THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 431-2006

INSTALLATION OF SUBMERSIBLE PUMPING UNITS AND UPGRADES TO THE BOURNAIS WASTEWATER PUMPING STATION

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B2. SUBMISSION DEADLINE

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

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

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

B3. SITE INVESTIGATION

B3.1 Further to GC:3.1, the Bidder may make an appointment to view the Site by contacting the Contract Administrator.

B3.2 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.

B4. ENQUIRIES

B4.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.

B4.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.

B4.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B4.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.

B5. ADDENDA

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

B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

B5.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at http://www.winnipeg.ca/matmgt.

B5.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Branch internet site for addenda shortly before submitting his Bid.

B5.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 9 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B6. SUBSTITUTES

B6.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.

B6.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B6.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.

B6.4 The Bidder shall ensure that any and all requests for approval of a substitute:

(a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;

(b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;

(c) identify any anticipated cost or time savings that may be associated with the substitute;

(d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;

(e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.

B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.

B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.

B6.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.

B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

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

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

B7. BID SUBMISSION

B7.1 The Bid Submission consists of the following components:

(a) Form A: Bid;

(b) Form B: Prices;

(c) Form G1: Bid Bond and Agreement to Bond, or
Form G2: Irrevocable Standby Letter of Credit and Undertaking, or
a certified cheque or draft;

B7.2 All components of the Bid Submission shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely in ink, to constitute a responsive Bid.

B7.3 The Bid Submission shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.

B7.3.1 Samples or other components of the Bid Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder’s Bid Submission.

B7.4 Bid Submissions submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B7.5 Bid Submissions shall be submitted to:

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

B8. BID

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

B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:

(a) if the Bidder is a sole proprietor carrying on business in his own name, his name shall be inserted;

(b) if the Bidder is a partnership, the full name of the partnership shall be inserted;

(c) if the Bidder is a corporation, the full name of the corporation shall be inserted;

(d) if the Bidder is carrying on business under a name other than his own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.

B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.

B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

B8.4 Paragraph 11 of Form A: Bid shall be signed in accordance with the following requirements:

(a) if the Bidder is a sole proprietor carrying on business in his own name, it shall be signed by the Bidder;

(b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;

(c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, should be affixed;

(d) if the Bidder is carrying on business under a name other than his own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

B8.4.1 The name and official capacity of all individuals signing Form A: Bid shall be printed below such signatures.

B8.4.2 All signatures shall be original and shall be witnessed except where a corporate seal has been affixed.

B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid Submission and the Contract, when awarded, shall be both joint and several.

B9. PRICES

B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B9.1.1 Notwithstanding GC.12.2.3(c), prices on Form B: Prices shall not include the Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable.

B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.

B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B10. QUALIFICATION

B10.1 The Bidder shall:

(a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba;

(b) be responsible and not be suspended, debarred or in default of any obligation to the City;

(c) be financially capable of carrying out the terms of the Contract;

(d) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract;

(e) have successfully carried out work, similar in nature, scope and value to the Work;

(f) employ only Subcontractors who:

(i) are responsible and not suspended, debarred or in default of any obligation to the City (a list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at http://www.winnipeg.ca/matmgt); and

(ii) have successfully carried out work similar in nature, scope and value to the portion of the Work proposed to be subcontracted to them, and are fully capable of performing the Work required to be done in accordance with the terms of the Contract;

(g) have a written workplace safety and health program in accordance with The Workplace Safety and Health Act (Manitoba);

B10.2 Further to B10.1(g), the Bidder shall, within three (3) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

(a) a valid COR certification number under the Certificate of Recognition (COR) Program - Option 1 administered by the Manitoba Heavy Construction Association's Safety, Health and Environment Program; or

(b) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association; or

(c) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at http://www.winnipeg.ca/matmgt.)

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

B10.4 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B11. BID SECURITY

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

(a) a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond); or

(b) an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Bid Price, and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form included in the Bid Submission (Form G2: Irrevocable Standby Letter of Credit and Undertaking); or

(c) a certified cheque or draft payable to "The City of Winnipeg", in the amount of at least fifty percent (50%) of the Total Bid Price, drawn on a bank or other financial institution registered to conduct business in Manitoba.

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

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

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

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

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

B12. OPENING OF BIDS AND RELEASE OF INFORMATION

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

B12.1.1 Bidders or their representatives may attend.

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

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

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

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

B13. IRREVOCABLE BID

B13.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 10 of Form A: Bid.

B13.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the performance security furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 10 of Form A: Bid.

B14. WITHDRAWAL OF BIDS

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

B14.1.1 Notwithstanding GC:23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.

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 11 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 shall:

(a) retain the Bid Submission until after the Submission Deadline has elapsed;

(b) open the Bid Submission to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 11 of Form A: Bid; and

(c) if the notice has been given by any one of the persons specified in B14.1.3(b), declare the Bid withdrawn.

B14.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B13.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B15. EVALUATION OF BIDS

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

(a) compliance by the Bidder with the requirements of the Bid Opportunity (pass/fail);

(b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B10 (pass/fail);

(c) Total Bid Price;

(d) economic analysis of any approved alternative pursuant to B6.

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

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

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

B15.4.1 If there is any discrepancy between the Total Bid Price written in figures, the Total Bid Price written in words and the sum of the quantities multiplied by the unit prices for each item, the sum of the quantities multiplied by the unit prices for each item shall take precedence.

B16. AWARD OF CONTRACT

B16.1 The City will give notice of the award of the Contract by way of a letter of intent, or will give notice that no award will be made.

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.

PART C - GENERAL CONDITIONS

C1. GENERAL CONDITIONS

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

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

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D1.2 The General Conditions are amended by striking out “The City of Winnipeg Act” wherever it appears in the General Conditions and substituting “The City of Winnipeg Charter”.

D1.3 The General Conditions are amended by striking out “Tender Package” wherever it appears in the General Conditions and substituting “Bid Opportunity”.

D1.4 The General Conditions are amended by striking out “Tender Submission” wherever it appears in the General Conditions and substituting “Bid Submission”.

D1.5 The General Conditions are amended by deleting GC:6.16 and GC:6.17. The City of Winnipeg is now within the jurisdiction of the Manitoba Ombudsman pursuant to The Ombudsman Act.

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of the installation of three (3) submersible wastewater pumping units at the Bournais Wastewater Pumping Station. The work shall also include modifications and upgrades to the station structural, mechanical and electrical components.

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

(a) Removal of two (2) existing submersible wastewater pumping units and piping.

(b) Installation of three (3) 10 hp submersible wastewater pumping units.

(c) Supply and installation of discharge piping, gate valves and check valves.

(d) Supply and installation of new electrical controls.

(e) Supply and installation of new access hatch covers, ladders, hand holds and wet-well lighting fixtures.

(f) Supply and installation of sluice gate with stem extension and operating nut on the wet-well inlet pipe.

(g) Supply and installation of new ventilation fan, blower motor and ducting.

(h) Supply and installation of all electrical equipment and wiring as detailed.

(i) Miscellaneous services for a complete installation including all permits, testing and start-up, in accordance with this specification.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is:

Mr. Doug Berg, C.E.T.
Design and Construction Technologist
849 Ravelston Avenue W. R3W 1S8

Telephone No. (204) 986-4452
Facsimile No. (204) 986-5345

D3.2 At the pre-construction meeting, the Contract Administrator will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D4. CONTRACTOR'S SUPERVISOR

D4.1 At the pre-construction meeting, the Contractor shall identify his designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D5. NOTICES

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

D5.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D5.3, D5.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the address or facsimile number identified in D3.1.

D5.3 All notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following address or facsimile number:

The City of Winnipeg
Chief Administrative Officer Secretariat
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9

Facsimile No.: (204) 949-1174

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

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

Facsimile No.: (204) 947-9155

D6. FURNISHING OF DOCUMENTS

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

SUBMISSIONS

D7. SAFE WORK PLAN

D7.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in GC:4.1 for the return of the executed Contract.

D7.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at http://www.winnipeg.ca/matmgt.

D8. INSURANCE

D8.1 The Contractor shall provide and maintain the following insurance coverage:

(a) commercial general liability insurance, in the amount of at least two million dollars ($2,000,000.00) all inclusive, with The City of Winnipeg being added as an additional insured, with a cross-liability clause, such liability policy to also contain a contractual liability, an unlicensed motor vehicle liability and a products and completed operations endorsement to remain in place at all times during the performance of the Work and throughout the warranty period;

(b) automobile liability insurance for owned and non-owned automobiles used for or in connection with the Work in the amount of at least two million dollars ($2,000,000.00) at all times during the performance of the Work and until the date of Total Performance;

D8.2 Deductibles shall be borne by the Contractor.

D8.3 The Contractor shall provide the City Solicitor with a certificate of insurance of each policy, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in GC:4.1 for the return of the executed Contract.

D8.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least fifteen (15) Calendar Days prior written notice to the Contract Administrator.

D9. PERFORMANCE SECURITY

D9.1 The Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:

(a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or

(b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or

(c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.

D9.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.

D9.2 If the bid security provided in his Bid Submission was not a certified cheque or draft pursuant to B11.1(c), the Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site but in no event later than the date specified in GC:4.1 for the return of the executed Contract.

D10. DETAILED WORK SCHEDULE

D10.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in GC:4.1 for the return of the executed Contract.

D10.2 The detailed work schedule shall consist of the following:

(a) a Gantt chart for the Work, acceptable to the Contract Administrator.

D10.3 Further to D10.2(a), the Gantt chart will show the time on a weekly basis, required to carry out the Work of each unit item in Form B: Prices. The time shall be on the horizontal axis, and the type of trade shall be on the vertical axis.

SCHEDULE OF WORK

D11. COMMENCEMENT

D11.1 The Contractor shall not commence any Work until he is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.

D11.2 The Contractor shall not commence any Work on the Site until:

(a) the Contract Administrator has confirmed receipt and approval of:

(i) evidence that the Contractor is in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba;

(ii) evidence of the workers compensation coverage specified in GC:6.14;

(iii) the Safe Work Plan specified in D7;

(iv) evidence of the insurance specified in D8;

(v) the performance security specified in D9;

(vi) the detailed work schedule specified in D10;

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

D11.3 The Contractor shall not commence the Work on the Site before November 1, 2006.

D12. SUBSTANTIAL PERFORMANCE

D12.1 The Contractor shall achieve Substantial Performance by February 28, 2007.

D12.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D12.3 The date on which the Work has been certified by the Contract Administrator as being substantially performed to the requirements of the Contract through the issue of a certificate of Substantial Performance is the date on which Substantial Performance has been achieved.

D13. TOTAL PERFORMANCE

D13.1 The Contractor shall achieve Total Performance by March 30, 2007.

D13.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D13.3 The date on which the Work has been certified by the Contract Administrator as being totally performed to the requirements of the Contract through the issue of a certificate of Total Performance is the date on which Total Performance has been achieved.

D14. LIQUIDATED DAMAGES

D14.1 If the Contractor fails to achieve Substantial Performance or Total Performance in accordance with the Contract by the day fixed herein for same, the Contractor shall pay the City the following amounts per Calendar Day for each and every Calendar Day following the days fixed herein for same during which such failure continues.

(a) Substantial Performance – One thousand dollars ($1000.00)

(b) Total Performance – Five hundred dollars ($500.00)

D14.2 The amount specified for liquidated damages in D14.1 is based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve Substantial Performance by the day fixed herein for same.

D14.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

CONTROL OF WORK

D15. JOB MEETINGS

D15.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of the Contract Administrator, and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City and the Contractor respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.

D15.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

D16. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D16.1 Further to GC:6.26, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

D17. TRAFFIC CONTROL AND MAINTENANCE OF ACCESS

D17.1 Traffic control shall be carried out in accordance with Section 3.7 of CW 1130 of the General Requirements.

D17.2 The Contractor shall maintain a minimum of one lane of traffic at all times.

D17.2.1 The Contractor shall provide a flag person to direct traffic without additional compensation at the request of the Contract Administrator.

D17.3 Do not stockpile materials in a location and manner that will obstruct the safe operation of motor vehicles past the site.

D17.4 The Contractor shall not park company or private vehicles inside the barricaded work zone in a manner that will block sightlines for vehicles and pedestrians approaching and crossing intersections.

FORM H1: PERFORMANCE BOND
(See D9)

KNOW ALL MEN BY THESE PRESENTS THAT

_____
(hereinafter called the "Principal"), and

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

_____

_____ dollars ($_____.____)

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

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

_____ day of _____ , 20____ , for:

BID OPPORTUNITY NO. 431-2006

INSTALLATION OF SUBMERSIBLE PUMPING UNITS AND UPGRADES TO THE BOURNAIS WASTEWATER PUMPING STATION

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

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

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

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

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

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

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

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

FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)
(See D9)

_____
(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 431-2006

INSTALLATION OF SUBMERSIBLE PUMPING UNITS AND UPGRADES TO THE BOURNAIS WASTEWATER PUMPING STATION

Pursuant to the request of and for the account of our customer,

_____ ,
(Name of Contractor)

_____
(Address of Contractor)

WE HEREBY ESTABLISH in your favour our irrevocable Standby Letter of Credit for a sum not exceeding in the aggregate

_____

_____ Canadian dollars.

This Standby Letter of Credit may be drawn on by you at any time and from time to time upon written demand for payment made upon us by you. It is understood that we are obligated under this Standby Letter of Credit for the payment of monies only and we hereby agree that we shall honour your demand for payment without inquiring whether you have a right as between yourself and our customer to make such demand and without recognizing any claim of our customer or objection by the customer to payment by us.

The amount of this Standby Letter of Credit may be reduced from time to time only by amounts drawn upon it by you or by formal notice in writing given to us by you if you desire such reduction or are willing that it be made.

Partial drawings are permitted.

We engage with you that all demands for payment made within the terms and currency of this Standby Letter of Credit will be duly honoured if presented to us at:

_____
(Address)

and we confirm and hereby undertake to ensure that all demands for payment will be duly honoured by us.

All demands for payment shall specifically state that they are drawn under this Standby Letter of Credit.

Subject to the condition hereinafter set forth, this Standby Letter of Credit will expire on

_____ .
(Date)

It is a condition of this Standby Letter of Credit that it shall be deemed to be automatically extended from year to year without amendment from the present or any future expiry date, unless at least 30 days prior to the present or any future expiry date, we notify you in writing that we elect not to consider this Standby Letter of Credit to be renewable for any additional period.

This Standby Letter of Credit may not be revoked or amended without your prior written approval.

This credit is subject to the Uniform Customs and Practice for Documentary Credit (1993 Revision), International Chamber of Commerce Publication Number 500.

_____
(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS, STANDARD DETAILS AND DRAWINGS

E1.1 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.

E1.1.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at http://www.winnipeg.ca/matmgt.

E1.1.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.

E1.1.3 Further to GC:2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.2 The following Drawings are applicable to the Work:

Drawing No.	Drawing Name/Title
	Cover Sheet
05800	Installation of Submersible Pumping Units and Upgrades to the Bournais Wastewater Pumping Station – Site Plan and Section Views
05801	Installation of Submersible Pumping Units and Upgrades to the Bournais Wastewater Pumping Station – Plan Views and Miscellaneous Details
05802	Installation of Submersible Pumping Units and Upgrades to the Bournais Wastewater Pumping Station – Hatch Details
05803	Installation of Submersible Pumping Units and Upgrades to the Bournais Wastewater Pumping Station – Lighting Plan
05804	Installation of Submersible Pumping Units and Upgrades to the Bournais Wastewater Pumping Station – Power and Systems Plan
05805	Installation of Submersible Pumping Units and Upgrades to the Bournais Wastewater Pumping Station – Electrical Single Line
05806	Installation of Submersible Pumping Units and Upgrades to the Bournais Wastewater Pumping Station – Electrical Single Line and Schedules

E2. EQUIPMENT SUPPLIED BY CITY

E2.1 The City will supply the following equipment:

(a) Three (3) 10 hp submersible pumping units complete with guide rails, lifting chains, power cables and all nuts, bolts and fasteners for installation, as indicated in this Specification and Drawings, by the Contractor.

(b) One 10 hp duplex pump control panel to operate the pumps as detailed herein.

E2.2 Inspection of installation upon completion will be provided by a qualified technical representative from the manufacturer of the pumping units. The cost of the initial inspection will be paid for by the City.

E2.3 Provide the Contract Administrator with seven (7) days notice of when pumps will be installed to allow for arrangements to be made with the pump supplier for initial start-up inspection.

E3. EQUIPMENT AND MATERIALS

E3.1 The Contractor shall supply all equipment and materials necessary to execute the work, except for the equipment and material listed in E2 and as shown on the Drawings to be re-used.

E3.2 Existing equipment and materials may be re-used only as specifically indicated in these specifications, as shown on the Drawings or as approved by the Contract Administrator.

E4. SALVAGE

E4.1 All salvaged equipment and materials as determined by the Contract Administrator shall remain property of the City unless specifically noted otherwise. The Contractor shall deliver salvaged equipment and materials to the City of Winnipeg's "Y Yard" outdoor storage compound located at the North East corner of the intersection of Dugald Road and Van Bellegham Avenue, Winnipeg, Manitoba.

E4.2 The Contractor shall notify the Contract Administrator at least 48 hours prior to delivery of salvaged equipment to allow for arrangements to be made to receive the salvaged equipment. All deliveries shall be made between 8:30 am and 4:30 pm on Business days.

E4.3 The Contactor shall remove and haul all rejected salvage from the site and legally dispose of it.

E4.4 Removal and delivery of salvageable and non-salvageable equipment and material shall be included in the Contract Unit Price for "Pumping Station Modifications and Mechanical Work".

E5. DANGEROUS WORK CONDITIONS

E5.1 Further to clause GC 6.26 of the General Conditions, the Contractor shall be aware that underground chambers, manholes, and sewers are considered a confined space and shall follow the "Guidelines for confined Entry Work" as published by the Manitoba Workplace Safety and Health Division.

E5.2 The Contractor shall be aware of the potential hazards that can be encountered in underground chambers, manholes and sewers such as explosive gases, toxic gases and oxygen deficiency. The Contractor's Safe Work Plan should address these issues.

E5.3 The air in a confined space must be tested before entry and continuously during the time that personnel are inside the space. Equipment for continuous monitoring of gases must be explosion-proof and equipped with a visible and audible alarm. The principal tests are for oxygen deficiency, explosion range and toxic gases. Testing equipment must be calibrated in accordance with manufacturer's specifications.

E5.4 The Contractor shall ventilate all confined spaces including underground chambers, tunnels, pipes and shafts as required and approved by the Manitoba Workplace Safety and Health Act (the "Act"). If no ventilation is supplied, a worker must wear a respirator or supplied air to enter the confined space.

E5.5 Workers must wear a respirator or supplied air at all times when entering an underground chamber, manhole or sewer where live sewage is present.

E5.6 The Contractor shall provide a photoionization detector (PID) on site at all times to monitor potential hydrocarbon vapours in the confined spaces. The gas detector and safety equipment conforming to the Act shall be made available to the Contract Administrator for his use during inspections. In addition, the Contract Administrator shall collect discrete air samples for laboratory analysis.

E5.7 The Contract Administrator may issue a stop work order to the Contractor if the above guidelines are not being followed. The Contractor shall not resume operations until the Contract Administrator is satisfied the Contractor is following the appropriate procedures. The Contractor shall have no claim for extra time or costs due to the stop work order for not following these safety guidelines.

E6. PROTECTION OF EXISTING TREES

E6.1 Do not remove existing trees and take the following precautionary steps to avoid damage from construction activities to existing boulevard trees within the limits of the construction area.

E6.1.1 Do not stockpile materials and soil or park vehicles and equipment on boulevards within 2 metres of trees.

E6.1.2 Strap mature tree trunks with 25 x 150 x 2400 wood planks. Smaller trees shall be similarly protected using appropriately sized wood planks.

E6.1.3 Excavations shall be carried out in a manner to minimize damage to existing root systems. Where roots must be cut to facilitate an excavation they shall be neatly pruned at the face of the excavation.

E6.1.4 Work on site shall be carried out in a manner to minimize damage to existing tree branches. Where damage to tree branches does occur, the Contractor shall neatly prune the damaged branch.

E6.1.5 American elm trees shall not be pruned between April 1st and August 1st and Siberian elm trees between April 1st and July 1st of any year under provisions of The Dutch Elm Disease Act.

E6.2 All damage to existing trees due to construction activities shall be repaired to the requirements and satisfaction of the City of Winnipeg, Parks and Recreation Department, Forestry Branch at the Contractor's expense.

E6.3 Costs for protection of trees shall be considered incidental to the contract works and shall be done at the Contractor's expense.

E7. SHOP DRAWINGS

E7.1 Description

(a) This Specification shall revise, amend and supplement the requirements of CW 1100.

(i) The term 'shop drawings' means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, which are to be provided by the Contractor to illustrate details of a portion of the work.

(ii) The Contractor shall submit specified shop drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be show on all submissions for Engineering review.

(b) Shop Drawings

(i) Original drawings are to be prepared by the Contractor, Subcontractor, Supplier, Distributor, or Manufacturer, which illustrate appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate sections.

(ii) Shop drawings for the following components shall bear the seal of a Manitoba registered Professional Engineer.

(a) Gate valves.
(b) Check valves.
(c) Sluice gate

(d) Stem extensions.
(e) Hatch covers
(f) Ladders and Hand Hold
(g) Ventilation blower motor
(h) Electrical Equipment

(c) Contractor's Responsibilities

(i) Review shop drawings, product data and samples prior to submission and stamp and sign drawings indicating conformance to the Contract requirements.

(ii) Verify:
(a) Field measurements
(b) Field construction criteria
(c) Catalogue numbers and similar data

(iii) Coordinate each submission with requirements of work and Contract Documents. Individual shop drawings will not be reviewed until all related drawings are available.

(iv) Notify Contract Administrator, in writing at time of submission, of deviations from requirements of Contract Documents.

(v) Responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator's review of submission, unless Contract Administrator gives written acceptance of specified deviations.

(vi) Responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.

(vii) The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the required number of corrected copies of Shop Drawings. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on previous submission.

(viii) After Contract Administrator's review and return of copies, distribute copies to sub-trades as appropriate.

(ix) Maintain one (1) complete set of reviewed shop drawings, filed by Specification Section Number, at the site of the work for use and reference of the Contract Administrator and Subcontractors.

(d) Submission Requirements

(i) Schedule submissions at least 14 Calendar days before dates reviewed submissions will be needed, and allow for a 14 Calendar day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.

(ii) Submit five (5) paper prints of shop drawings. The Contractor is advised that the Contract Administrator will retain three (3) copies of all submittals and return two (2) copies to the Contractor.

(iii) Accompany submissions with transmittal letter, containing:
(a) Date
(b) Project title and Bid Opportunity number
(c) Contractor's name and address
(d) Number of each shop drawing, product data and sample submitted
(e) Specification Section, Title, Number and Clause
(f) Drawing Number and Detail/Section Number
(g) Other pertinent data

(iv) Submissions shall include:
(a) Date and revision dates.
(b) Project title and Bid Opportunity number.
(c) Name of:
(i) Contractor

(ii) Subcontractor
(iii) Supplier
(iv) Manufacturer
(v) Separate detailer when pertinent

(d) Identification of product of material.
(e) Relation to adjacent structure or materials.
(f) Field dimensions, clearly identified as such.
(g) Specification section name, number and clause number or drawing number and detail/section number.
(h) Applicable standards, such as CSA or CGSB numbers.
(i) Contractor's stamp, initialled or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.

(e) Other Considerations

(i) Fabrication, erection, installation or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent shop drawings and resubmit.

(ii) Material and equipment delivered to the site of the works will not be paid for at least until pertinent shop drawings have been submitted and reviewed.

(iii) Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.

(iv) No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of shop drawings.

E7.2 Measurement and Payment

E7.3 Preparation and submittal of Shop Drawings will be included in the contract unit price for "Pumping Station Modifications and Mechanical Work".

E8. EXISTING PUMPING STATION OPERATION DURING CONSTRUCTION

E8.1 The Contractor is advised that the existing wastewater pumping station will remain in operation while the Work is being completed and the Contractor shall plan his activities around the continued operation of the station.

E8.2 The Contractor shall cooperate with and provide full access at all times for City personnel to carry out maintenance and operational duties.

E9. TEMPORARY SHUTDOWN OF THE PUMPING STATION

E9.1 Temporary shutdown of the wastewater pumping station will be allowed for the following work activities.

(a) Removal of existing pumps, discharge piping valves and fittings inside the station.

(b) Installation of new pumps, discharge piping, valves and fittings inside the station.

(c) Connection of new electrical controls to new pumps.

(d) Connection of new discharge pipe and new forcemain to 1200 millimetre diameter interceptor sewer.

(e) Application of protective coatings inside wet well of station.

(f) Installation of Sluice Gate.

(g) Installation of Concrete Benching.

E9.2 Allowable shutdown time indicated is approximate and the Contractor must monitor the upstream system at all times to ensure the stored level of wastewater will not exceed the critical basement elevation indicated on the Drawings.

E9.3 Subject to unforeseen flow conditions, more than 4 hours of allowable shutdown time may be available during the night.

E9.4 Schedule work activities requiring station shutdown to be done at night, if required by the Contract Administrator, when flow amounts are generally reduced, to maximize the amount of shutdown time available and reduce the risks associated with station shutdown.

E9.5 Schedule several work activities to be completed in the same shutdown where possible to minimize the number of station shutdowns and amount of temporary by-pass pumping required.

E9.6 Temporary by-pass pumping, as described in E10, must be installed and operational at all times during construction and ready to be put into service if liquid level in the sewer system reaches the critical basement elevation shown on the drawings or as determined by the Contract Administrator.

E9.7 Temporary shutdown will include closing the sluice gate or installing a sewer plug in upstream of the station, pump turn off, forcemain draining (if required), pump start up and opening the sluice gate or removing the sewer plug.

E9.8 Water and Waste Department, Collection System personnel will be available to provide assistance to the Contractor for temporary shutdown of the wastewater pumping station to facilitate completion of the Work.

E9.9 There will be no charge to temporarily shutdown the wastewater pumping station for the work activity listed.

E9.10 If an unreasonable number of station shutdowns are required to complete the same work activity due to the Contractor's method of operation, a fee of $300.00 per hour for Collection System personnel may be charged to the Contractor and deducted from future Progress Payments.

E9.11 The Contract Administrator reserves the right to cancel a planned station shutdown if in his opinion, flow conditions or the weather forecast would not allow for a shutdown of sufficient duration to complete the work activity. The Contractor shall reschedule the work activity to a more suitable time.

E9.12 Consecutive back-to-back station shutdowns will not be allowed until the sewer system has returned to normal.

E10. FLOW CONTROL AND TEMPORARY BY-PASS PUMPING

E10.1 Description

E10.1.1 This specification covers flow control in existing sewers and temporary by-pass pumping of flow during installation of the wastewater pumping units and station modifications.

E10.2 Materials

E10.2.1 Inflatable Rubber Sewer Plugs

(a) Made of rubber, capable of remaining in place when inflated to the pressure required to withstand the expected sewer levels.

(b) Provided with an inflation/deflation hose, monitoring pressure valve, removal rope or cable and safety chain all of sufficient length to reach to ground elevation for monitoring and removal.

E10.2.2 Temporary By-Pass Pumping Equipment

(a) Non-clog, submersible pumping units, each sized to meet or exceed the required capacity. Complete with all required piping, fittings, floats and pump controls suitable for temporary installation in a sewer manhole.

(b) Provide model and capacity curves to the Contract Administrator for approval.

(c) Power supply to be suitably sized for pumping equipment complete with all required controls. Fuel to be in lockable, tamperproof container, approved by Contract Administrator.

E10.2.3 Fittings and Appurtenances

(a) Fittings, couplings and appurtenances to be used for repairs to existing forcemains and sewers to be approved products for underground use in the City of Winnipeg.

E10.2.4 Bedding and Backfill

(a) Bedding and initial backfill material to be sand in accordance with CW 2030.

(b) Backfill excavations in pavement areas to be Class 3 in accordance with Clause 3.8.3 of CW 2030. Backfill in excavations in boulevard areas to be Class 5 in accordance with Clause 3.8.3 of CW 2030.

E10.3 Construction Methods

E10.3.1 General

(a) Maintain level of sewage in existing sewers below the critical basement elevation shown on the Drawings at all times. The Contract Administrator will provide a mark at a convenient location for reference.

(b) Allowable shutdown times shown on the drawings are approximate and the Contractor must monitor the upstream system at all times to ensure the stored level of wastewater does not exceed the critical basement elevation.

(c) Provide a flow control plan to the Contract Administrator for review before construction starts.

(d) Diversion of wastewater flow directly or indirectly to the environment, Land Drainage Sewers or Storm Relief Sewers will not be allowed.

E10.3.2 Expected Wastewater Flow to the Bournais Pumping Station

(a) The expected peak dry weather flow (PDWF) to the Bournais Pumping Station included in this Contract is 24 l/s (380 US gpm).

(b) Critical Basement elevation is 227.782 m.

E10.3.3 Inflatable Sewer Plugs

(a) Only inflatable rubber sewer plugs shall be used to plug sewers.

(b) Clean sewer pipe as required to properly install inflatable sewer plug(s) in accordance with the manufacturer's instructions at the locations shown on the Drawings to isolate the installation location. Installation of inflatable sewer plugs at other locations to be approved by the Contract Administrator before construction starts.

(c) Secure inflatable sewer plugs at or near the ground surface.

(d) Continuously monitor air pressure while sewer plug is in place and have proper inflation equipment available at all times.

E10.3.4 Temporary By-Pass Pumping

(a) Provide two submersible pumps at all times, each with a capacity equal to or greater than the listed PDWF. One pump is to be used for by-pass pumping and one pump shall act as a standby pump and be on site ready to be installed immediately if the installed pump fails. A replacement pump with the required capacity shall be immediately provided if one of the two original pumps has to be removed from the site for repairs.

(b) Surface mount, vertical lift suction pumps are not acceptable.

(c) Temporary by-pass pumping shall be from Manhole “A” to Manhole “B” as shown on the Drawings.

(d) Provide detailed information for pumping equipment to be used including pump capacity and dimensions, depth of submergence, pump controls and installation details to the Contract Administrator for review before construction starts.

(e) Power supply to be approved by the Contract Administrator before set-up. Locate the power supply where it will not adversely affect local residences. Location to be approved by the Contract Administrator before construction starts.

(f) Provide suitable traffic ramps approved by the Contract Administrator if the by-pass pumping discharge pipe and power supply cables are laid across vehicle or pedestrian traffic areas.

(g) Provide a check valve on the by-pass pumping discharge pipe to prevent cycling when the pumping station is activated.

(h) The Contractor is advised that the pumping station will remain in service while the work is being completed, except for planned temporary shutdowns as described in E9. The Contractor shall cooperate and coordinate with the City to allow full access at all times for City staff to carry out maintenance and operational duties.

(i) Arrange construction activities and schedule to be able to remove temporary inflatable sewer plug(s) and restore pumping station operation at the end of each day’s work.

(j) If a temporary pump in use fails, it must be replaced immediately with the standby pump and if the flow level in the sewer rises to the mark established by the Contract Administrator, the inflatable sewer plug shall be deflated and flow allowed to go the pumping station or additional temporary pumping must be provided.

(k) Temporary by-pass pumping equipment and materials shall remain on-site until station construction is completed as described in these Specifications and to the satisfaction of the Contract Administrator.

E10.4 Measurement and Payment

E10.4.1 Flow control and temporary by- pass pumping will be measured on a unit basis and paid for at the Contract Unit Price for “Flow Control and Temporary By-Pass Pumping”, installed in accordance with this specification, accepted and measured by the Contract Administrator.

E11. WET WEATHER FLOWS IN EXISTING SEWER

E11.1 In the event the flow in the sewer system is expected to exceed the amount indicated for PDWF due to wet weather runoff, the Contract Administrator may suspend work activities that require temporary by-pass pumping and temporary shutdown of the wastewater pumping station. Suspension of these activities will continue until the high flow diminishes in the sewer system.

E11.2 In the opinion of the Contract Administrator, if suspension of work activities that require temporary by-pass pumping and temporary shutdown of the wastewater pumping station cause

a delay in completion of the Work through no fault of the Contractor, the completion date of the Work will be adjusted accordingly.

E12. MOBILIZATION AND DEMOBILIZATION

E12.1 Mobilization and demobilization will include but not be limited to start-up costs, equipment set-up and removal, storage facilities set-up and removal and site cleanup.

E12.2 Mobilization and demobilization will be measured on a unit basis and paid for at the Contract Unit Price for "Mobilization and Demobilization" in accordance with this specification, accepted and measured by the Contract Administrator.

E12.3 50% of the Mobilization and Demobilization unit price will be paid on the first progress payment.

E12.4 The remaining 50% of the Mobilization and Demobilization unit price will be paid subsequent to the completion of the work and restoration and clean up of all sites.

E13. WET WELL CLEAN OUT

E13.1 The Contractor shall be responsible for the clean out of the wet well before starting construction and as construction progresses. Clean out shall be done by mechanical or manual methods and shall remove grit, tallow and other build-ups to the satisfaction of the Contract Administrator.

E13.2 The Contractor shall also ensure that all concrete rubble and construction material is removed from the wet well after completing the works and prior to station startup.

E13.3 The Contractor shall be responsible to maintain a clean wet well in the station during construction.

E13.4 Costs for clean out of pumping station wet well shall be included at the Contract Unit Price for "Pumping Station Modifications and Mechanical Work".

E14. PUMPING STATION MODIFICATIONS AND MECHANICAL WORK

E14.1 Description

E14.1.1 This Specification covers the piping, equipment and structural modifications to the existing pumping station.

E14.1.2 The Contractor shall remove the existing submersible pumping units, piping and equipment as required and install new submersible pumping units, piping and equipment as shown on the drawings or as indicated by the Contract Administrator.

E14.1.3 All equipment and material shall be supplied by the Contractor except as listed in E2.

E14.2 Materials

E14.2.1 Submersible Pumping Units

(a) Shall be supplied by the City as indicated in section E2.

E14.2.2 Piping and Fittings

(a) All piping shall be Class 52 ductile iron or ASTM Carbonsteel Schedule 80 thickness.

(b) Cast Iron fittings shall conform to AWWA C110.

(c) Fabricated fittings shall conform to ASTM A53 carbon steel grade B, Schedule 800 wall thickness.

(d) Steel fittings shall be ASTM A234 grade B carbon steel, Schedule 80 wall thickness. Dimensions shall be to ANSI B16.9.

(e) All welded steel flanges shall be in conformance with AWWA C207, Class B.

E14.2.3 Miscellaneous Metal Fabrications (including Hatch Covers, ladders and hand hold)

(a) See section E19.

E14.2.4 Fasteners

(a) Flange nuts and bolts shall be high strength carbon steel

(b) Anchors shall be Kwik-bolt or Rawl Stud Type 316 stainless steel.

E14.2.5 Gaskets

(a) Flange gaskets shall be full faced rubberized cloth gaskets, 3mm in thickness.

E14.2.6 Grout, Concrete and Reinforcing Steel

(a) Grout to be S.P.I. Rapid Repair Grout, Sika Grout 212 or an approved equal.

(b) Concrete to be in accordance with CW 2160 using type 50 sulphate resistant Portland cement.

(c) Reinforcing steel and dowels to be in accordance with Specification CW 2160.

(d) Epoxy resin for bonding dowels to hardened concrete to be ASTM C881, Type 1, Grade 3.

E14.2.7 Bonding Agent

(a) Bonding agent to be Acrl Stix or approved equal.

E14.2.8 Protective Coatings

(a) See section E20.

E14.2.9 Gate Valves

(a) Cast iron body with flanged ends equipped with outside rising stem, screw and yoke; bronze trimmed cast iron wedge; bronze stem, double O-ring stem seals and 50 millimetre square operating nut.

(b) Flanges shall conform in dimension and drilling to ANSI/ASME B16.1, Class 125.

(c) Direction of opening shall be counter clockwise and shall be clearly stamped or indicated with raised letters and arrow.

(d) Manufacturer’s nameplate shall be attached to the valve body with stainless steel fasteners.

(e) Gate valves shall be as manufactured by Clow Canada, Crane, Mueller Canada or approved equal.

(f) Submit shop drawings of gate valves in accordance with E7of this specification.

E14.2.10 Check Valves

(a) Ductile iron body with flanged ends and removable inspection cover manufactured and tested in accordance with AWWA C508.

(b) Flanges shall conform in dimension and drilling to ASME B16.1, Class 125.

(c) ASTM D2000-BG, Buna - N (NBR) sewage resistant rubber flap and Type 302 stainless steel disc accelerator.

(d) Attach manufacturer's nameplate to the valve body with stainless steel fasteners.

(e) Acceptable product: Val-Matic Series 500 or approved equal.

(f) Submit shop drawings of check valves in accordance with E7 of this specification.

E14.2.11 Ventilation

(a) See section E18.

E14.3 Construction Methods

E14.3.1 General

(a) Install the new station piping and pumping equipment as indicated in this specification and shown on the Drawings. Make no changes, revisions or substitutions to the layout without obtaining written approval from the Contractor Administrator.

(b) Be aware of and contend with the wastewater in the existing forcemain when preparing to make the required piping modifications.

(c) Prior to pumping unit installation, provide a portable sewage pump and discharge hose to remove remaining wastewater in the wet well. The wastewater shall be directed to the upstream manhole or to a sewage hauler for disposal.

E14.3.2 Flow Control and Temporary By-Pass Pumping

(a) Provide flow control measures and temporary by-pass pumping as shown on the Drawings and in accordance with E10 of this Specification.

E14.3.3 Construction Sequence

(a) Arrange construction activities and sequence to be able to remove temporary inflatable sewer plug(s) and restore pumping station operation at the end of each day's work.

E14.3.4 Existing Pump Controls and Float Alarms in Wet Wells

(a) Maintain and protect existing pump controls and float type alarms located in the wet well during the execution of the work until the equipment is ready for replacement.

E14.3.5 Submersible Pumping Unit and Piping Installation

(a) The existing station pumping setup consists of only two pumps (pumps # 1 and #3) with respective piping. There is existing discharge piping but no existing pump in the pump # 2 location as indicated on the drawings.

(b) Remove all existing piping as indicated in the Specifications and on the Drawings and replace with new piping. Reuse existing header section shown with shading on the drawings.

(c) Installation to be as follows:

(i) Prepare and arrange for temporary shutdown of station in accordance with E9 and have temporary by-pass pumping operations in accordance with E10.

(ii) Where steel pipe is used for fittings or filler pipes, it shall be field measured and fitted before fabrication.

(iii) Piping and fitting welds shall be full penetration butt type in accordance with ANSI/ASME B31.9. Welders shall be fully qualified and licensed by Provincial Authorities. Welds which do not penetrate fully will not be accepted.

(iv) Weld steel flanges on both the inside and the outside in conformance with AWWA Standard C207.

(v) All pipe and equipment shall be adequately protected from on-site welding procedures.

(vi) Pumping units shall be installed as per the manufacturer's installation specifications, complete with anchors, guide rails, lifting chains and power cables at the location indicated on the drawing.

(d) After all three pumps and piping have been completed; all pipes and pipe welds shall be cleaned and prepared for application of protective coatings in accordance with E20.

E14.3.6 Concrete Work

(a) Make neat openings in walls and floor slabs using concrete coring and cutting equipment and methods.

(b) Fill openings left in concrete after removal of piping or other equipment with watertight, non-shrink grout. Finish new surfaces flush with the existing surface and match the surrounding surface texture.

(c) Neatly grout any concrete surface that has been broken and had the aggregate exposed with a smooth finish similar in texture to that of the surrounding concrete.

(d) Apply concrete bonding agents between new concrete or grout and existing concrete surfaces. Remove all loose, pitted and scaled concrete and apply bonding agent in accordance with the manufacturer's instructions

(e) De-scale exposed reinforcing steel and have all rust removed before applying grout.

E14.4 Measurement and Payment

E14.4.1 Pumping station modifications and mechanical work installations will be measured on a unit basis and paid for at the Contract Unit Price for "Pumping Station Modifications and Mechanical Work" as supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E15. WASTEWATER FORCEMAIN

E15.1 Material

E15.1.1 AWWA C900, Class 150 PVC.

E15.2 Construction Methods

E15.2.1 Install wastewater forcemain in accordance with CW 2110. Substitute the word forcemain where the word watermain appears.

E15.2.2 Backfill excavations in accordance with CW 2030 as follows.

(a) In boulevard areas: Class 5 Backfill

(b) In pavement areas: Class 3 Backfill

E15.2.3 Remove plug and connect to new PVC forcemain at location shown on the Drawings in accordance with CW 2110.

E15.2.4 Perform hydrostatic leakage test on forcemain in accordance with CW 2125. Forcemain does not have to be disinfected.

E15.2.5 Existing 250 mm forcemain to be plugged and abandoned in accordance with CW2130. Costs for plugging and abandoning the existing 250 mm forcemain shall be included in the Contract Unit price for "250 mm forcemain Installation" and no additional payment shall be made for this work.

E15.3 Measurement and Payment

E15.3.1 Forcemain installation will be measured on a length basis and paid for at the Contract Unit Price for "Forcemain Installation". Length to be paid for will be the total number of linear metres supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E15.3.2 Hydrostatic leakage test shall be included in the contact unit price for supplying and installing 250 mm forcemain.

E16. ELECTRICAL

E16.1 Description

E16.1.1 This specification covers the supply and installation of all electrical requirements including power supply, service panels, motor starters, disconnects, lighting, controls, wiring devices, fittings and fastenings, wires and cables and other materials for the wastewater pumping station

E16.2 Materials

E16.2.1 Provide labour, materials, transportation, equipment and facilities, etc., required for the complete electrical installation as indicated or implied on the drawings and specifications

E16.2.2 Electrical equipment shall be new and of type and quality specified. Equipment and material to be CSA certified, and manufactured to standards described. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from the Manitoba Department of Labour.

E16.2.3 All equipment shall be suitable for the environment (hazardous / corrosive areas, etc) in which it is installed. In cases where equipment suitability is questionable (ie/ the Contract Administrator and/or Engineer has concerns) the Contractor shall prove that the equipment is suitable (via manufacturer assurance of compliance) or shall replace the equipment at no extra cost. All equipment installation and associated methods used shall be suitable for the environment and shall comply with the applicable codes and standards as required by the inspection authority.

E16.2.4 Contractor supplied materials shall be CSA approved.

E16.2.5 Voltage Ratings

(a) Operating voltages: to CAN3-C235

E16.2.6 Junction and Pull Boxes

(a) Hazardous Boxes:
  (i) Boxes shall be EEMAC 4X rated for Class I, DIV I in all areas.
  (ii) Boxes shall be complete with neoprene gaskets and bolted covers.
  (iii) Suitably sized threaded watertight hubs complete with insulating nylon throat shall be installed in all boxes which do not contain integral hubs.
  (iv) Boxes shall have external mounting plates or “ears”.
  (v) Boxes shall be sized in accordance with wire space requirements defined in CSA C22.1.
  (vi) Approved manufacturers: Hoffman, Crouse Hinds, Appleton or approved equal.

(b) Non-Hazardous Boxes:
  (i) Shall be Nema 4 rated, cast type junction boxes.
  (ii) Approved manufacturers: Hoffman, Crouse Hinds, Appleton or approved equal.

E16.2.7 Electrical Equipment Supports

(a) Supports for pull and junction boxes shall be fabricated using green epoxy coated channels and fittings.

(b) Supports shall be designed with a minimum safety factor of two (2)

(c) Approved Support manufactures: B-Line Duragreen.

E16.2.8 Terminal Blocks

(a) Terminal blocks shall be installed in all control boxes where Integral terminal blocks are not provided.

(b) Terminal blocks and associated fittings shall be Weidmuller (SAK 4) melamine types or as specified on the drawings.

E16.2.9 Cable Fittings

(a) Cable fittings shall be size and type recommended by the cable manufacturer for the installation location (i.e. hazardous or non-hazardous locations) and includes all necessary hardware such as a grounding ring. Cable fittings shall match armour type.

(b) Approved Cable Fitting manufacturers:

(i) Thomas & Betts “Star Teck” connector for non-hazardous locations.

(ii) Thomas & Betts “Star Teck XP” connector for hazardous locations.

E16.2.10 Disconnect Switches

(a) Provide provision for padlocking in off switch position.

(b) ON-OFF switch position indication on switch enclosure cover.

(c) Provide mechanically interlocked door to prevent opening when handle in the ON position.

(d) Switches to provide “quick-make” and “quick-break” action.

(e) Approved manufacturers: Square D, Cutler Hammer.

E16.2.11 Cable Ties

(a) Cable ties shall be size and type recommended by the cable tie manufacturer for the installation location.

(b) Approved manufacturers for Cable Ties: Thomas & Betts, 3M

E16.2.12 Motor Starter

(a) Full voltage non-reversing magnetic starters as detailed on the drawings.

(b) Acceptable manufacturers are Cutler Hammer, Square D or equal.

E16.2.13 Lighting

(a) Lighting equipment as detailed on the drawings, suitably rated for the application and complete with all accessories as noted.

E16.2.14 Duplex Pump Controller

(a) City will supply Duplex Pump Controller installation. Contract Administrator will make available Shop Drawings and Installation Manual to the Contractor. The contractor shall provide any additional installation material to complete the work.

(b) Contractor to install equipment as indicated in the Shop Drawings and the Installation Manual, complete with alarm points and control as defined herein for a complete operating system.

(c) The Contractor shall provide a complete operating system and warranty the installation work as per the conditions of this contract.

E16.2.15 Wires and Cables

(a) Wires

(i) Wires to be 600V rated and shall be CSA approved.

(ii) Wires for installation in conduit shall be stranded copper (solid copper not permitted unless required by code), 600V rated, black colour, RW90, cross-linked polyethylene insulated type unless otherwise specified on the Drawings.

(iii) Conductor size shall be as follows:

- Minimum No. 14 AWG for control and instruments where power requirements are150 watts or less and fed from an individual circuit breaker; or
- Minimum No. 12 AWG for lighting and power; or
- As specified on the drawings.

(b) Cables

(i) Cables to be 600V rated and shall be CSA approved.

(ii) Cables shall be aluminium armoured, stranded, copper conductors, cross linked polyethylene (XLPE) insulated, PVC jacketed TECK type copper conductors and shall meet ASTM standard requirements.

(iii) All cables shall meet the Fire Retardance/Flame Test requirements of CAN/CSA-M421-93.

(iv) Cables shall be multi-conductor type.

(v) Cables with less than five (5) conductors shall have color-coded insulation or be number coded.

(vi) Cables with 5 or more conductors shall have the individual conductors number coded.

(vii) Minimum conductor size shall be as follows:

- No. 14 AWG copper for control; and
- No. 12 AWG copper for power and lighting.

(viii) 600V cables shall be non-shielded construction with 100% insulation level.

(ix) 600V cables shall be black jacketed.

(c) Cable Connectors

(i) Cable connectors shall be Thomas and Betts " Star Teck" connectors for all locations and shall match cable armour and location environment rating.

(ii) The connector manufacturer's catalogue number, with respect to cable dimensions, shall be verified with the manufacturer prior to placing orders.

(iii) Connectors of each type shall be manufactured by a single manufacturer.

(d) Phasing Tape

(i) Phasing tape shall be vinyl, 19 millimetre wide. Phasing shall be as follows: Phase A (red), Phase B (black), and Phase C (blue).

E16.3 Construction Methods

E16.3.1 The interior of the "wet well" of the wastewater pumping station is classified as a **Class I, Division 1 Hazardous and Corrosive Location**. All wiring, devices and installation methods shall conform to these requirements. Class I, Division 1 cable sealing gland connectors or conduit seals shall be used at the entry and exit of cables into panelboards, junction boxes, control cabinets, disconnects, motor starters, etc, for all cables entering or exiting from the hazardous area. This is done in order to prevent the migration of explosive gases up the conductor or raceway and into the electrical compartment.

E16.3.2 Provide Shop Drawings and five (5) Operations and Maintenance manuals upon project completion.

E16.3.3 Provide breakers in existing panels, as required, to match existing.

E16.3.4 Install the City-supplied Duplex Pump controller 'DC1'. Provide all materials, testing and commissioning for complete and working installation.

E16.3.5 Provide magnetic motor starter, complete with control as indicated in the drawings and Specifications. Provide terminal blocks as required.

E16.3.6 Provide lighting complete with control as shown on the Drawings.

E16.3.7 Provide new lamacoid nameplates for existing equipment.

E16.3.8 Provide photocell controlled exterior lighting in a suitable position above station entrance door.

E16.3.9 Complete installation in accordance with CSA C22.1-2002 except where specified otherwise.

E16.3.10 Care, Operation and Start-up

(a) Instruct the Contract Administrator and Operating Personnel in the operation, care and maintenance of systems, system equipment and components.

(b) Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation; also to check, adjust, balance and calibrate components and instruct operating personnel.

(c) Provide these services for such period and for as many visits as necessary to put equipment into operation. Ensure that operating personnel are conversant with all aspects of care and operation.

E16.3.11 Voltage Ratings

(a) Operating voltages: to CAN3-C235-83.

(b) Electrical equipment to operate satisfactorily at 60 Hz within normal operating limits established by the above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

E16.3.12 Permits, Fees and Inspection

(a) Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

(b) Pay associated fees.

(c) Notify the Contract Administrator of changes required by Electrical Inspection Department or Fire Commissioner prior to making changes.

(d) Furnish Certificates of Acceptance from authorities having jurisdiction on completion of work to the Contract Administrator

E16.3.13 Finishes

(a) Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

E16.3.14 Identifications Equipment

(a) Identify electrical equipment with nameplates and labels as follows:

(i) Nameplates:

- Lamacoid 3 mm thick plastic engraving sheet, black face, white core, mechanically attached (non-hazardous areas) with self tapping screws. Screws and rivets may not be used to attach lamacoids in hazardous areas where piercing of an enclosure will compromise its integrity. In such

cases, straps or chains may be used. Lamacoid sizing shall be adjusted as required in these cases in order to accommodate the mounting methods.

- Wording on nameplates and labels to be approved by Engineer prior to manufacture.
- Allow for average of twenty-five (25) letters per nameplate and label.
- Identification to be English.
- Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- Terminal cabinets and pull boxes: indicate system and voltage
- Transformers: indicate device name, capacity, primary and secondary voltages.
- Panels: indicate device name, voltage, phase

(ii) Nameplate sizes:

• Size 1	10 x 50 mm	1 line	3 mm high letters
• Size 2	12 x 70 mm	1 line	5 mm high letters
• Size 3	12 x 70 mm	2 lines	3 mm high letters
• Size 4	20 x 90 mm	1 line	8 mm high letters
• Size 5	20 x 90 mm	2 lines	5 mm high letters
• Size 6	25 x 100 mm	1 line	12 mm high letters
• Size 7	25 x 100 mm	2 lines	6 mm high letters

E16.3.15 Wiring Identification

(a) Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

(b) Maintain phase sequence and colour coding throughout.

(c) Colour code: to CSA C22.1.

E16.3.16 Manufacturer and CSA Labels

(a) Visible and legible, after equipment is installed.

(b) All hazardous area devices shall have manufacturer label indicating compliance and suitability for the area installed.

E16.3.17 Warning Signs

(a) As specified and to meet requirements of Electrical Inspection Department.

(b) Decal signs, minimum size 175 x 250 mm.

E16.3.18 Field Quality Control

(a) All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks - the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.

(b) Carry out tests, as requested, in presence of the Contract Administrator.

(c) Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

(d) Submit test results for the City's review.

E16.3.19 Codes and Standards

(a) All components of the Contractor's work shall comply with all applicable laws, regulations, codes, standards and with the regulations of the governing inspection authorities at the place of use, including but not limited to the following:

(i) Provincial Electrical Protection Branch Regulations,

(ii) Canadian Electrical Codes (CEC) C22.1 and Manitoba Amendments,

(iii) Canadian Standards Association (CSA), Standards, Codes and Regulations,

(iv) National Electrical Manufacturer's Association (NEMA) Standards,

(v) Electrical and Electronic Manufacturer's Association (EEMAC) Standards,

(vi) Instrument Society of America (ISA) Standards,

(vii) Institute of Electrical and Electronic Engineers (IEEE).

E16.3.20 Supplier – Installer Qualifications

(a) Installation of materials of this Section shall be carried out by personnel who are able to provide evidence that they meet the current recommended qualifications of

(i) The Canadian Interprovincial Standards for Journeyman Electrician in the Electrical Trade or

(ii) The Provincial Standards for Journeyman Electrician or Apprentice Electrician in the Electrical Trade.

E16.3.21 Inspection

(a) Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this Section prior to the required inspections, tests and approvals.

(b) Ensure raceways are complete and free from obstructions or sharp edges that may damage cables or conductors;

(c) Ensure electrical and mechanical equipment installations have advanced to the point where cables installed in or near the equipment will not be damaged;

(d) Ensure that activities of other trades along cable and wire routes are complete and that cables and conductors will not be damaged by ongoing or future activity.

E16.3.22 General Installation

(a) All wiring in junction boxes shall be neatly bundled, formed and secured in place with cable ties, or cable straps.

(b) Securely mount junction boxes on preformed channel supports using bolts and spring type nuts.

(c) Install junction boxes as required, and in accordance with the Drawings.

(d) Mount junction box in suitable locations.

(e) Install terminal blocks as required.

(f) Equipment supports shall be welded to the structural steel using welding rods compatible with the structure and support materials.

(g) All surfaces damaged or defaced by the welding procedures shall be repainted in accordance with Structural Drawings.

(h) Final finish color to match the structural steel color.

(i) Paint grounding connections made to structural steel with insulating paint after connection and respective testing is complete.

(j) Use mounting bolts and miscellaneous hardware to secure disconnect switches, junction boxes, pull boxes and cable trays, etc., to floors, walls or racks as specified and in accordance with the drawings.

E16.3.23 Inspection and Testing of Wiring

(a) Inspect all connections for tightness prior to energizing.

(b) Test each conductor for insulation resistance and continuity.

(c) Remedy and make good defects disclosed by such tests and test the work again, repeating until defects are eliminated.

E16.3.24 Cleaning

(a) Clean all equipment and blow out all dirt with compressed air. Use vacuum cleaner to clean inside of panels.

E16.3.25 Product Delivery, Storage and Handling of Cables

(a) Store materials in an area approved by the Contract Administrator.

(b) Protect cable ends from ingress of moisture and dirt by sealing the cable ends.

(c) Minimum bending radius while pulling shall be as follows:

(i) 600 V cables - Minimum final bending radius shall be 12 times cable overall diameter.

E16.3.26 Installation of Wire and Cable

(a) Remove all debris and foreign matter from trenches, or conduit before installing wires and cables.

(b) Follow manufacturer's recommended practices when installing cables. Do not damage cable sheaths, conductors or insulation. When pulling cables, do not apply excessive tension that might damage the cables. Use suitable rollers, pulleys, etc., to maintain the recommended bending radius for pulling cables around sharp corners. Replace damaged and rejected cables without additional payment.

(c) Use non-hardening cable lubricants that do not contain materials injurious to wire and cable.

(d) Where cables pass through walls, run the cables to avoid interference and protect against mechanical injury.

(e) Install power conductor’s full length, without splices or taps, from origin to destination.

(f) Contractor to assume full responsibility for all construction means and co-ordinate with City and other Trades.

(g) Verify the required cable length prior to cutting or pulling of the cable;

(h) Install wires and cables as one continuous length between termination points. Splices will not be permitted except within junction boxes;

(i) Install wire and cables without damage to the jackets, insulation or conductors. Ensure maximum permissible pulling tensions as specified are not exceeded;

(j) Install phase and ground conductor lugs in accordance with the lug manufacturer’s recommendations using dies and tools compatible with the lugs. Provide necessary tools and dies;

(k) Install ground lugs or posts using the specified hardware;

(l) Conductor insulation shall be colour coded in accordance with the following:

(i)	Single Phase (AC) 2W	Line	Red or Black
		Neutral	White
(ii)	Single Phase (AC) 3W	Line	Red
		Line	Black
		Neutral	White
(iii)	Three Phase (AC) 3W, 4W	A Phase	Red
		B Phase	Black
		C Phase	Blue
		Neutral	White
(iv)	Ground Wires	Equipment	Green
		Instrument	Green with red tape on ends

(m) No more than two (2) conductors shall be terminated on any one (1) side of a terminal block;

(n) All spare wires in a junction box shall labelled “SPARE”;

(o) Support all conductors adequately;

(p) Strip conductor insulation with an approved device, which does not nick or damage the conductor strands;

(q) Route conductors in control cabinets, junction boxes neatly and collect into bundles. Secure bundles with plastic cable ties or other approved devices. Taping or lacing of conductors is not permitted;

(r) Group conductors serving terminal boards neatly into bundles and secured with cable ties. Tree individual conductors exiting the bundle at a spacing to match the terminals on the terminal board;

(s) Bundle and secure the conductors of an multi-conductor cable with cable ties and anchor or strap to the enclosure. Do not weave the conductors of different cables together;

(t) Ensure conductors in raceways are guided during installation to prevent twisting, kinking, or looping;

(u) Cables:

  (i) Strip cables within a panel back to the point of entry and clear of filler, jute, tape, cable jacket and armour;

  (ii) Clamp all vertical cable runs on Unistrut or approved supports;

  (iii) Attach individual cables on single runs to structural steel using straps held with threaded impact fastener type pins or bolts. Install cables straight, parallel to building structure;

  (iv) Install cables without exceeding the manufacturers recommended pulling tension and bending radius.

(v) Terminations:

  (i) Use lugs, terminals and screws suitable for copper conductors;

  (ii) Connect no more than two wires to a single terminal block connection point;

  (iii) Bond ground conductors and cable armour to ensure continuity of the grounding network.

E16.4 Measurement and Payment

E16.5 Electrical material, equipment and accessories installation will be measured on a unit basis and paid for at the Contract Unit Price for "Electrical Work" as supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E17. SLUICE GATE

E17.1 Description

E17.1.1 This Specification covers the supply, fabrication, transportation, handling, delivery and installation of sluice gate equipment including the guide stem, guide stem support brackets, operating nut, valve box cover and related components

E17.2 Materials

E17.2.1 Sluice Gate

(a) Fabricated from Type 304 stainless steel conforming to requirements of AWWA C561.

(b) Frame shall be curved wall mountable and constructed of structural members or formed plate welded to form a rigid one-piece frame. The frame shall be of a flange back design suitable for mounting on a curved concrete wall.

(c) The guide slot and guides shall be made of UHMWPE (Ultra high molecular weight polyethylene). The guides shall be of such length as to retain and support at least two-thirds (2/3) of the vertical height of the slide or gate in the fully open position.

(d) The slide or gate shall consist of a flat plate reinforced with formed plates or structural members to limit its deflection to 1/720 of the gate's span under the design head of 6.65 metres.

(e) Side and top seals shall be made of UHMWPE of the self adjusting type. A continuous compression cord shall ensure contact between the UHMWPE guide and the gate in all positions. The sealing system shall maintain efficient sealing in any position of the slide and allow the water to flow only in the opened part of the gate.

(f) The bottom seal shall be made of resilient neoprene set into the bottom member of the frame and shall form a flush bottom.

(g) The frame configuration shall be of the flush bottom type and shall allow the replacement of the top and side seals without removing the gate frame from the concrete wall.

(h) Sluice gate shall be manually operated with a spindle or valve stem extension complete with valve box and cover.

(i) Submit shop drawings of sluice gates in accordance with E7 of this specification.

E17.2.2 Sluice Gate Stem Extensions

(a) 38 millimetre diameter ASTM A276, Type 304 stainless steel, schedule 40 pipe. One end finished with a 50 mm square operating nut and the other end with a socket to fit a 50 millimetre square operating nut.

(b) Submit shop drawings of the valve stem extensions in accordance with E7 of this specification.

E17.3 Construction Methods

E17.3.1 General

(a) Install the sluice gate and equipment as indicated in this specification, as shown on the Drawings and as per manufacturer's instructions. Do not make any changes, revisions or substitutions to the layout without obtaining written approval from the Contractor Administrator.

E17.3.2 Sluice Gate Installation

(a) Install sluice gate, valve spindle and valve stem extensions as shown on the Drawings

(b) Thoroughly clean existing concrete surface and fasten gate frame in accordance with manufacturer's instructions.

(c) Remove concrete benching in wet well as required to accommodate proper installation of sluice gate.

(d) Install sluice gate with stem in vertical position with stem extensions plumb from the sluice gate to the surface.

(e) Make openings in existing concrete floor slabs using coring method.

(f) Install valve box and cover as indicated on the drawings.

(g) Sluice gate shall be left in the open position after installation and station modifications are complete.

E17.4 Measurement and Payment

E17.4.1 Sluice gate with all related material and equipment installation will be measured on a unit basis and paid for at the Contract Unit Price for "Sluice Gate Installation" as supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E18. VENTILATION

E18.1 Description

E18.1.1 This Specification covers the supply, fabrication, transportation, handling, delivery and installation of ventilation equipment including the fan, blower motor, ductwork piping and related components.

E18.2 Materials

E18.2.1 Fan and Blower Motor

(a) Supply and install a 380 l/s (806 cfm), minimum $^{1}/_{4}$ HP ventilation fan and blower in accordance with the Specifications and as detailed on the drawings to provide 15 air exchanges per hour inside the wet well chamber of the pumping station.

(b) Internal and external fan surfaces to be epoxy coated.

(c) Acceptable products: Northern Blower, Cook CP series or an approved equal.

(d) Submit shop drawings of fan blower in accordance with E7 of this specification

E18.2.2 Ductwork Piping

(a) All ductwork piping shall be zinc coated steel strip, spiral 0.60 millimetre (24 ga.) with ribs spaced 150 millimetres apart. Size as indicated on the Drawings. Duct sizes are inside dimensions.

(b) Duct sealer: Duro Dyne S-2 duct sealer or approved equal.

E18.2.3 Inside Vent Outlets and Louvres

(a) Titus supply grille model 300FS or approved equal.

E18.2.4 Miscellaneous Metal Fabrications

(a) See section E19.

E18.2.5 Shop Drawings

(a) Submit shop drawings for all ventilation materials in accordance with E7 of this specification.

E18.3 Construction Methods

E18.3.1 Fan and Blower Motor

(a) Remove the existing ventilation fan and blower motor from the existing support stand.

(b) Install the new ventilation fan and blower motor on the existing support stand in accordance with the manufacturer's instructions. The Contractor shall be responsible to fabricate and install a new support stand, if required and at no additional cost.

E18.3.2 Fresh Air Inlet Duct

(a) Remove the existing fresh air inlet duct and prepare the existing opening in the wall as required to accommodate the new fresh air inlet duct.

(b) Seal around wall opening and fresh air duct to make it watertight.

(c) Connect fresh air inlet duct to new ventilation fan and blower motor using adapters and fittings as required. Install flexible adapter between inlet duct and fan inlet to reduce noise vibration.

E18.3.3 Low Pressure Ductwork

(a) Location of ductwork shown on drawings is based on existing conditions. Contractor to finalize all measurements and locations of new ductwork before installing.

(b) Clean and degrease ductwork prior to application.

(c) Assemble and install ductwork in accordance with recognized industry practices to achieve a virtually airtight and noiseless system.

(d) Connect ductwork to new ventilation fan and outside exhaust stack using adapters and fittings as required. Install flexible adapter between duct and fan outlet to reduce noise and vibration.

(e) Install each duct run with a minimum number of joints.

(f) Keep duct runs level and plumb following building lines. Minimize the use of elbows and other fittings accept as required.

(g) Align ductwork accurately at connections.

(h) Locate ductwork so as not to interfere with headroom and present a hazard to personnel.

(i) Support ducts rigidly with suitable ties, braces, hangers and anchors of a type that will hold ducts true-to-shape and prevent buckling. All material should be suitable for use in a highly corrosive environment.

(j) Support vertical ducts at every floor.

(k) Connect lengths of duct pipe with laps in airflow direction.

(l) Seal joints with a continuous 6.4 millimetre bead of sealer.

(m) Clean duct system to remove accumulated dust and debris after complete installation.

E18.3.4 Openings in Concrete Floors

(a) If required, core holes of required size in concrete floors where the new duct will pass through. Existing holes for duct work shall be patched and sealed in accordance with this specification.

(b) No additional payment will be made for coring and/or patching of holes in concrete.

E18.4 Measurement and Payment

E18.4.1 Ventilation material, equipment and accessories will be measured on a unit basis and paid for at the Contract Unit Price for "Ventilation Work" as supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E19. MISCELLANEOUS METAL FABRICATIONS

E19.1 Description

E19.1.1 General

(a) This Specification covers the supply, fabrication, transportation, handling, delivery and installation of miscellaneous metal fabrications.

E19.2 Materials

E19.2.1 General

(a) All materials shall be of a type acceptable to the Contract Administrator, and shall be subject to inspection and testing by the Contractor Administrator.

(b) Material intended for use in the various assemblies shall be new, straight, clean, with well defined profiles.

E19.2.2 Steel Sections and Plates

(a) To CAN/CSA G40.20/G40.21, Grade 300 W, except W, HP and HSS sections, which shall be Grade 350 W.

E19.2.3 Steel Pipe

(a) To ASTM A53/A53M, seamless, galvanized, as specified by item.

E19.2.4 Welding Materials

(a) To CSA W59.

E19.2.5 Hot Dipped Galvanized Steel Repair Material

(a) Galvalloy and Gal-Viz

E19.2.6 Stud Anchors

(a) To ASTM A108, Grade 1020.

E19.2.7 Aluminium

(a) To CAN/CSA S157 and the Aluminium Association 'Specifications for Aluminium Structures'. Aluminium for plates shall be Type 6061-T651. Aluminium plate shall have an approved raised oval or multi-grip pattern.

E19.2.8 Isolating Sleeves

(a) "Hyalite" – headed sleeve as manufactured by SPAE-Nauru of Kitcheners, Ontario, or approved equal.

E19.2.9 Anchor Bolts and Fasteners

(a) ASTM A276, Type 316 stainless steel, of ample section to safely withstand the forces created by operation of the equipment or the load to which they will be subjected.

E19.3 Construction Methods

E19.3.1 Submittals

(a) Submit the qualifications of the fabricator and welders to the Contractor Administrator for acceptance.

(b) Submit shop drawings in accordance with E7 clearly indicating materials, core thickness, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and, accessories. Indicate field measurements on shop drawings.

E19.3.2 Fabrication

(a) Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured. Assemble work in such a way that no disfigurements will show in the finished work, or impair the strength.

(b) Confirm measurements for all fabrications before fabricating.

(c) Cut aluminium plate with edges straight and true, and as far as practical, maintain continuity of the pattern at abutting edges.

(d) Pieces shall be of the sizes indicated on the Drawings and shall not be built up from scrap pieces. Confirm sizes with field measurements.

(e) Fit work and shop assemble, ready for erection where possible.

(f) Use same material for angle frames as for cover plates.

(g) Supply cover plates with hinges and lifting handles as shown on the Drawings. Provide hasp suitable for a padlock for exterior covers.

(h) Remove and grind smooth burrs, filings, sharp protrusions, and projections from metal fabrications to prevent possible injury. Correct dangerous or potentially harmful installations as directed by Contract Administrator.

(i) Steel welding to conform to CSA Standard W.59. Fabricator to be fully approved by the Canadian Welding Bureau, in conformance with CSA Standard W.47.1. Welding to be done by currently licensed welders only.

(j) Aluminium welding to conform to Welding and be in accordance with the requirements of CSA W59.2. Fabricator to be fully certified in conformance with CSA Standard W47.2. All welding to be done in a licensed welding shop. Obtain Contract Administrator's approval to do field welding.

(k) Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

(l) Hot-dip galvanize steel after fabrication, in accordance with CAN/CSA-G164, to a minimum net retention of 600 gm/m^2.

(m) Seal exterior steel fabrications to provide corrosion protection in accordance with CAN3-S16.1.

(n) Use self-tapping, shake-proof, flat-headed screws on items requiring assembly by screws.

E19.3.3 Erection

(a) Steel welding work to be done in accordance with CSA W59.

(b) Aluminium welding work to be in accordance with CSA W59.2

(c) Provide components for building in accordance with Shop Drawings and schedule.

(d) Erect metalwork in accordance with reviewed shop drawings, square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

(e) Provide suitable means of anchorage acceptable to Contract Administrator such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles where not specifically indicated on the Drawings.

(f) Make field connections with bolts to CAN/CSA-S16, or weld.

(g) Touch-up rivets, bolts and burnt or scratched surfaces that are to receive paint finish, with zinc primer after completion of erection.

(h) Repair damaged galvanized surfaces and field welds with self-fluxing, low temperature, zinc-based alloy rods in accordance with ASTM A780, Repair of Damaged Hot Dip Galvanizing Coatings. The general procedure shall be to allow a small amount of the repair alloy to flow then spread by brushing briskly with a wire brush. Brushing shall be sufficient to obtain a bright finish. Repeat process three times to ensure a proper thickness is achieved. Temperatures shall be kept below 177ºC (350ºF) at all times. All heating of structural steelwork shall be done in the presence of the Contract Administrator.

(i) Install access hatch frames square and level at the locations show on the Drawings. Embed anchors in concrete as shown on the Drawings. Install covers and adjust hardware to proper function.

(j) Isolate aluminium surfaces in contact with concrete using alkali-resistant bituminous paint meeting the requirements of CGSB 31-GP-3M.

(k) Install electrochemical isolation gaskets and sleeves to electrically isolate dissimilar metals.

E19.4 Measurement and Payment

E19.4.1 Supply, fabrication, transportation, handling, delivery and installation of miscellaneous metal fabrications will be measured on a unit basis and paid for at the Contract Unit Price for “Pumping Station Modifications and Mechanical Work” as supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E20. PROTECTIVE COATINGS

E20.1 Description

E20.1.1 General

(a) This specification shall cover supply and application of protective coatings and associated work for the items included.

(b) All interior, below grade concrete surfaces and piping shall be coated in accordance with this specification.

E20.2 Materials

E20.2.1 Coatings

(a) Coating materials are to be products of a single manufacturer and designed for thick-film, single coat application.

(b) Coating shall be a 100% solids epoxy novolac suitable for use on concrete and metal surfaces in a highly corrosive environment.

(c) Coating material to be applied in a damp, moist environment and have a maximum cure time of eight (8.0) hours for immersion service.

(d) Colour schedule will be determined by the Contract Administrator from a selection of the manufacturer’s full range of colours.

(e) Acceptable products are Enviroline 222 Moisture Resistant Lining or an approved equal.

E20.3 Construction Methods

E20.3.1 Standard of Acceptance

(a) Walls: No defects visible from a distance of 1000 millimetres at 90 degrees to surface when viewed using final lighting source.

(b) Ceilings: No defects visible from floor at 45 degrees to surface when viewed using final lighting source.

(c) Piping, valves and pumping equipment: No visible defects from a distance of 1000 millimetres at 90 degrees to surface when viewed using final lighting source.

(d) Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

E20.3.2 Delivery, Storage and Handling

(a) Deliver and store materials in original containers, sealed with labels intact.

(b) Indicate on containers or wrappings:

(i) Manufacturer's name and address.

(ii) Type of coating.

(iii) Compliance with applicable standard.

(iv) Colour number in accordance with colour schedule provided by Contract Administrator.

(c) Observe manufacturer's recommendations for storage and handling.

E20.3.3 Safety Requirements

(a) Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

E20.3.4 Protection

(a) Cover or mask floors, walls, and equipment adjacent to areas being coated to prevent damage and to protect from drops and splatters. Use non-staining coverings.

(b) Protect items that are permanently attached such as Fire Labels on hatch doors, frames, and name plates on equipment.

(c) Protect factory finished products and equipment.

E20.3.5 Cleaning and Surface Preparation

(a) Clean and prepare surfaces in accordance with the Manufacturer's instructions and the MPI Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:

(i) Remove dust, dirt, and other surface debris by scrubbing, vacuuming and wiping with dry, clean cloths or compressed air.

(ii) All surfaces must be clean and free of dust, dirt, oil and other foreign matter. Concrete surfaces shall be abrasive blasted or etched with ten (10) percent muriatic acid.

(iii) Rinse prepared surfaces with clean water until foreign matter is flushed from surface.

(iv) Allow surfaces to drain and dry sufficiently as per manufacturer's instruction to allow for coating application.

(b) Apply primer coat or paint to prepared surfaces if required by the manufacturer.

(c) Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before protective coating is applied. Apply coating as soon as possible after cleaning.

(d) Clean metal surfaces to be coated by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with section this

specification. Remove traces of blast products from surfaces, pockets and corners to be coated.

(e) Do not apply coatings to pumps.

E20.3.6 Application

(a) Apply protective coating using Plural Component equipment including a pump with a 2:1 mix ratio and a minimum 45:1 power ratio or as recommended by the manufacturer.

(b) Application thickness for coatings shall be as follows:

(i) Concrete surfaces – minimum 40 mils DFT or as per manufacturer's instructions.

(ii) Metal Surfaces – minimum 15 mils DFT or as per manufacturer's instructions.

(c) For heavily pitted or porous surfaces, the Contractor shall apply fifty (50) percent of the required film thickness followed immediately with a short nap roller or squeegee to work the coating material into bottom of pitted areas. Follow the rolled or squeegeed areas with applying the remaining required thickness of the coating product so as to provide a single coat, continuous application procedure. Sufficient drop clothes, shields or other protection shall be provided to protect adjacent piping, equipment, walls and floors from drips or splatters.

(d) Do not apply coating over galvanized metal, aluminium, stainless steel, brass or bronze, rubber, plated surfaces, machined surfaces, hangers and nameplates.

(e) Ventilate area of work by use of approved portable supply and exhaust fans.

(f) Provide temporary heating where permanent facilities are not available to maintain minimum recommended temperatures.

(g) Apply coating only in areas where dust is no longer being generated by related construction operations such that airborne particles will not affect the quality of the finished surface.

(h) Apply coating only when surface to be protected is adequately cleaned and prepared.

(i) Apply coating as a continuous film of uniform thickness. Recoat thin spots or bare areas as required to the minimum thickness is achieved.

(j) Allow surfaces to dry and properly cure for time period as recommended by manufacturer up to a maximum of eight (8) hours

(k) Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

E20.3.7 Cleanup

(a) Clean and reinstall all hardware items that were removed before undertaken coating operations.

(b) Remove over-spray, coating splatter and spills from exposed surfaces that were not intended for coating. Remove smears and spatter immediately as operations progress, using appropriate methods as per manufacturer's instructions.

E20.4 Measurement and Payment

E20.4.1 Protective coating application will be measured on a unit basis and paid for at the Contract Unit Price for "Protective Coating Work" as supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E21. SURFACE RESTORATIONS

E21.1.1 Surface Restoration

(a) Permanently restore all existing surface areas disturbed by construction activities including but not limited to areas disturbed by; construction equipment, placement of equipment trailer, snow clearing and where construction materials were stockpiled, shall be restored as follows:

(b) Boulevards and grassed areas: sodding using imported topsoil in accordance with CW3510.

(c) Gravel surfaces: in accordance with CW3150.

(d) Asphalt surfaces: match existing base course and asphalt thickness or a minimum or 150 millimetres of base course and 75 millimetres of Type 1A Asphaltic concrete whichever is greater, in accordance with CW 3410

(e) Miscellaneous concrete slabs (median slab, sidewalk, bullnose): in accordance with CW 3235

(f) Pavement slabs (including private approaches): in accordance with CW 3240.

(g) Interlocking stones: in accordance with CW 3330

(h) Concrete curb and gutter: in accordance with CW 3240

E21.1.2 Measurement and Payment

(a) Costs for surface restoration will be included in the contract works.

E22. PUMP START UP

E22.1 New pumps supplied by the City and installed by the Contractor shall not be started up by the Contractor without approval from the Contract Administrator. The Contractor shall provide the Contract Administrator his proposed schedule for pump start up at least one week in advance in order to allow time for the Contract Administrator to make arrangements with the pump supplier to be present for the start up.

E22.2 If any new pumping equipment (pump, pump controller, motor or drive shaft) fails to operate or perform properly and has to be removed for service as determined by the Contract Administrator, the Contractor shall remove the equipment that fails at no cost to the City and make arrangements with the pump supplier to have the equipment taken to the supplier's shop.

E22.3 The City shall be responsible for the re-installation of the pumping equipment once it has been repaired or replaced.

E22.4 The pumping equipment supplier and Contact for this Contract is:

Power and Mine Supply Company Ltd.

4 – 75 Meridian Drive

Winnipeg, Manitoba

Attention: Dan Shamlock, P. Eng.

Telephone (204) 694-9300