



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 1133-2014

SUPPLY AND DELIVERY OF DIGESTER SLUDGE PUMPS

TABLE OF CONTENTS

PART A - BID SUBMISSION

Form A: Bid	1
Form B: Prices	3

PART B - BIDDING PROCEDURES

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

PART C - GENERAL CONDITIONS

C0. General Conditions	1
------------------------	---

PART D - SUPPLEMENTAL CONDITIONS

General

D1. General Conditions	1
D2. Scope of Work	1
D3. Contract Administrator	1
D4. Ownership of Information, Confidentiality and Non Disclosure	1
D5. Notices	1

Submissions

D6. Authority to Carry on Business	2
D7. Insurance	2
D8. Material Safety Data Sheets	2

Schedule of Work

D9. Commencement	2
D10. Delivery	3
D11. Orders	3
D12. Records	3

Measurement and Payment

D13. Invoices	3
D14. Payment	4
D15. Payment Schedule	4
D16. Warranty	4

PART E - SPECIFICATIONS

General

E1. Applicable Specifications and Drawings	1
E2. Goods	1
E3. Approved Manufacturers	1
E4. General Requirements	1
E5. Digester Sludge Pump	2

E6. Spare Parts	11
E7. Training	11

PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 SUPPLY AND DELIVERY OF DIGESTER SLUDGE PUMPS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 4:00 p.m. Winnipeg time, February 25, 2015.

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. ENQUIRIES

B3.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.

B3.2 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 promptly notify the Contract Administrator of the error, discrepancy or omission at least five (5) Business Days prior to the Submission Deadline.

B3.3 If the Bidder is unsure of the meaning or intent of any provision therein, the Bidder should request clarification as to the meaning or intent prior to the Submission Deadline.

B3.4 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.

B3.5 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.

B3.6 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

B4. CONFIDENTIALITY

B4.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:

- (a) was known to the Bidder before receipt hereof; or
- (b) becomes publicly known other than through the Bidder; or
- (c) is disclosed pursuant to the requirements of a governmental authority or judicial order.

B4.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Bid Opportunity to the media or any member of the public without the prior written authorization of the Contract Administrator.

B5. ADDENDA

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

- B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
- B5.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>
- B5.2.2 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B5.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 8 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B6. SUBSTITUTES

- B6.1 The Work is based on the materials, equipment, methods and products 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 seven (7) 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 material, equipment, method or product as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the Contract;
 - (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 Contract.
- B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.
- B6.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.
- B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

- B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her 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 price(s) because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.
- B6.10 Notwithstanding B6.2 to B6.9, and in accordance with B7.7, deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B15.1(a).

B7. BID SUBMISSION

- B7.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices;
- B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.
- B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely in ink, to constitute a responsive Bid.
- B7.4 The Bid Submission may be submitted by mail, courier or personal delivery, or by facsimile transmission.
- B7.5 If the Bid Submission is submitted by mail, courier or personal delivery, it shall be enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address, and shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management Division
185 King Street, Main Floor
Winnipeg MB R3B 1J1
- B7.5.1 Samples or other components of the Bid Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid Submission.
- B7.6 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.
- B7.7 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B15.1(a).
- B7.8 If the Bid Submission is submitted by facsimile transmission, it shall be submitted to 204- 949-1178.
- B7.8.1 The Bidder is advised that the City cannot take responsibility for the availability of the facsimile machine at any time.
- B7.9 Bids submitted by internet electronic mail (e-mail) will not be accepted.

B8. BID

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

- B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her 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/her own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.
- B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B8.4 Paragraph 10 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers;
 - (d) if the Bidder is carrying on business under a name other than his/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B8.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.
- B8.4.2 All signatures shall be original.
- B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.
- B9. PRICES**
- B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B9.1.1 Prices on Form B: Prices shall include:
- (a) duty;
 - (b) freight and cartage;
 - (c) Provincial and Federal taxes except the Goods and Services Tax (GST) and Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable and all charges governmental or otherwise paid;
 - (d) profit and all compensation which shall be due to the Contractor for the Work and all risks and contingencies connected therewith.
- B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.
- B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B10. DISCLOSURE

B10.1 Various Persons provided information or services with respect to this Work.. In the City's opinion, this relationship or association does not create a conflict of interest because of this full disclosure. Where applicable, additional material available as a result of contact with these Persons is listed below.

B10.2 The Persons are:

- (a) Paul Wong, Capital H2O Systems, Inc.
- (b) Nico Ramos, LobePro Engineering
- (c) Domenic Janssen, Waste 'n WaterTech Ltd.
- (d) Gary Haberny, Vogelsang
- (e) Dan Robinson, Vogelsang

B11. QUALIFICATION

B11.1 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, or if the Bidder does not carry on business in Manitoba, in the jurisdiction where the Bidder does carry on business; 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.

B11.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

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

B11.3 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);

B11.4 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.

B11.5 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.

B12. OPENING OF BIDS AND RELEASE OF INFORMATION

B12.1 Bids will not be opened publicly.

- 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 or evaluated prices) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt>
- B12.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt>
- B12.4 The Bidder is advised that any information contained in any Bid may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B13. IRREVOCABLE BID

- B13.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 9 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 for the time period specified in Paragraph 9 of Form A: Bid.

B14. WITHDRAWAL OF BIDS

- B14.1 A Bidder may withdraw his/her Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.
- B14.1.1 Notwithstanding C21, 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 10 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 10 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/her Bid after the Submission Deadline but before his/her 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.

B15. EVALUATION OF BIDS

- B15.1 Award of the Contract shall be based on the following bid evaluation criteria:
- (a) compliance by the Bidder with the requirements of the Bid Opportunity, or acceptable deviation therefrom (pass/fail);
 - (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B11 (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 Submission is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements 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/her Bid or in other information required to be submitted, that he/she is responsible and qualified.

B15.4 Further to B15.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.

B15.4.1 Further to B15.1(a), in the event that a unit price is not provided on Form B: Prices, the City may determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B15.5 This Contract will be awarded as a whole.

B16. AWARD OF CONTRACT

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

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

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

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

B16.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B15.

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

B16.4 Notwithstanding C4 and Paragraph 6 of Form A:Bid, the City may issue a Purchase Order to the successful Bidder in lieu of the execution of a Contract.

B16.5 The Contract Documents, as defined in C1.1(n)(ii) in their entirety shall be deemed to be incorporated in and to form a part of the Purchase Order notwithstanding that they are not necessarily attached to or accompany said Purchase Order.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for the Supply of Goods* (Revision 2008 05 26) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for the Supply of Goods* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm
- C0.2 A reference in the Bid Opportunity to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Supply of Goods*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of the supply and delivery of Digester sludge pumps.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is:
Terry Josephson
City of Winnipeg
Water and Waste Department
Telephone No.: 204-986-8609
Email-TJosephson@winnipeg.ca

D4. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

D4.1 The Contract, all deliverables produced or developed, and information provided to or acquired by the Contractor are the property of the City and shall not be appropriated for the Contractors own use, or for the use of any third party.

D4.2 The Contractor shall not make any public announcements or press releases regarding the Contract, without the prior written authorization of the Contract Administrator.

D4.3 The following shall be confidential and shall not be disclosed by the Contractor to the media or any member of the public without the prior written authorization of the Contract Administrator;

- (a) information provided to the Contractor by the City or acquired by the Contractor during the course of the Work;
- (b) the Contract, all deliverables produced or developed; and
- (c) any statement of fact or opinion regarding any aspect of the Contract.

D4.4 A Contractor who violates any provision of D4 may be determined to be in breach of Contract.

D5. NOTICES

D5.1 Notwithstanding C21.3, all notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following facsimile number:

The City of Winnipeg
Chief Financial Officer
Facsimile No.: 204- 949-1174

SUBMISSIONS

D6. AUTHORITY TO CARRY ON BUSINESS

D6.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

D7. INSURANCE

D7.1 The Contractor shall provide and maintain the following insurance coverage:

- (a) Commercial general liability insurance in the amount of at least two million (\$2,000,000) inclusive, with The City of Winnipeg to be added as an additional insured; such liability policy to also contain a cross liability clause, non-owned automobile liability and products and completed operations cover, to remain in place at all times during the performance of the Work. The deductible shall be borne by the contractor. The contractor shall not cancel, materially later, or cause the policy to lapse without providing at least thirty (30) calendar days prior written notice of the Contract Administrator.

D7.2 Deductibles shall be borne by the Contractor.

D7.3 The Contractor shall provide the Contract Administrator with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4 for the return of the executed Contract.

D7.4 The Contractor shall not cancel, materially alter, or cause the policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D7.5 The City shall have the right to alter the limits and/or coverages as reasonably required from time to time during the continuance of this agreement.

D8. MATERIAL SAFETY DATA SHEETS

D8.1 The Contractor shall provide the Contract Administrator with one (1) copy of Material Safety Data Sheets (MSDS's) for each product to be supplied under the Contract at least two (2) Business Days prior to the commencement of Work but in no event later than seven (7) Calendar Days from notification of the award of Contract.

D8.2 Throughout the term of the Contract, the Contractor shall provide the Contract Administrator with revisions or updates of the MSDS's as soon as may be reasonably possible.

SCHEDULE OF WORK

D9. COMMENCEMENT

D9.1 The Contractor shall not commence any Work until he/she is in receipt of a notice of award from the City authorizing the commencement of the Work.

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

- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence of authority to carry on business specified in D6; And;
 - (ii) the Material Safety Data Sheets specified in D8.

- (b) the Contractor has attended a meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a meeting.

D10. DELIVERY

- D10.1 Goods shall be delivered within one hundred (100) Calendar Day(s) of the award of Contract, f.o.b. destination, freight prepaid to:

North End Water Pollution Control Centre

2230 Main Street

Winnipeg, MB R2V 4T8

Attn: Wastewater Treatment Plant Supervisor

- D10.2 Goods shall be delivered between 8:30 a.m. and 3:30 p.m. on Business Days.

- D10.3 The Contractor shall off-load goods as directed at the delivery location.

D11. ORDERS

- D11.1 The Contractor shall provide a local Winnipeg telephone number or a toll-free telephone number at which orders for delivery may be placed.

D12. RECORDS

- D12.1 The Contractor shall keep detailed records of the goods supplied under the Contract.

- D12.2 The Contractor shall record, as a minimum, for each item listed on Form B: Prices:

- (a) user name(s) and addresses;
- (b) order date(s);
- (c) delivery date(s); and
- (d) description and quantity of goods supplied.

- D12.3 The Contractor shall provide the Contract Administrator with a copy of the records for each quarter year within fifteen (15) Calendar Days of a request of the Contract Administrator.

MEASUREMENT AND PAYMENT

D13. INVOICES

- D13.1 Further to C10, the Contractor shall submit an invoice for each order delivered to:

The City of Winnipeg

Corporate Finance - Accounts Payable

4th Floor, Administration Building, 510 Main Street

Winnipeg MB R3B 1B9

Facsimile No.: 204- 949-0864

Email: CityWpgAP@winnipeg.ca

- D13.2 Invoices must clearly indicate, as a minimum:

- (a) the City's purchase order number;
- (b) date of delivery;
- (c) delivery address;
- (d) type and quantity of goods delivered;

- (e) the amount payable with GST, MRST, and any applicable environmental handling charges/fees identified and shown as separate amounts; and
- (f) the Contractor's GST registration number.

D13.3 The City will bear no responsibility for delays in approval of invoices which are improperly submitted.

D13.4 Bids Submissions must be submitted to the address in B7.5.

D14. PAYMENT

D14.1 Further to C10, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

D15. PAYMENT SCHEDULE

D15.1 Further to C10, payment shall be in accordance with the following payment schedule:

- (a) Form B, Item 1:
 - (i) 80% upon delivery of the Goods.
 - (ii) 10% upon receipt and approval of the final operation and maintenance manuals.
 - (iii) 10% upon successful commissioning or six (6) months after delivery, whichever comes first.
- (b) Form B, Item 2:
 - (i) 100% upon the delivery of the Goods.

D16. WARRANTY

D16.1 The warranty period shall begin on the date of installation. The warranty period for each Digester Sludge Pump shall expire one (1) year from the date of the initial installation of each pump by the City.

D16.2 Further to C11 and D16.1, if a defect or deficiency prevents the full and normal use or operation of the Work or any portion thereof, for purposes of calculating the warranty period, time shall be deemed to cease to elapse for the defective or deficient portion, and for any portion of the Work whose use or operation is prevented by such defect or deficiency, as of the date on which the defect or deficiency is observed or the use or operation is prevented and shall begin to run again when the defect or deficiency has been corrected or the Work may be used or operated to the satisfaction of the Contract Administrator.

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

- E1.1 These Specifications shall apply to the Work.
- E1.2 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B6.
- E1.3 The following are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
B-89240	Existing Digester Sludge Pump Shop Drawing

E2. GOODS

- E2.1 The Contractor shall supply Digester sludge pumps in accordance with the requirements hereinafter specified.
- E2.2 Item No. 1 – Digester Sludge Pump shall be as per E5.
- E2.3 Item No. 2 – Spare Parts shall be as per E6.

E3. APPROVED MANUFACTURERS

- E3.1 The following manufacturers are approved;
- (a) Börger.
 - (b) LobePro.
 - (c) Or approved substitute in accordance with B6.
 - (i) Submittals must include complete product data including dimensioned drawings and performance characteristics.

E4. GENERAL REQUIREMENTS

- E4.1 Submittals
- E4.1.1 Description
- (a) This Specification shall revise, amend and supplement the requirements of CW 1100 of the City of Winnipeg's Standard Construction Specifications.
 - (b) The Contractor shall submit specified submittals to the Contract Administrator or designated representative for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be shown on all submissions for engineering review.
 - (c) Submittals shall be submitted electronically in .pdf format.
 - (d) Provision of submittals will be considered incidental to the price for supply and delivery of Goods.
- E4.1.2 Timeframe
- (a) Provide submittals within twenty-one (21) Calendar Days from the award of the contract.
- E4.1.3 Contractor's Responsibilities
- (a) Further to C6, the Contractor shall:

- (i) review submittals prior to submission, stamp and sign documents indicating conformance to the Contract requirements;
 - (ii) verify catalogue numbers and similar data;
 - (iii) coordinate each submission with requirements of Work and Contract Documents. Submittals of separate components of a larger system will not be reviewed until all related drawings are available;
 - (iv) notify the Contract Administrator or designate, in writing at time of submittal submission, of deviations from the requirements of the Contract.
- (b) The City's review does not relieve the Contractor of:
- (i) their obligation to perform the Work in strict accordance with the Contract
 - (ii) their responsibility for errors and omissions in their submittals
- (c) The Contractor shall make any corrections required by the Contract Administrator or designate and shall resubmit the submittals.
- (d) The Contractor shall clearly identify, in writing, or on resubmitted submittals any revisions other than those specifically requested by the Contract Administrator pursuant to E4.1.3(c).

E4.1.4 Submission Requirements

- (a) Accompany submissions with transmittal letter, containing:
- (i) Date
 - (ii) Project title and Bid Opportunity number
 - (iii) Contractor's name and address
 - (iv) Number of each Shop Drawing, product data and sample submitted
 - (v) Specification Section, Title, Number and Clause
 - (vi) Drawing Number and Detail/Section Number
 - (vii) Other pertinent data
- (b) Submissions shall include:
- (i) Date and revision dates.
 - (ii) Project title and Bid Opportunity number.
 - (iii) Name of:
 - ◆ Contractor
 - ◆ Subcontractor
 - ◆ Supplier
 - ◆ Manufacturer
 - ◆ Separate detailer when pertinent
 - (iv) Identification of product of material.
 - (v) Relation to adjacent structure or materials.
 - (vi) Field dimensions, clearly identified as such.
 - (vii) Specification section name, number and clause number or drawing number and detail/section number.
 - (viii) Applicable standards, such as CSA or CGSB numbers.
 - (ix) Contractor's stamp, initialed or signed, certifying review of submission and compliance with Contract Documents.

E5. DIGESTER SLUDGE PUMP

- E5.1 Supply rotary lobe Digester sludge pump assemblies complete with pump, motor, V-Belt drive and guard, and structural steel base.
- E5.1.1 Assemble and test all pump components prior to delivery.
- E5.1.2 The pumps shall be furnished complete and ready for use by the City. All parts not specifically mentioned but which are required to complete and place the pumps into

successful operation shall be furnished as though specifically mentioned in these specifications.

E5.2 Applicable Codes and Standards

E5.2.1 The following codes, standards and regulations in force on the closing date of the Bid Opportunity shall apply to the work:

- (a) American Bearing Manufacturers' Association (ABMA).
- (b) American Iron and Steel Institute (AISI).
- (c) American National Standards Institute (ANSI).
- (d) ASTM International (ASTM):
 - (i) A48/A48M, Standard Specification for Gray Iron Castings.
 - (ii) D2240, Standard Test Method for Rubber Property—Durometer Hardness.
- (e) Hydraulic Institute Standards (HIS): 9.6.4, Rotodynamic Pumps for Vibration Analysis and Allowable Values.
- (f) National Building Code of Canada (NBCC).
- (g) National Electrical Manufacturers' Association (NEMA): MG 1, Motors and Generators.
- (h) Manitoba Workplace Safety & Health.
- (i) OSHA 29 CFR 1910.
- (j) CSA C390, Energy Efficiency Test Methods for Three-Phase Induction Motors.
- (k) CSA Standard Z432-04, Safeguarding of Machinery.
- (l) ASME B16.5 Pipe Flanges and Flanged Fittings.
- (m) ASTM A278 Standard Specification for Grey Iron Castings for Pressure-Containing Parts for Temperatures up to 650 Degrees F (350 Degrees C).
- (n) ASTM A536 Standard Specifications for Ductile Iron Castings.
- (o) Welding to CSA and AISC as applicable.
- (p) Steel Structures Painting Code (SSPC).
- (q) CSA C22.1 Canadian Electrical Code - Part I.
- (r) CSA C22.2, No. 100 Motors and Generators.
- (s) CSA Z107.51 Procedure for In-Situ Measurement of Noise from Industrial Equipment.
- (t) NEMA MG1 Motors and Generators.
- (u) NEMA MG 2 Safety Standards for Motors and Generators.
- (v) IEEE 85 Test Procedure for Airborne Sound Measurements on Rotating Electrical Machinery.
- (w) IEEE 112 Standard Test Procedures for Polyphase Induction Motors and Generators.

E5.3 Identification

E5.3.1 Identify the pumps using the following tags:

- (a) W110-SFP
- (b) W120-SFP
- (c) W130-SFP
- (d) W140-SFP
- (e) W150-SFP
- (f) W160-SFP

E5.4 Submittals

E5.4.1 The Contractor shall submit the following in accordance with E4.1:

- (a) Complete information including: model, weight, horsepower, catalog information, descriptive literature, specifications, and materials of construction
- (b) Shop drawings / general arrangement drawings of pump skid assemblies including pump, drive, motor, and ancillary components. Include dimensions, size, and locations of connections and weights of associated equipment.
- (c) Pump performance characteristics. The data shall include curves indicating capacity, power, and mechanical efficiency plotted against discharge pressure.
- (d) Electrical power and control wiring diagrams, including terminals and numbers.
- (e) Complete motor nameplate data, as defined by NEMA, motor manufacturer, and including motor modifications.
- (f) Factory finish system.

E5.5 Quality Assurance

E5.5.1 Rotary lobe pump manufacturer shall be ISO 9001 certified.

E5.6 Service

E5.6.1 Each pump will be utilized to feed Digester sludge into an associated centrifuge for dewatering. Pumps will draw from a common header; which will be supplied with Digester sludge from storage tanks in the digester area.

E5.6.2 Line pressure in the common header will be maintained by the sludge transfer pumps in the digester area.

E5.6.3 Fluid characteristics:

- (a) Fluid type: Anaerobically Digester Sludge
- (b) Solids content: 3 – 5%
- (c) Solid size: <= 50 mm diameter
- (d) Temperature: 30 to 37.8 °C
- (e) pH: 6.5 to 7.5

E5.7 Application Requirements

E5.7.1 Pumping Requirements - Maximum:

- (a) Capacity: 22.0 l/s
- (b) Discharge Pressure: 103 kPa (15 psi)

E5.7.2 Pumping Requirements - Minimum:

- (a) Capacity: 3.2 l/s
- (b) Discharge Pressure: 103 kPa (15 psi)

E5.7.3 Environment

- (a) Ambient temperature: 5 to 40 °C
- (b) Elevation (Winnipeg, Manitoba, Canada): 235 m above sea level
- (c) Atmospheric contaminants: Low levels of H₂S

E5.7.4 Duty

- (a) Pumps shall be designed for heavy duty, continuous operation 24 hours per day.

E5.7.5 Suction / Discharge:

- (a) 150 mm / 150 mm ANSI Class 125, non-raised face

(b) Ports shall be oriented horizontally without offset

E5.7.6 Electrical Power Supply:

(a) 575 Volts, 3 Phase, VFD driven (VFD existing)

E5.8 Equipment Arrangement

E5.8.1 Each pump shall be shop assembled onto a structural steel base frame including pump, motor, drive coupling and guard(s).

(a) Motor to be located above the pump.

E5.8.2 The new pump assembly shall be consistent with the existing installation and allow for installation of the new pump assembly within the space of the existing assembly. The shop drawing of the existing pump assembly is included for reference.

E5.8.3 The pumps must fit on top of an existing concrete base:

(a) The size of the existing concrete base upon which each of the pumps will rest is:

- (i) Width: 737 mm (29")
- (ii) Length: 832 mm (32.75")
- (iii) Height: ~914 mm (36")

(b) The concrete base has a chamfered edge pedestal at the top to match the existing pump structural base. It is desired that the new pump structural base match the existing base bolting pattern, as shown on the existing shop drawing.

E5.8.4 Provide mechanical equipment, including drives and electric motors in accordance with applicable safety regulations. Unless otherwise specified, provide rigid painted steel or stainless steel guards on rotating assemblies. Guards shall be removable only by use of a tool.

E5.9 Pump

E5.9.1 General Requirements

(a) Heavy-duty positive displacement pump capable of handling Digester sludge on a continuous basis.

(b) Pumps shall be capable of running dry for up to 30 minutes without overheating or damaging effect to any of the components.

(c) Pumping units shall be capable of specified discharge capacities and heads when operating at the suction conditions, temperatures, specific gravities, viscosities and composition of the material being handled. Pumping units shall not overload the drivers at any point along the head-capacity curve from shut-off head to maximum capacity. At design conditions, and at maximum power along the pump curve, the power requirements shall not exceed the nameplate rating of the motor and associated drive systems.

E5.9.2 Performance Requirements

(a) Speed range: 10 – 100% of rated speed.

- (i) For reference, the speed range of existing pumps is 32 rpm (@ 6 Hz) to 320 rpm (@ 60 Hz).

(b) Minimum solids passing capability: 70 mm

E5.9.3 Casing

(a) The pump casing shall be cast iron ASTM A48 class 30 or higher.

(b) Pump Rotor Housing: Multi-piece to allow adjustment of rotor running clearance at least twice or shall include radial liners that can be replaced to restore running clearance.

(c) Provide access to pump chamber without disconnecting pipe work or bearings via removable front cover.

E5.9.4 Wear Plates

- (a) Rear of pump rotor casing and front cover shall be protected with replaceable wear plates having a minimum Brinell hardness of 500.
- (b) Front cover wear plate shall be reversible.
- (c) Wear Plate Bolts: Bolts that secure wear plates to castings inside pump assembly shall be stainless steel, hex head type.

E5.9.5 Sealing

- (a) O-rings to be FKM or NBR.
- (b) Lip seals to be NBR (Buna-N).

E5.9.6 Rotors

- (a) Rotors shall be helical tri or quad lobe screw rotor design and shall consist of a cast iron or ductile iron core coated with abrasion-resistant Buna-N suitable for sludge service with an average durometer hardness of 70 as per ASTM D2240. Alternatively, pump may utilize rotors with replaceable Buna-N 70 durometer tips. The length of the rotor shall not exceed its diameter. Rotors shall be keyed to the shaft with a cylindrical bore.

E5.9.7 Shaft and Gear Case

- (a) Carbon steel AISI A4140.
- (b) Protected from wetting by fluid being pumped or fabricated of carbon steel with ceramic coated stainless steel sleeves through seal area.

E5.9.8 Seals

- (a) The pumps shall be fitted with maintenance free, quenched mechanical seals with Duronit, silicon carbide or tungsten carbide seal faces. Cartridge style or component type mechanical seals that use bushings to permanently place seals are acceptable.
- (b) Seal Holders: Fabricated of materials that are suitable for prolonged corrosion and chemical resistance.
- (c) The mechanical seals shall be accessible for service from the pump chamber.
- (d) Pumps that utilize packing glands or require external flushing for lubrication and cooling are not acceptable.

E5.9.9 Quench/Blocking Chamber:

- (a) Oil-filled quench/blocking chamber located behind mechanical seal, and in front of bearing housing lip seal shall be molded into casting of pump.
- (b) Chamber shall be suitable for fill, from side of pump, through nipples and have an external sight glass or oil bottle for visual inspection of status of mechanical seal operation.
- (c) Lubrication and cooling of seals shall be via oil.

E5.9.10 Bearings and timing gear

- (a) Bearings and timing gear shall be located in a separate common oil-filled case iron gearbox, fitted with a built in sight glass to monitor oil level. The timing gear shall maintain non-contact between the rotors.
- (b) Bearing life shall be designed for an ABMA L-10 bearing life rating of 100,000 hours at constant speed design conditions, or 50,000 hours when operated with a variable frequency drive.
- (c) Bearings to be sized to withstand maximum radial or axial load carried by shafts for continuous duty.
- (d) Timing gears to meet AGMA Class 8 quality minimum.

- E5.9.11 V-Belt Drive
- (a) Motor shall be mounted above pump on adjustable base that allows adjustment of belt tension.
 - (b) Drive shall consist of pulleys with separate hubs attached to shafts with keys.
 - (c) Belts and pulleys shall be enclosed in removable metal guard that meets OSHA and CSA requirements. Guard shall allow measurement of pump rpm with strobe or contact meter without removing guard or via window.
- E5.9.12 Vibration
- (a) Pumps and motors shall operate at any point within their operating range without undue vibration. Vibration at any point in the operating range shall not exceed the limits allowed by the Hydraulic Institute.
- E5.9.13 Noise
- (a) Noise level of pump system, unless otherwise noted, shall not exceed limits established by ANSI/HI 3.1-3.5-2008 paragraph 3.3.17.3.
- E5.9.14 Service
- (a) Lubrication fitting shall be brought to outside of equipment so they are readily accessible from outside without necessity of removing covers, plates, housings, or guards.
 - (b) Mechanical seals, wear plates and rotors shall be replaceable by removing front cover of rotor housing without disassembly of pump unit or pipe system.
- E5.10 Structural Base
- E5.10.1 The pump, gear reducer, and motor shall be mounted on a structural steel baseplate, with structural channel supports as necessary, complete with couplings, guards, and mounting hardware.
- E5.10.2 Material
- (a) Pump and drive to be mounted on a common base, made from galvanized steel.
- E5.11 Motor
- E5.11.1 General Requirements
- (a) Three-phase squirrel cage induction type.
 - (b) Totally Enclosed Fan Cooled (TEFC).
 - (c) Premium efficiency.
 - (d) Inverter-duty rated.
- E5.11.2 Power
- (a) 11.2 kW (15 hp) unless otherwise approved by Contract Administrator.
- E5.11.3 Construction Requirements
- (a) Winding Insulation
 - (i) Class F insulation system.
 - (ii) Insulation system shall be treated to make stator windings and leads moisture proof.
 - (b) Copper conductors shall be used for stator windings and terminal leads.
 - (c) Frame designation shall comply with NEMA MG13-1.03 for the horsepower and speed specified where the horsepower is less than 200 hp at 1800 rpm.
 - (d) Enclosures shall completely enclose the motor. Designs in which the stator laminations form part of the enclosure are not acceptable.

- (e) Enclosures for motors smaller than 75 kW (100 hp) shall be constructed entirely of cast iron; for motors 75 kW (100 hp) and larger, cast iron or sheet steel enclosures are acceptable. Sheet steel shall have a minimum thickness of 3 mm (1/8 in.).
- (f) All motors weighing 140 kg (300 lb.) or more shall be provided with one or more eyebolts, rings or lugs, capable of supporting the weight of the motor. If concealed lugs are used, data plates shall be attached to both sides of the motor enclosure, warning against improper lifting.
- (g) Mounting: standard foot mounting.
- (h) Shaft and Coupling
 - (i) Motors shall be single shaft extension sized in accordance with NEMA standards and with shaft extension suitable for the type of drive unless otherwise specified.
- (i) Bearing and Lubrication
 - (i) Motors shall be equipped with antifriction bearings. The type of bearings chosen shall be determined from the radial and thrust loads, speed of rotation and duty of the drive to which the motor is applied.
 - (ii) Rolling element bearings shall be supplied to meet the requirements of the latest issue of ANSI applicable standards and shall be chosen to have rated L 10 life of 50,000 hours under actual service conditions.
 - (iii) Bearing housings shall preferably be provided with covers or end caps which are readily removable or can be backed off without dismantling the motor, to permit a visual check for the presence of grease. In addition, the grease fitting and relief plug shall be located so as to ensure complete lubrication of the bearing.
 - (iv) Bearing lubrication shall be suitable for minimum ambient temperature. Rolling element bearings shall preferably be grease lubricated and provided with suitable seals to keep foreign matter out and prevent the loss of grease.
 - (v) Pre-lubricated bearings are acceptable provided a trouble free service life of minimum 3 years can be achieved without re-lubrication.
 - (vi) Oil lubricated bearings shall be provided with means for positive indication of the running and standstill oil levels, and for inspection of the oil rings, where used.
 - (vii) Provision shall be made for complete drainage of oil from the bearing housings.
- (j) Terminal Boxes
 - (i) Terminal boxes shall be water proof and constructed in cast iron or steel. Sheet steel terminal boxes shall have a minimum thickness of 3 mm (1/8 in.).
 - (ii) Terminal boxes shall be arranged in such a way that a rotation of the box in 90° steps is possible and that either top, side or bottom entry of the conduit/cable may be achieved.
 - (iii) Terminal boxes shall be furnished with solderless compression type cable connectors suitable for the cable sizes required and with clamp terminals for grounding connections.
 - (iv) All terminal boxes shall be gasketed and joints sealed.
 - (v) On explosion proof motors, all terminal box joints shall be explosion proof, including the seal between motor and terminal box.

E5.11.4 Performance Requirements

- (a) Motors shall conform to NEMA Design B requirements, unless otherwise required by the driven equipment or as stated in the data sheets.
- (b) Motors shall be rated for continuous operation, full voltage starting, with service factor of 1.15.
- (c) Speed – as recommended by the manufacturer.

- (d) Torque Requirements
 - (i) The torque / power rating of the motor shall exceed the pump power requirements at any point on the pump capacity-head curve.
 - (ii) Motors shall have minimum values of torque in accordance with the requirements of NEMA MG1 12.
 - (iii) In addition, motors shall be sized to provide sufficient torque to start and accelerate the driven load at 80% rated voltage at the motor terminals.
 - (iv) Motor torque characteristics shall be subject to the Contract Administrator's approval.
- (e) Efficiency:
 - (i) Tested in accordance with CSA C390, paragraph 12.59.
 - (ii) Guaranteed minimum at full load in accordance with Section 12.60 Table 12-12 of NEMA MG 1.
- (f) Temperature Rise
 - (i) The temperature rise of the windings at rated output shall not exceed 80°C above the maximum ambient temperature of 40°C, as measured by resistance. The intent of this requirement is to ensure that the motor can operate continuously at its rated output without exceeding hot spot copper temperature of 130°C, based on a rated ambient temperature of 40°C.
- (g) Noise Level
 - (i) Motors to be designed and certified for 85 dBA maximum noise level when measured in accordance with IEEE No. 85.
- (h) Rotor Construction
 - (i) The rotor bars shall not be insulated from the rotor body laminations. They shall be installed with tight fit over the full length of the rotor so as to avoid fatigue failure. No slot filler material shall be used.
 - (ii) The direction of rotor rotation shall be indicated on the non-driving end by means of a permanently marked arrow. Painted arrow will not be acceptable.
 - (iii) Cooling fans for motors 75 kW (100 hp) or smaller shall be suitable for rotation in either direction. A fan impeller may form part of the rotor and shall force the cooling air from the non-driving end towards the driving end.
- (i) Finish
 - (i) Exterior and interior surfaces shall be cleaned, given rust-inhibiting treatment, primed and painted with a minimum of two coats of exterior type paint.
 - (ii) Internal parts of the motor exposed to the cooling air shall be made of corrosion resisting material or have corrosion resisting plating or treatment. Machined fits shall be coated with corrosion resisting material.

E5.11.5 Nameplates

- (a) Motor nameplates shall conform to CSA Standards and in addition carry the CSA or cUL approval number where motors are specified for hazardous locations.
- (b) Motor nameplates shall be stainless steel, fixed to a non-removable part of the motor enclosure with stainless steel screws.
- (c) In addition to the nameplate information detailed by CSA Standards, the following information must be included on the motor nameplate or on a separate nameplate:
 - (i) motor service factor
 - (ii) bearing manufacturer, type, size and part number
 - (iii) total weight and individual weights of the rotor and stator
 - (iv) heater rating and connection details
 - (v) recommended grade of lubricant
 - (vi) the motor shall also bear a "CSA Approved" or "cUL Approved" label
 - (vii) area classification.

E5.11.6 Tests

- (a) Standard routine tests shall be conducted on all motors, in accordance with the applicable standards listed in this specification.
- (b) In addition to the above, other tests shall be conducted as specified by the applicable standards. Any other tests normally performed by the manufacturer to assure quality and conformance to this specification shall also be carried out.

E5.12 Factory Quality Control

E5.12.1 Functional Test:

- (a) Conduct on each pump.
- (b) Perform manufacturer's standard production tests.

E5.12.2 Performance Test:

- (a) Conduct on each pump.
- (b) Perform under simulated operating conditions.
- (c) Test for a continuous 3-hour period without malfunction.

E5.12.3 Hydrostatic Test:

- (a) Test pump casing at 150 percent of shutoff head for a minimum of five minutes.

E5.12.4 Motor Test:

- (a) In accordance with CSA C390 for polyphase motors and for single-phase motors.
- (b) Routine (production) tests on all motors in accordance with NEMA MG 1. Test multispeed motors at all speeds.
- (c) For energy efficient motors, test efficiency at 50, 75, and 100 percent of rated horsepower in accordance with CSA C390 or IEEE 112, Test Method B, and NEMA MG 1, paragraphs 12.59 and 12.60.
 - (i) For motors 74 kW and smaller, furnish a certified copy of a motor efficiency test report on an identical motor.
- (d) Power Factor.
- (e) Speed.
- (f) Current at rated horsepower.
- (g) kW input at rated horsepower.
- (h) Vibration (balance).

E5.12.5 Test Report Forms:

- (a) Routine Tests: IEEE 112, Form A-1.
- (b) Efficiency and power factor by CSA C390 or Test Method B, IEEE 112, Form A-2, and NEMA MG 1.
- (c) Efficiency and power factor by CSA C390 or Test Method F, IEEE 112, Forms F-1, F-2, and F-3.

E5.13 Operation and Maintenance Manuals

E5.13.1 Supply and deliver operation and maintenance manuals, in English, for the compressors.

E5.13.2 Number of copies required:

- (a) Six (6) paper copies.
- (b) Two (2) electronic copies, PDF format on two (2) separate Compact Disks (CDs).

E5.13.3 Format

- (a) Supply paper copies in binders: vinyl, hard covered, 3 'D' ring, with spine and face pockets.

- (b) Provide overall Title sheet, labelled "Operation and Maintenance Manual", and containing the following:
 - (i) project name and date
 - (ii) City's Contract number
 - (iii) the name and address of the Contractor
 - (iv) and the issue date.
- (c) Provide overall table of contents and labelled dividers for each section.
- (d) Drawings to be provided with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

E5.14 Contents

- (a) As-built drawings
- (b) Detailed instruction, operation, and maintenance instructions.
- (c) Dimensioned installation drawings.
- (d) Arrangement drawings, incorporating a complete bill of materials.
- (e) A complete parts list.
- (f) Motor data sheet.

E5.15 Maintenance Guarantee

- E5.15.1 Provide a guarantee that under normal operation at specified conditions, that the pumps will be maintenance free for 6,000 operating hours or twelve (12) months, whichever comes earlier.
- E5.15.2 The Contractor shall provide all replacement parts and components for maintenance required during the Maintenance Guarantee period at no additional cost.

E6. SPARE PARTS

- E6.1 Supply one (1) complete set of spare parts for each pump model. The spare parts shall be based upon the greater of the manufacturer's recommended spare parts and the following:
 - (a) One (1) complete set of bearings.
 - (b) One (1) complete set of gaskets and seals.
 - (c) One (1) complete set of keys, dowels and pins.
 - (d) One (1) complete set of mechanical seals for one pump.
 - (e) One (1) complete set of drive V-belts.
 - (f) One (1) complete set of rotor tips and o-rings. If replaceable rotor tips are not proposed, one set of rotors shall be supplied.
 - (g) One (1) complete set of wear plates.
 - (h) One (1) complete set of housing segments or radial liners.
 - (i) One (1) complete set of all special tools required to maintain or dismantle pump.

E7. TRAINING

- E7.1 Not required for rotary lobe pumps. Any alternate pump approved under B6 would be subject to training requirements.