer: Pass & Seymour 2601-W or approved equal in accordance with B6.
- (e) Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, commercial grade, with following features:
 - (i) White urea moulded housing.
 - (ii) Suitable for No. 10 AWG for back and side wiring.
 - (iii) Break-off links for use as split receptacles.

- (iv) Eight back wired entrances, four side wiring screws.
- (v) Triple wipe contacts and riveted grounding contacts.
- (vi) Acceptable manufacturer: Pass & Seymour 885W Series.

- (f) Receptacles of one manufacturer throughout project.
- (g) Cover plates for wiring devices, galvanized.
- (h) Install single throw switches with handle in "up" position when switch closed.
- (i) Install receptacles in gang type outlet box when more than one receptacle is required in one location.
- (j) Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

E2.4.8 Disconnect Switches Fused and Non-Fused

- (a) Submit product data in accordance with General Section.
- (b) Fusible, horsepower rated disconnect switch in CSA Enclosure 1 or 3 as shown, size as indicated.
- (c) Provision of padlocking in on-off switch position by three locks.
- (d) Mechanically interlocked door to prevent opening when handle in ON position.
- (e) Quick-make, quick-break action.
- (f) ON-OFF switch position indication on switch enclosure cover.
- (g) Solid neutral block as required.
- (h) Acceptable Manufacturer: Square D Series CH or approved equal in accordance with B6.
- (i) Provide equipment identification in accordance with Electrical General Requirements.
- (j) Indicate name of load controlled on size 4 nameplate.

E2.4.9 Panelboards Breaker Type

- (a) Submit shop drawings in accordance with General Section.
- (b) Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.
- (c) Install circuit breakers in panelboards before shipment.
- (d) In addition to CSA requirements, manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.
- (e) Panelboards: to CSA C-22.2 No. 29.
- (f) Acceptable manufacturer: Cutler Hammer, Square D or approved equal in accordance with B6.
- (g) 250V branch circuit panelboards: bus and breakers rated for minimum 10kA (symmetrical) interrupting capacity or as indicated.
- (h) Sequence phase bussing such that circuit breakers will be numbered in consecutive order, with each breaker identified by permanent number identification as to circuit number and phase.
- (i) Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.
- (j) Two keys for each panelboard and key panelboards alike.
- (k) Copper bus with neutral of same ampere rating as mains.
- (l) Main: suitable for bolt-on 1" wide breakers.
- (m) Provide equipment identification in accordance with Electrical General Requirements.
- (n) Nameplate for each panelboard size 5 engraved as indicated.

- (o) Complete circuit directory with typewritten legend showing location and load of each circuit.
- (p) Bolt-on moulded case circuit breaker: quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.
- (q) Common-trip breakers: with single handle for multi-pole applications.
- (r) Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
- (s) Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection. Moulded case circuit breaker to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for short circuit protection.
- (t) Panelboard to be supplied with integral 160 KA surge current rated TVSS with integral overcurrent protection.
- (u) Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces with metal U-channel supports.
- (v) Connect loads to circuits.
- (w) Connect branch circuit neutral conductors to common neutral bus.
- (x) Locate all panelboards as shown on the drawings.
- (y) Wiring in panelboards shall be neat and organized. All neutral conductors shall be identified in the panel with their associated circuit numbers by means of Brady Markers.
- (z) All panelboards throughout the building shall be phased together such that the left-hand, centre and right-hand panelboard busses represent phases A, B and C respectively. All indicating meters shall be identified to this sequence.

E2.4.10 Lighting

- (a) Lighting fixtures shall be CSA certified and come with lamps.
- (b) Type A fixture
 - (i) Architectural area lighting
 - (ii) Metal Halide – 400 watt, 120 volt
 - (iii) Assymmetric Type III distribution
 - (iv) Square pole mount, 9 inch arm
 - (v) Integral photocell
 - (vi) Pole-steel, 5 inch square, 20- feet high, West Coast Engineering model 5SQPH20.
 - (vii) Acceptable manufacturer: Lithonia KVF 400M SR3FL.
- (c) Type B fixture
 - (i) Small wallpack, polycarbonate lens, wireguard.
 - (ii) Metal Halide – 70 watt, 120 volt.
 - (iii) Integral photocell.
 - (iv) Acceptable manufacturer: Lithonia TWA 70M 120 PE TAWWG.
- (d) Type C fixture
 - (i) Strip fluorescent c/w wireguard.
 - (ii) Two T-8, 32W lamp, 120 volt.
 - (iii) Acceptable manufacturer: Lithonia C232 120 GEB WGCSMR.

E2.4.11 Connections to Fuel Management System

- (a) All wiring and conduit required for the fuel management system shall be completed according to the wiring diagrams supplied by the company who is awarded a Contract for the system.

E2.4.12 Connections to Mechanical Equipment

- (a) Provide a complete system of wiring to motors and controls as specified herein and as shown on the drawings.
- (b) Unless specifically noted otherwise, wire and leave in operation all electrically operated equipment supplied under this Contract. Examine the drawings and shop drawings of all divisions for the extent of electrically operated equipment supplied by other divisions or by pre-bid opportunity.
- (c) Unless specifically noted otherwise, supply all pushbuttons, relays, starters, etc., necessary for the operation of equipment. Check all starters, relay coils and thermal elements to ensure that they provide the necessary protection for motors.
- (d) Do not operate motors and controls until approval is obtained from the trade providing equipment.
- (e) Examine drawings and shop drawings of other divisions to obtain exact location of motors and equipment shown on drawings. Where necessary, obtain conduit locations from other trades' drawings and shop drawings.
- (f) Assist in placing in operation all mechanical equipment having electrical connections.
- (g) Refer to Mechanical Drawings and Specifications for full extent of mechanical equipment being supplied and location of each item.

E2.4.13 Power Generation Diesel

- (a) References
 - (i) ANSI/NEM M61-1978, Motors and Generators.
 - (ii) ISO 3046/1-1981, Specification for Reciprocating Internal Combustion Engines: Performance.
 - (iii) CAN/CSA-C282-M89, Emergency Electrical Power Supply for Buildings.
- (b) Generating system consists of:
 - (i) Diesel engine.
 - (ii) Alternator.
 - (iii) Alternator control panel.
 - (iv) Automatic transfer equipment.
 - (v) Battery charger and battery.
 - (vi) Automatic ventilation system.
 - (vii) Fuel supply system including double walled sub-base fuel tank.
 - (viii) Exhaust system.
 - (ix) Steel mounting base.
 - (x) System designed to operate as standby.
- (c) Submit five (5) copies of shop drawings in accordance with General Section. Include:
 - (i) Engine: make and model, with performance curves.
 - (ii) Alternator: make and model.
 - (iii) Voltage regulator: make, model and type.
 - (iv) Automatic transfer switch: make, model and type.
 - (v) Battery: make, type and capacity.
 - (vi) Battery charger: make, type and model.
 - (vii) Alternator control panel: make and type of meters and controls.
 - (viii) Electronic Governor type and model.
 - (ix) Automatic ventilation system.

- (x) Cooling air requirements in m/s.
 - (xi) British standard or DIN rating of engine.
 - (xii) Flow diagrams for:
 - ◆ Diesel fuel.
 - ◆ Cooling air.
 - (xiii) Dimensioned drawing showing complete generating set mounted on steel base, base diesel tank including vibration isolators, exhaust system, drip trays, and total weight.
 - (xiv) Continuous full load output set at 0.8 PF lagging.
 - (xv) Description of set operation including:
 - ◆ Automatic starting and transfer to load and back to normal power, including time in seconds from start of cranking until unit reaches rated voltage and frequency.
 - ◆ Manual starting.
 - ◆ Automatic shut down and alarm on:
 - Overcranking.
 - Overspeed.
 - High engine temp.
 - Low lube oil pressure.
 - Short circuit.
 - Alternator overvoltage.
 - Lube oil high temperature.
 - Over temperature on alternator.
 - Common City's Alarms: leak detection.
 - ◆ Manual remote emergency stop.
- (d) Provide operation and maintenance data for diesel generator for incorporation into manual specified in General Requirements.
- (e) Include in Operation and Maintenance Manual instructions for particular unit supplied and not general description of units manufactured by supplier and:
- (i) Operation and maintenance instructions for engine, alternator, control panel, automatic transfer switch, battery charger, battery, fuel system, ventilation system, exhaust system and accessories, to permit effective operation, maintenance and repair.
 - (ii) Technical data:
 - ◆ Illustrated parts lists with parts catalogue numbers.
 - ◆ Schematic diagram of electrical controls.
 - ◆ Flow diagrams for:
 - Fuel system.
 - Lubricating oil.
 - Cooling system.
 - ◆ Certified copy of factory test results.
 - ◆ Maintenance and overhaul instructions and schedules.
 - ◆ Precise details for adjustment and setting of time delay relays or sensing controls which require on site adjustment.
- (f) Include the following maintenance materials:
- (i) 2 fuel filter replacement elements.
 - (ii) 2 lube oil filter replacement elements.
 - (iii) 2 air cleaner filter elements.

- (iv) 2 sets of fuses for each size for control panel.
- (v) Special tools for unit servicing.
- (g) Factory test generator set including engine, alternator, control panels, transfer switch and accessories in presence of engineer at the worksite.
- (h) Notify The Contract Administrator 5 days in advance of date of factory test.
- (i) Test procedure:
 - (i) Prepare blank forms and check sheet with spaces to record data. At top of first sheet record:
 - ◆ Date.
 - ◆ Generator set serial no.
 - ◆ Engine, make, model, serial no.
 - ◆ Alternator, make, model, serial no.
 - ◆ Voltage regulator, make and model.
 - ◆ Rating of generator set, kW, kV.A, V, A, r/min, Hz.
 - (ii) Mark check sheet and record data on forms in duplicate as test proceeds.
 - (iii) Engineer's signature on completed forms to indicate concurrence in results of test.
- (j) Tests:
 - (i) With 100% rated load, operate set continuously for 6 h, taking readings at 30 min intervals, and record following:
 - ◆ Time of reading.
 - ◆ Running time.
 - ◆ Ambient temp in C.
 - ◆ Lube oil pressure in kPa.
 - ◆ Lube oil temp in C.
 - ◆ Engine coolant temp in C.
 - ◆ Exhaust stack temp in C.
 - ◆ Alternator voltage: phase 1,2,3.
 - ◆ Alternator current: phase 1,2,3.
 - ◆ Power in kW.
 - ◆ Frequency in Hz.
 - ◆ Power Factor.
 - ◆ Battery charger current in A.
 - ◆ Battery voltage.
 - ◆ Alternator cooling air outlet temp.
 - (ii) After completion of 6 h run, demonstrate following shut down devices and alarms:
 - ◆ Overcranking.
 - ◆ Overspeed.
 - ◆ High engine temp.
 - ◆ Low lube oil pressure.
 - ◆ Short circuit.
 - ◆ Alternator overvoltage.
 - ◆ Low battery voltage, or no battery charge.
 - ◆ Manual remote emergency stop.
 - ◆ Fuel leak detection.

- (iii) Next install continuous strip chart recorders to record frequency and voltage variations during load switching procedures. Each load change delayed until steady state conditions exist. Switching increments to include:
- ◆ No load to full load to no load.
 - ◆ No load to 70% load to no load.
 - ◆ No load to 20% load to no load.
 - ◆ 20% load to 40% load to no load.
 - ◆ 40% load to 60% load to no load.
 - ◆ 60% load to 80% load to no load.
- (iv) Demonstrate:
- ◆ Automatic starting of set and automatic transfer of load on failure of normal power.
 - ◆ Automatic shut down of engine on resumption of normal power.
 - ◆ That battery charger reverts to high rate charge after cranking.
- (v) Demonstrate low oil pressure and high engine temperature shutdown devices operation without subjecting engine to these excesses.
- (vi) These tests to be repeated in their entirety on site in place.
- (k) For the diesel engine driven generator set, the warranty period is to be 60 months or 1500 operating hours, whichever ever occurs first.
- (l) Diesel engine: to ISO 3046/1.
- (i) Engine: standard product of current manufacture, from company regularly engaged in production of such equipment.
- (ii) Turbo charged and after cooled, synchronous speed 1800 r/min.
- (iii) Capacity:
- ◆ Rated continuous power in kW at rated speed, after adjustment for system losses in auxiliary equipment necessary for engine operation; to be calculated as follows:
- $$\text{Rated continuous output} = \frac{\text{Generator kW}}{\text{Generator Eff @ FL}(0.746)}$$
- .1 Under following site conditions:
- .1 Altitude: 200 m.
 - .2 Ambient temperature: 40C.
- (iv) Cooling System:
- ◆ Liquid cooled: heavy duty industrial radiator mounted on generating set base with engine driven pusher type fan to direct air through radiator from engine side, anti-freeze non-sludging above minus 46C. Include coolant drain valve.
 - ◆ To maintain manufacturer's recommended engine temperature range at 10% continuous overload in ambient temperature of 40C.
 - ◆ Heavy duty block heater: thermostatically controlled lube oil or liquid coolant heater connected to line side of automatic transfer switch to allow engine to start in room ambient -50C.
 - Switch and fuse in heater circuit, mounted in engine-alternator control cubicle and fed from line side of automatic transfer switch.
- (v) Fuel:

- ◆ Type A fuel oil: to CGSB 3-GP-6c.
- (vi) Fuel system: solid injection, mechanical fuel transfer pump, fuel filters and air cleaner, fuel rack solenoid energized when engine running.
- (vii) Governor:
 - ◆ Electronic load sharing type, electric actuator, speed droop externally adjustable from isochronous to 5%, temperature compensated with steady state speed maintenance capability of plus or minus 0.25%.
- (viii) Lubrication system:
 - ◆ Pressure lubricated by engine driven pump.
 - ◆ Lube oil filter: replaceable, full flow type, removable without disconnecting piping.
 - ◆ Lube oil cooler.
 - ◆ Engine sump drain valve.
 - ◆ Oil level dip-stick.
- (ix) Starting system:
 - ◆ Positive shift, gear engaging starter.
 - ◆ Cranking limiter to provide 3 cranking periods of 5 s duration, each separated by 10 s rest.
 - ◆ Lead acid, 12 V storage battery with sufficient capacity to crank engine for 1 min at 0C without using more than 25% of ampere hour capacity. Heavy duty diesel starting type. Exide 8D or equal.
 - ◆ Battery charger: constant voltage, solid state, two stage from trickle charge at standby to boost charge after use. Regulation: plus or minus 1% output for plus or minus 10% input variation. Automatic boost for 6 h every 30 days. Equipped with dc voltmeter, dc ammeter and on-off switch. Minimum charger capacity.
- (x) Guards to protect personnel from hot and moving parts. Locate guards so that normal daily maintenance inspections can be undertaken without their removal.
- (xi) Drip tray.
- (xii) Diesel generator set as manufactured by Cummins model DKAE 60HZ.
- (m) Alternator: to ANSI/NEMA MG1.
 - (i) Rating: three phase, 120/208V, 4 wire, 20 kW/25 kVA, 60 Hz, at 0.8 PF.
 - (ii) Output at 40C ambient:
 - ◆ 100% full load continuously.
 - (iii) Revolving field, brushless, single bearing.
 - (iv) Drip proof.
 - (v) Synchronous type.
 - (vi) Dynamically balanced rotor permanently aligned to engine by flexible disc coupling.
 - (vii) Exciter: brushless permanent magnet.
 - (viii) EEMAC class H insulation on windings.
 - (ix) Voltage regulator: thyristor controlled rectifiers with phase controlled sensing circuit:
 - ◆ Regulation: +/- 2% maximum voltage deviation between no-load steady state and full-load steady state.
 - ◆ Transient: % maximum voltage dip on one-step application of 0.8 PF full load.
 - ◆ Transient: % maximum voltage rise on one-step removal of 0.8 PF full load.

- ◆ Transient: s maximum voltage recovery time with application or removal of 0.8 PF full load.
- (x) Alternator: capable of sustaining 300% rated current for period not less than 10 s permitting selective tripping of down line protective devices when short circuit occurs. Alternator output circuit breaker to be sized for output of generator.
- (n) Totally enclosed, mounting base isolated from diesel generator engine mounted.
 - (i) Controller shall be microprocessor based with backlit LCD screen for alpha-numeric display and programming. Controller shall be NFPA 110 compliant and come installed with overcrank relay, speed sensing magnetic pick-up, oil pressure sensor and engine temperature sensor.
 - (ii) Digital 3-phase display of generator output voltage, current, kVA and frequency. Digital engine display of oil pressure, engine temperature, battery voltage, engine run hourmeter and tachometer.
 - (iii) Shutdowns shall include:
 - ◆ Over crank
 - ◆ Under voltage
 - ◆ Over voltage
 - ◆ High engine temperature
 - ◆ Low oil pressure
 - ◆ Overspeed
 - ◆ Loss of speed signal
 - ◆ Emergency stop
 - (iv) Alarm indications shall include:
 - ◆ Under frequency
 - ◆ Over frequency
 - ◆ Over current
 - ◆ Weak battery
 - ◆ Low battery voltage
 - ◆ High battery voltage
 - ◆ Battery charger fail
 - ◆ Low engine temperature
 - ◆ High engine temperature
 - ◆ Low oil pressure
 - ◆ Low fuel level
 - ◆ Switch not in auto
 - ◆ Damper fail
 - ◆ High fuel level alarm
 - ◆ Interstitial fuel tank leak
 - ◆ Five spare customer configured input alarm conditions
 - ◆ All alarms shall be configured/programmed in the factory
 - (v) Panel LED Indicators shall include:
 - ◆ Control switch position (RUN, OFF, AUTO, TEST)
 - ◆ Common alarm
 - ◆ Common shutdown
 - ◆ Generator ready
 - ◆ Speed signal
 - ◆ Emergency stop

- (vi) Control Pushbuttons shall include:
 - ◆ RUN-OFF-AUTO-LOAD-TEST
 - ◆ Emergency stop
 - ◆ Silence
 - ◆ Lamp test
 - ◆ Reset
 - ◆ Cursor up-down, exit and enter.
- (vii) Output Contacts
 - ◆ Common fail output contacts rated 10A @ 240 VA, Form C
 - ◆ Four programmable output contacts, programmed in the factory, rated 10A @ 240 VAC, Form C which shall include:
 - Engine RUN
 - Engine common fail
- (viii) Acceptable manufacturer: Cummins.
- (ix) Alternator Circuit Breaker: bolt on, moulded case, 100% current rated, temperature compensated for 40°C ambient, dual thermal-magnetic trip.
- (x) Complete generating set mounted on structural steel base of sufficient strength and rigidity to protect assembly from stress or strain during transportation, installation and under operating conditions on suitable level surface.
 - ◆ Assembly fitted with vibration isolators and control console resiliently mounted.
 - Spring type isolators with adjustable side snubbers and adjustable for levelling.
 - ◆ Sound insulation pads for installation between isolators and concrete base.
- (xi) Heavy duty residential type horizontally mounted exhaust silencer with condensate drain, plug and flanged couplings.
 - ◆ Heavy duty flexible exhaust pipe with flanged couplings as required.
 - ◆ Fittings and accessories as required.
 - ◆ Expansion joints: stainless steel, corrugated, of suitable length, to absorb both vertical and horizontal expansion.
- (xii) Double wall subbase fuel tank, ULS 142:
 - ◆ Heavy gauge construction, sized for 24 hour operation at 100% load.
 - ◆ Integral stub-up area.
 - ◆ 2 in. NPT fuel fitting.
 - ◆ Emergency relieve vent fitting and pressure relief vent kit.
 - ◆ Normal vent fitting.
 - ◆ Fuel supply and fuel return fitting.
 - ◆ Mechanical fuel gauge.
 - ◆ Low fuel level alarm.
 - ◆ High fuel level indication via vent whistle.
 - ◆ Interstitial fuel leak .
- (xiii) Perform tests in accordance with Electrical General Requirements.
 - ◆ Notify The Contract Administrator 5 working days in advance of test date.
 - ◆ Provide fuel for testing and leave full tank on acceptance.
 - ◆ Demonstrate:

- Unit start, transfer to load, retransfer to normal power, unit shut down, on “Automatic” control.
- Unit start and shut down on “Manual” control.
- Unit start and transfer on “Test” control.
- Unit start on “Engine start” control.
- Operation of automatic alarms and shut down devices.
- ◆ Run unit on load as described in Section 10 – Tests, to show load carrying ability, stability of voltage and frequency, and satisfactory performance of dampers in ventilating system to provide adequate engine cooling.
- ◆ At end of test run, check battery voltage to demonstrate battery charger has returned battery to fully charged state.

E2.4.14 Automatic Load Transfer Switch

- (a) Automatic load transfer equipment to:
- (i) Monitor voltage on all phases of normal power supply.
 - (ii) Initiate cranking of standby generator unit on normal power failure or abnormal voltage on any one phase below preset adjustable limits for adjustable period of time.
 - (iii) Transfer load from normal supply to standby unit when standby unit reaches rated frequency and voltage pre-set adjustable limits.
 - (iv) Transfer load from standby unit to normal power supply when normal power restored, confirmed by sensing of voltage on all phases above adjustable pre-set limit for adjustable time period.
 - (v) Shut down standby unit after running unloaded to cool down using adjustable time delay relay.
- (b) Submit shop drawings in accordance with General Requirements.
- (i) Include:
 - ◆ Make, model and type.
 - Load classification:
 - Tungsten lamp load: kW.
 - Ballast lamp load: kW.
 - Motor load: kW.
 - Restricted use: resistance and general loads, 0.8 pf or higher kW.
 - (ii) Single line diagram showing controls.
 - (iii) Description of equipment operation including:
 - ◆ Automatic starting and transfer to standby unit and back to normal power.
 - ◆ Test control.
 - ◆ Manual control.
 - ◆ Automatic shutdown.
 - (c) Provide three copies of operation and maintenance manuals.
 - (i) Detailed instructions to permit effective operation, maintenance and repair.
 - (ii) Technical data:
 - ◆ Schematic diagram of components and controls.
 - ◆ Illustrated parts lists with parts catalogue numbers.
 - ◆ Certified copy of factory test results.
 - (d) Transfer Equipment

- (i) Circuit breakers mounted on common frame, in double throw arrangement, mechanically and electrically interlocked, solenoid operated.
- (ii) Rated: 120/208 V, 60 Hz, 150 A, three phase, 4 wire.
- (iii) Main contacts: silver surfaced, protected by arc disruption means.
- (iv) Switch and relay contacts, coils, spring and control elements accessible for inspection and maintenance from front of panel without removal of switch panel or disconnection of drive linkages and power conductors.
- (v) Auxiliary contact: silver plated, to initiate emergency generator start-up on failure of normal power.
- (vi) Current and potential transformers.
- (vii) Fault withstand rating: 35 kA symmetrical for 3 cycles.
- (viii) Automatic transfer switch to be complete with auto exercise capability.
- (ix) Selector switch - four position "Auto", "Off", "Engine Start", "Test".
 - ◆ Test position - Normal power failure simulated. Engine starts and transfer takes place. Return switch to "Auto" to stop engine.
 - ◆ Auto position - Normal operation of transfer switch on failure of normal power; retransfers on return of normal voltage and shuts down engine.
 - ◆ Manual position - Transfer switch may be operated by manual handle but transfer switch will not operate automatically and engine will not start.
 - ◆ Engine start position - Engine starts but unit will not transfer unless normal power supply fails. Switch must be returned to "Auto" to stop engine.
- (x) Microprocessor based controller with LCD display module including the following functions:
 - ◆ Voltage sensing: single phase for normal power and on one phase only for emergency, solid state type, adjustable drop out and pick up, close differential, 2 V minimum undervoltage and overvoltage protection.
 - ◆ Time delay: normal power to standby, adjustable solid state, 0 to 60 s.
 - ◆ Time delay on engine starting to override momentary power outages or dips, adjustable solid state, 0 to 60 s delay.
 - ◆ Time delay on retransfer from standby to normal power, adjustable 5 to 180 s.
 - ◆ Time delay for engine cool-off to permit standby set to run unloaded after retransfer to normal power, adjustable solid state, 20 s intervals to 10 min.
 - ◆ Frequency sensing, to prevent transfer from normal power supply until frequency of standby unit reaches preset adjustable values.
- (xi) Pilot lights to indicate power availability normal and standby, switch position, green for normal, red for standby, mounted in panel.
- (xii) Auxiliary relays to provide 2 N.O. and 2 N.C. contacts for remote alarms, transfer switch in normal and emergency status and genset start/stop operation.
- (xiii) Plant exerciser: 168 hour timer to start standby unit once each week for selected interval (but does not transfer load from normal supply). Timer adjustable 0-168 hours in 15 minute intervals.
- (xiv) Digital meter showing load in kW on output of switch.
- (xv) Complete equipment, including transfer mechanism, controls, relays and accessories factory assembled and tested in presence of engineer at the worksite.
- (xvi) Tests:

- ◆ Operate equipment both mechanically and electrically to ensure proper performance.
 - ◆ Check selector switch, in all modes of operation Test, Auto, Manual, Engine Start and record results.
 - ◆ Check voltage sensing and time delay relay settings.
- (xvii) Check:
- ◆ Automatic starting and transfer of load on failure of normal power.
 - ◆ Retransfer of load when normal power supply resumed.
 - ◆ Automatic shutdown.
- (xviii) Approved Manufacturer: Cummins, OTPC.
- (xix) Field Quality Control
- ◆ Perform tests in accordance with Section 16010 - Electrical General Requirements.
 - ◆ Energize transfer equipment from normal power supply.
 - ◆ Set selector switch in "Test" position to ensure proper standby start, running, transfer, retransfer. Return selector switch to "Auto" position to ensure standby shuts down.
 - ◆ Set selector switch in "Manual" position and check to ensure proper performance.
 - ◆ Set selector switch in "Engine start" position and check to ensure proper performance. Return switch to "Auto" to stop engine.
 - ◆ Set selector switch in "Auto" position and open normal power supply disconnect. Standby should start, come up to rated voltage and frequency, and then load should transfer to standby. Allow to operate for 10 min, then close main power supply disconnect. Load should transfer back to normal power supply and standby should shutdown.
 - ◆ Repeat, at 1 h intervals, 5 times, complete test with selector switch in each position, for each test.