



**THE CITY OF WINNIPEG**

# **BID OPPORTUNITY**

**BID OPPORTUNITY NO. 956-2011**

**SUPPLY AND DELIVERY OF DIGESTER SLUDGE RECIRCULATION PUMP(S)**

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## **PART B - BIDDING PROCEDURES**

### **B1. CONTRACT TITLE**

B1.1 SUPPLY AND DELIVERY OF DIGESTER SLUDGE RECIRCULATION PUMP(S)

### **B2. SUBMISSION DEADLINE**

B2.1 The Submission Deadline is 4:00 p.m. Winnipeg time, December 12, 2011.

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

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

### **B3. 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. ADDENDA**

B4.1 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.

B4.2 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.

B4.2.1 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>

B4.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B4.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 7 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

## **B5. SUBSTITUTES**

- B5.1 The Work is based on the materials, equipment, methods and products specified in the Bid Opportunity.
- B5.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B5.3 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.
- B5.4 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.
- B5.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B5.6 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.
- B5.6.3 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.
- B5.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B5.8 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 B13.
- B5.9 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.
- B5.10 Notwithstanding B5.2 to B5.9, and in accordance with B6.7, deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B13.1(a).

## **B6. BID SUBMISSION**

- B6.1 The Bid shall consist of the following components:

- (a) Form A: Bid;
- (b) Form B: Prices.

- B6.2 Further to B6.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B5.
- B6.3 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.
- B6.4 The Bid Submission may be submitted by mail, courier or personal delivery, or by facsimile transmission.
- B6.5 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
- B6.5.4 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.
- B6.6 Bidders are advised not to include any information/literature except as requested in accordance with B6.1.
- B6.7 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 B13.1(a).
- B6.8 If the Bid Submission is submitted by facsimile transmission, it shall be submitted to (204) 949-1178.
- B6.8.5 The Bidder is advised that the City cannot take responsibility for the availability of the facsimile machine at any time.
- B6.9 Bids submitted by internet electronic mail (e-mail) will not be accepted.

**B7. BID**

- B7.1 The Bidder shall complete Form A: Bid, making all required entries.
- B7.2 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.
- B7.2.6 If a Bid is submitted jointly by two (2) or more persons, each and all such persons shall identify themselves in accordance with B7.2.
- B7.3 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.

- B7.4 Paragraph 9 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, it shall be signed by the Bidder;
  - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
  - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers;
  - (d) if the Bidder is carrying on business under a name other than his own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B7.4.7 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.
- B7.4.8 All signatures shall be original.
- B7.5 If a Bid is submitted jointly by two (2) 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.

## **B8. PRICES**

- B8.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B8.1.9 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.
- B8.2 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.
- B8.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

## **B9. QUALIFICATION**

- B9.1 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.
- B9.2 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>

B9.3 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).

B9.4 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.

B9.5 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.

## **B10. OPENING OF BIDS AND RELEASE OF INFORMATION**

B10.1 Bids will not be opened publicly.

B10.2 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>

B10.3 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>

B10.4 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.

## **B11. IRREVOCABLE BID**

B11.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 8 of Form A: Bid.

B11.2 The acceptance by the City of any Bid shall not release the Bids of the next two (2) lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work for the time period specified in Paragraph 8 of Form A: Bid.

## **B12. WITHDRAWAL OF BIDS**

B12.1 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.

B12.1.10 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.

- B12.1.11 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 9 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B12.1.12 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 9 of Form A: Bid; and
  - (c) if the notice has been given by any one of the persons specified in B12.1.12(b), declare the Bid withdrawn.
- B12.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B11.2 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.

### **B13. EVALUATION OF BIDS**

- B13.1 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 B9 (pass/fail);
  - (c) Total Bid Price 100%;
  - (d) economic analysis of any approved alternative pursuant to B5.
- B13.2 Further to B13.1(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.
- B13.3 Further to B13.1(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.
- B13.4 Further to B13.1(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.
- B13.4.13 If there is any discrepancy between the Total Bid Price written in figures, the Total Bid Price written in words and the sum of the quantities multiplied by the unit prices for each item, the sum of the quantities multiplied by the unit prices for each item shall take precedence.
- B13.4.14 Further to B13.1(a), in the event that a unit price is not provided on Form B: Prices, the City will determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.
- B13.5 This Contract will be awarded as a whole.

### **B14. AWARD OF CONTRACT**

- B14.1 The City will give notice of the award of the Contract or will give notice that no award will be made.



- B14.2 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.
- B14.2.15 Without limiting the generality of B14.2, 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.
- B14.3 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 B13.
- B14.3.16 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.
- B14.4 Notwithstanding C4 and Paragraph 5 of Form A: Bid, the City will issue a Purchase Order to the successful Bidder in lieu of the execution of a Contract.
- B14.5 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.
- C0.1.17 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](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 recirculation pump(s) to be utilized in the digester sludge recirculation systems at the North End Water Pollution Control Centre.

#### **D3. CONTRACT ADMINISTRATOR**

D3.1 The Contract Administrator is:

John Amos  
Wastewater Treatment Plant Supervisor  
2230 Main Street  
Winnipeg MB  
R2V 4T8

Telephone No.: (204) 986-4845

Facsimile No.: (204) 986-4809

#### **D4. NOTICES**

D4.1 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**

#### **D5. AUTHORITY TO CARRY ON BUSINESS**

D5.1 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.

### **SCHEDULE OF WORK**

#### **D6. COMMENCEMENT**

D6.1 The Contractor shall not commence any Work until he is in receipt of a notice of award from the City authorizing the commencement of the Work.

D6.2 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 D5; and
  - (ii) evidence of the workers compensation coverage specified in C6.16.
- (b) the Contractor has attended a meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a meeting.

## **D7. DELIVERY**

D7.1 Goods shall be delivered within fifty-six (56) Calendar Day(s) of the award of contract, f.o.b. destination, freight prepaid to:

Glen Greenaway  
North End Water Pollution Control Centre (N.E.W.P.C.C.)  
Wastewater Treatment Plant  
2230 Main Street  
Winnipeg MB R2V 4T8

D7.2 The Contractor shall confirm the delivery with the Contract Administrator or his/her designate, at least two (2) Business Days before delivery.

D7.3 The Contractor shall off-load goods as directed at the delivery location.

D7.4 Preparation for Shipment

- (a) Surfaces shall be free from all contaminants including moisture, dirt, grease, and rust.
- (b) All items shall be suitably protected from damage during shipping and handling.
- (c) All flange faces and other machined surfaces shall be coated with a rust preventative and protected with covers.
- (d) Bolts and nuts shall be coated with a suitable thread lubricant to prevent galling.
- (e) All bolting and other parts shall be suitably packaged and identified to avoid loss or damage during shipment.
- (f) Pump shall not be released for shipment without the approval of the Contract Administrator.

## **MEASUREMENT AND PAYMENT**

### **D8. INVOICES**

D8.1 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](mailto:CityWpgAP@winnipeg.ca)

D8.2 Invoices must clearly indicate, as a minimum:

- (a) the City's purchase order number;
- (b) date of delivery;
- (c) delivery address;
- (d) type and quantity of goods delivered;
- (e) the amount payable with GST and MRST shown as separate amounts; and
- (f) the Contractor's GST registration number.

D8.3 The City will bear no responsibility for delays in approval of invoices which are improperly submitted.

D8.4 Bids Submissions must be submitted to the address in B6.5.

**D9. PAYMENT**

D9.1 Further to C10, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

D9.2 Further to C10, payment shall be in Canadian funds net thirty (30) Calendar Days after receipt and approval of the Contractor's invoice.

**WARRANTY**

**D10. WARRANTY**

D10.1 Warranty is as stated in C11.

## **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 B5.

#### **E2. GOODS**

- E2.1 The Contractor shall supply and deliver a digester sludge recirculation pump(s) and drive assemblies in accordance with E3.
- E2.2 The Contractor shall also supply spare part sets as identified in E4.

#### **E3. DIGESTER SLUDGE RECIRCULATION PUMP**

- E3.1 Digester sludge recirculation pump assembly complete with pump, motor, direct drive coupler and guard, fabricated steel base, all shop assembled, and tested. The Contractor shall include all items, accessories and services that are usual or necessary to complete the work, but which may not have been specifically mentioned herein.

- E3.2 Applicable Codes and Standards:

- (a) The following codes, standards and regulations in force on the closing date of the Bid Opportunity shall apply to the work:
- (i) National Building Code of Canada
  - (ii) Canadian Electrical Code
  - (iii) Manitoba Workplace Safety & Health
  - (iv) Guards to OSHA 29 CFR 1910
  - (v) CSA Standard Z432-04, Safeguarding of Machinery.
  - (vi) ASME/ANSI B16.1 Cast Iron Pipe Flanges and Flanged Fittings
  - (vii) ASTM A536 Standard Specifications for Ductile Iron Castings
  - (viii) Welding to CSA and AISC as applicable
  - (ix) Steel Structures Painting Code (SSPC)
  - (x) CSA C22.1 Canadian Electrical Code - Part I
  - (xi) CSA C22.2, No. 100 Motors and Generators
  - (xii) CSA C22.2, No. 145 Motors and Generators for Use in Hazardous Locations
  - (xiii) CSA Z107.51 Procedure for In-Situ Measurement of Noise from Industrial Equipment
  - (xiv) NEMA MG1 Motors and Generators
  - (xv) NEMA MG 2 Safety Standards for Motors and Generators
  - (xvi) IEEE 85 Test Procedure for Airborne Sound Measurements on Rotating Electrical Machinery
  - (xvii) IEEE 112 Test Procedure for Polyphase Induction Motors and Generators

- E3.3 Identification:

- (a) Provide stainless steel nameplate attached to the pump listing the Manufacturer, Model, Serial No., rated capacity, head, speed and other pertinent data.

- E3.4 Submittals:

- (a) Submit the following after award and prior to delivery of the products which shall contain a section in **English**:
- (i) Submit shop drawings / general arrangement drawings of pump package assembly including pump, drive, motor, and steel base for review prior to fabrication.
  - (ii) Submit pump performance curve.
  - (iii) Submit Installation, Operating and Maintenance (IOM) manual, complete parts list, and list of recommended spare parts.
  - (iv) Provide one (1) set of submittals in electronic format (.pdf).

E3.5 Design Conditions:

- a) The equipment shall be designed and constructed to meet the following service conditions and minimum performance parameters:
- (i) **Environment:** digester sludge recirculation pumps are to be installed inside the wastewater treatment plant, which has an electrical classification of Class I, Zone 2, Group IIA hazardous location. The temperature code for the space is T2A (280°C). All motors located in the space must be rated and installed in accordance with the applicable code requirements.
  - (ii) **Elevation** (Winnipeg, Manitoba, Canada): 235 m above sea level.
  - (iii) **Ambient temperature:** 5 to 40 degrees C.
  - (iv) **Duty:** digester sludge recirculation pumps shall be designed for heavy duty, continuous operation 24 hours per day.
  - (v) **Electrical Power Supply:** 575 Volts, 3 Phase, 60 Cycles.
  - (vi) **Service:** digester sludge with properties as follows:
    - Digester Sludge: 3% to 6% concentration
    - Max. solids size: 65mm dia.
    - Other: Pump to be designed to chop though high concentrations of solids such as plastics, heavy rags, grease and hair balls, wood, and stringy materials without plugging.
  - (vii) Pumping Requirements

Sludge Temp (Deg C)	32 - 38
Capacity (M <sup>3</sup> /hr) / (L/s) at	135 / 37.5
Rated Head (M)	10.5
Pump speed (rpm)	1170
Power Required	
at Specified Conditions (kW)	By Contractor
Motor Size (kW)	By Contractor
Preferred Motor Size (kW)	11.2

E3.6 Equipment Arrangement:

- (a) Digester sludge recirculation pump is to be shop assembled onto a structural steel base frame including pump, motor, in-line direct drive coupling and guard.
- (b) Pump inlet orientation: horizontal
- (c) Pump discharge orientation: upwards

E3.7 Pump Construction:

- (a) Casing and Back Pull-Out Plate: The pump casing shall be of volute design, spiraling outward to the 125 lb. flanged centerline discharge. Back pull-out design shall incorporate jacking bolts for accurate adjustment of impeller-to-cutter bar clearance, and shall allow removal of pump components without requiring disconnection of casing from inlet or discharge piping. Casing & back-plate shall be ductile cast iron with all water passages to

be smooth, and free of blowholes and imperfections for good flow characteristics. A pressure tap shall be included on or near the discharge flange. Back-plate shall include a replaceable Rockwell C 60 steel cutter adjustable for 0.005-0.015" clearance to cut against the rotating impeller pump-out vanes for removing fibre and debris.

- (b) Impeller: Shall be semi-open type with pump out vanes to reduce seal area pressure. Chopping/maceration of materials shall be accomplished by the action of the cupped and sharpened leading edges of the impeller blades moving across the cutter bar at the intake openings, with a maximum set clearance between the impeller and cutter bar of 0.015-0.025" cold. Impeller shall be cast alloy steel heat treated to minimum Rockwell C 60 and dynamically balanced. The impeller shall be keyed to the shaft and shall have no axial adjustments and no set screws.
- (c) Cutter Bar Plate: Shall be recessed into the pump bowl and shall contain at least 2 shear bars extending diametrically across the intake opening to within 0.010-0.020" of the rotating cutter nut tooth, for the purpose of preventing intake opening blockage and wrapping of debris at the shaft area. Chopper pumps utilizing individually mounted shear bars shall not be acceptable. Cutter bar shall be alloy steel heat-treated to minimum Rockwell C 60.
- (d) Cutter Nut: The impeller shall be secured to the shaft using a cutter nut, designed to cut stringy materials and prevent binding using a raised, rotating cutter tooth. The cutter nut shall be cast steel heat treated to minimum Rockwell C 60.
- (e) Upper Cutter: Shall be threaded into the back pull-out adapter plate behind the impeller, designed to cut against the pump-out vanes and the impeller hub, reducing and removing stringy materials from the mechanical seal area. Upper cutter shall be cast steel heat treated to minimum Rockwell C 60. The upper cutter teeth are positioned as closely as possible to the center of shaft rotation to minimize cutting torque and nuisance motor tripping. The ratio of upper cutter cutting diameter to shaft diameter in the upper cutter area of the pump shall be 3.0 or less.
- (f) Pump Shafting: Shall be heat treated alloy steel.
- (g) Bearings: Shall be oil-bath lubricated with ISO Gr. 100 turbine oil. Shaft thrust in both directions shall be taken up by two back-to-back mounted single-row angular contact ball bearings. Two adjacently mounted single-row radial bearings shall also be provided. B10 bearing life shall be minimum 100,000 hours.
- (h) Bearing Housing: Shall be ductile cast iron and machined with piloted bearing fits for concentricity of all components. Bearing housing shall include a side-mounted site glass. Viton® double lip seals riding on stainless steel shaft sleeves are to provide sealing at each end of the bearing housing. Thrust bearings are mounted in an adjustable cartridge to allow external upper cutter adjustment.
- (i) Mechanical Seal system specifically designed to require no seal flush: The mechanical seal shall be located immediately behind the impeller hub to eliminate the stuffing box and maximize the flushing available from the impeller pump-out vanes. The seal shall be a cartridge-type mechanical seal with Viton O-rings and silicon carbide faces. This cartridge seal shall be a pre-assembled, and pre-tested so that no seal settings or adjustments are required from the installer. Any springs used to push the seal faces together must be shielded from the fluid to be pumped. The cartridge shall also include a 17-4PH, heat-treated seal sleeve and a CF8M stainless steel seal gland.
- (j) Inlet Manifold: Shall be cast ductile iron assembly mounted horizontally with a 125 lb. inlet flange, ½"-NPT pressure tap, cleanout, drain connection and mounting feet.

### E3.8 Motor:

- (a) Data Sheets.
  - (i) Contractor shall complete the data sheets and return to Buyer as stipulated in the Contractor Data and Drawing Requirements Sheet(s);
  - (ii) Data and information provided by Contractor in the data sheets will be considered contractually binding, since they will be used in the overall system design.



- (b) Motors shall be three phase squirrel cage induction type.
- (c) Motors to be premium efficiency.
- (d) Motors to be inverter duty rated.
- (e) Motors shall conform to NEMA Design B requirements, unless otherwise required by the driven equipment or as stated in the data sheets.
- (f) Motors shall be rated for continuous operation, full voltage starting, with service factor of 1.15.
- (g) Speed – as required for direct drive application.
- (h) Type: TEFC
- (i) 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.
- (j) Winding Insulation:
  - (i) Three-phase, integral horsepower motors shall be insulated with class F insulation system.
  - (ii) Insulation system shall be treated to make stator windings and leads moisture proof.
  - (iii) Copper conductors shall be used for stator windings and terminal leads.
- (k) Torque Requirements:
  - (i) Motors shall have minimum values of torque in accordance with the requirements of NEMA MG1 12. The Contractor shall provide motors with adequate torque to suitably start, accelerate and operate the driven equipment.
  - (ii) 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.
  - (iii) Motor torque characteristics shall be subject to the Contract Administrator's approval.
- (l) Noise Level:
  - (i) Motors to be designed and certified for 85 dBA maximum noise level when measured in accordance with IEEE No. 85.
- (m) Motors shall be approved for Class I, Zone 2, Group IIA, Temperature Code T2A (280 deg C) in accordance with Section 18 of CSA Standard C22.1.
- (n) 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.
- (o) Enclosures shall completely enclose the motor. Designs in which the stator laminations form part of the enclosure are not acceptable.
- (p) 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.).
- (q) 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.
- (r) Mounting: standard foot mounting.
- (s) Shaft and Coupling:
  - (i) Motors shall be single shaft extension sized in accordance with EEMAC/NEMA standards and with shaft extension suitable for the type of drive unless otherwise specified.

- (t) 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. Provision shall be made for complete drainage of oil from the bearing housings.
- (u) 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.
  - (iv) For motors used in hazardous locations and generally on all totally enclosed motors, fan impellers shall be made of non sparking material.
- (v) 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.
- (w) Nameplates:
- (i) Motor nameplates shall conform to CSA Standards and in addition carry the CSA or cUL approval number where motors are specified for hazardous locations.
  - (ii) Motor nameplates shall be stainless steel or non corrodible alloy, fixed to a non removable part of the motor enclosure with stainless steel screws.
  - (iii) 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:
    - motor service factor
    - bearing manufacturer, type, size and part number
    - total weight and individual weights of the rotor and stator
    - heater rating and connection details
    - recommended grade of lubricant
    - the motor shall also bear a "CSA Approved" or "cUL Approved" label
    - area classification.

- (x) Voltage Rating and Power Supply:
  - (i) Motors shall be rated 575 volts, 3 phase, 60 Hz for operation on a 600 volt, 3 phase, 60 Hz system.
  - (ii) Motors shall operate successfully with any variation of voltage or frequency permitted in NEMA MG1 12.44.
- (y) Terminal Boxes:
  - (i) Terminal boxes shall be located on the right side of the motor when viewed from the bell (non driving) end.
  - (ii) 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.).
  - (iii) 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.
  - (iv) Terminal boxes shall be furnished with solderless compression type cable connectors suitable for the cable sizes required and with clamp terminals for grounding connections.
  - (v) All terminal boxes shall be gasketed and joints sealed.
  - (vi) Main terminal boxes shall not restrict the ventilating air flow and shall not interfere with any other motor accessory.
- (z) Wire Markers:
  - (i) All cable terminations shall be clearly and permanently marked using shrink on sleeve type wire markers approved for terminal wiring at each terminal point. Wire and terminal numbers used shall be identical on equipment and on all drawings and diagrams where they are shown.
  - (ii) Marking of terminals and leads shall be as per NEMA MG1.
- (aa) Tests:
  - (i) Standard routine tests shall be conducted on all motors, in accordance with the applicable standards listed in this specification.
  - (ii) 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.

#### E3.9 Pump Drive Components:

- (a) All rotating drive components shall be personnel protected by removable, total enclosed guard assemblies.
- (b) Pumps shall be direct driven with the main drive motor by means of a coupling including driver and driven coupling halves and necessary bolts and shear protection. Drive shall also include a suitable OSHA compliant non-sparking coupling guard.
- (c) Bearing housing and motor stool design is to provide accurate alignment. Pump and motor coupling shall be T.B. Woods Sureflex elastomeric type or approved equal.

#### E3.10 Structural Steel Base:

- (a) The pump, driver and motor shall be shop assembled and mounted on a structural steel base frame as an integral unit. The frame shall be constructed with 1018 mild steel and welded in accordance with CSA or AISC standards. Skid to include anchor bolt holes, and lifting eyes. Base frame surface preparation to be sand blasted to SSPC-SP6 or better and painted with zinc-rich primer and finish coat of epoxy paint system.

#### E3.11 Inspection:

- (a) The Contractor is responsible for the testing and inspection of all materials and work in accordance with this specification and all applicable codes, laws, and regulations.
- (b) The Contractor shall submit all applicable inspection, testing, and quality control procedures for approval.

- (c) The Contractor shall notify the Contract Administrator prior to the start of fabrication, and when components are completed and ready for final inspection and tests. The City reserves the right for its authorized representative to inspect the equipment at any time during their fabrication to assure that materials and workmanship are in accordance with this Specification and applicable Codes.

#### E3.12 Operation and Maintenance Manuals

- (a) Supply four (4) Operation and Maintenance manuals, in English, for the pumps.
- (b) Provide overall Title page, 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.
- (d) Include all as-built drawings.
- (e) Operation and Maintenance manuals must include:
  - (i) Detailed instruction, operation, and maintenance instructions;
  - (ii) Dimensioned installation drawings;
  - (iii) Arrangement drawings, incorporating a complete bill of materials;
  - (iv) A complete parts list;
  - (v) Motor data sheet.

### **E4. SPARE PARTS**

#### E4.1 Spare Parts

- (a) Provide the following spare:
  - (i) One (1) impeller;
  - (ii) One (1) cutter bar;
  - (iii) One (1) upper cutter;
  - (iv) One (1) cutter nut;
  - (v) One (1) set of 5 shims for upper cutter;
  - (vi) One (1) flushless mechanical seal.