



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 500-2008

BANNATYNE FLOOD PUMPING STATION – BUILDING UPGRADE

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 BANNATYNE FLOOD PUMPING STATION – BUILDING UPGRADE

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, July 15, 2008.

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

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

B3. SITE INVESTIGATION

B3.1 Further to C3.1, the Contract Administrator or an authorized representative will be available at the Site from 10:00 a.m. to 11:00 a.m. on July 8, 2008 to provide Bidders access to the Site.

B3.2 The Bidder is advised that the Site should be viewed to identify any Site restrictions that could impede the work progress.

B3.3 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 regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B5.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B6. SUBSTITUTES

- B6.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.
- B6.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B6.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.
- B6.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.
- B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an "approved equal" or as an "approved alternative", or may refuse to grant approval of the substitute.
- B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.
- B6.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.
- B6.7 If the Contract Administrator approves a substitute as an "approved equal", any Bidder may use the approved equal in place of the specified item.
- B6.8 If the Contract Administrator approves a substitute as an "approved alternative", any Bidder bidding that approved alternative may base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with 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 COMPONENTS

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

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

B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.

B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.

B7.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.

B7.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.

B7.5 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.

B7.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, may result in the Bid being determined to be non-responsive.

B7.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B7.8 Bids shall be submitted to:

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

B8. BID

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

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

- (a) if the Bidder is a sole proprietor carrying on business in his own name, his name shall be inserted;
- (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
- (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
- (d) if the Bidder is carrying on business under a name other than his own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.

- B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.
- B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B8.4 Paragraph 12 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, should be affixed;
 - (d) if the Bidder is carrying on business under a name other than his own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B8.4.1 The name and official capacity of all individuals signing Form A: Bid shall be printed below such signatures.
- B8.4.2 All signatures should be witnessed, except where a corporate seal has been affixed.
- B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B9. PRICES

- B9.1 The Bidder shall state the lump sum price in Canadian funds for the Work on Form B: Prices.

B10. QUALIFICATION

- B10.1 The Bidder shall:
- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba; and
 - (b) be financially capable of carrying out the terms of the Contract; and
 - (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.
- B10.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:
- (a) be responsible and not be suspended, debarred or in default of any obligations to the City (a list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>).
- B10.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:
- (a) have successfully carried out work similar in nature, scope and value to the Work; and
 - (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and
 - (c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);

- B10.4 Further to B10.3(c), the Bidder shall, within three (3) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:
- (a) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association or by the Manitoba Heavy Construction Association's Safety, Health and Environment Program; or
 - (b) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt.>)
- B10.5 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.
- B10.6 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B11. BID SECURITY

- B11.1 The Bidder shall provide bid security in the form of:
- (a) a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond); or
 - (b) an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Bid Price, and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form included in the Bid Submission (Form G2: Irrevocable Standby Letter of Credit and Undertaking); or
 - (c) a certified cheque or draft payable to "The City of Winnipeg", in the amount of at least fifty percent (50%) of the Total Bid Price, drawn on a bank or other financial institution registered to conduct business in Manitoba.
- B11.1.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.
- B11.1.2 All signatures on bid securities shall be original, and shall be witnessed or sealed as required.
- B11.2 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly executed by the successful Bidder and the performance security furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.
- B11.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B11.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.
- B11.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.
- B11.3 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Bid Opportunity.

B12. OPENING OF BIDS AND RELEASE OF INFORMATION

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

B12.1.1 Bidders or their representatives may attend.

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

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

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

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

B13. IRREVOCABLE BID

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

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

B14. WITHDRAWAL OF BIDS

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

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

B14.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid, and only such person, has authority to give notice of withdrawal.

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

- (a) retain the Bid until after the Submission Deadline has elapsed;
- (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid; and
- (c) if the notice has been given by any one of the persons specified in B14.1.3(b), declare the Bid withdrawn.

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

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

B15. EVALUATION OF BIDS

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

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

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

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

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

B15.4.1 If there is any discrepancy between the lump sum price written in figures and the lump sum price written in words, the price written in words shall take precedence.

B16. AWARD OF CONTRACT

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

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

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

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

B16.3 Subject to B16.2, where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid.

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

PART C - GENERAL CONDITIONS

C1. GENERAL CONDITIONS

- C1.1 The *General Conditions for Construction* (Revision 2006 12 15) are applicable to the Work of the Contract.
- C1.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.
- C1.2 A reference in the Bid Opportunity to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of:

(a) The upgrading of the existing flood pumping station site, building envelope and ventilation system.

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

(a) Upgrading of site access north of the building by extending the curbs and asphalt paving from Ship Street.

(b) Architectural improvements to the flood pumping station including new air barrier, insulation, brick veneer, roof hatches and roofing system.

(c) Structural improvements to the flood pumping station including concrete surface repairs, and modification of openings to accommodate mechanical.

(d) Ventilation improvements to the flood pumping station including installation of new main floor exhaust fans, drywell supply fan, louvers and associated ductwork.

(e) Electrical improvements to the flood pumping station including new exterior building lighting, interior lighting, miscellaneous relocations of receptacles / switches, controls and wiring associated with the ventilation improvements.

(f) Replacement of parking lot exterior electrical panel including co-ordination of re-feed with Manitoba Hydro.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is KGS Group, represented by:

Colin Siepman, P.Eng.
Senior Engineer and Project Manager

Telephone No. (204) 896-1209

Facsimile No. (204) 896-0754

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

D4. CONTRACTOR'S SUPERVISOR

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

D5. NOTICES

D5.1 Except as provided for in C23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.

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

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

The City of Winnipeg
Chief Administrative Officer Secretariat
Attn: Chief Administrative Officer
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9
Facsimile No.: (204) 949-1174

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

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

D6. FURNISHING OF DOCUMENTS

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

SUBMISSIONS

D7. AUTHORITY TO CARRY ON BUSINESS

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

D8. SAFE WORK PLAN

D8.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D8.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

D9. INSURANCE

- D9.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;
 - (b) automobile liability insurance for owned automobiles used for or in connection with the Work in the amount of at least two million dollars (\$2,000,000.00) at all times during the performance of the Work and until the date of Total Performance;
 - (c) an all risks Installation Floater carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.
- D9.2 Deductibles shall be borne by the Contractor.
- D9.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4.1 for the return of the executed Contract.
- D9.4 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.

D10. PERFORMANCE SECURITY

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

D11. DETAILED PRICES

- D11.1 The Contractor shall provide the Contract Administrator with a detailed price breakdown (Form I: Detailed Prices) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

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

D12. SUBCONTRACTOR LIST

D12.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D13. DETAILED WORK SCHEDULE

D13.1 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 C4.1 for the return of the executed Contract.

D13.2 The detailed work schedule shall consist of the following:

- (a) a critical path method (C.P.M.) schedule for the Work;
- (b) a Gantt chart for the Work based on the C.P.M. schedule; and
- (c) all acceptable to the Contract Administrator.

SCHEDULE OF WORK

D14. COMMENCEMENT

D14.1 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.

D14.2 The Contractor shall not commence any Work on the Site until:

- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence of authority to carry on business specified in D7;
 - (ii) evidence of the workers compensation coverage specified in C6.15;
 - (iii) the Safe Work Plan specified in D8;
 - (iv) evidence of the insurance specified in D9;
 - (v) the performance security specified in D10;
 - (vi) the Detailed Prices specified in D11;
 - (vii) the Subcontractor list specified in D12;
 - (viii) the detailed work schedule specified in D13; and
- (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.

D14.3 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the letter of intent.

D15. SUBSTANTIAL PERFORMANCE

D15.1 The Contractor shall achieve Substantial Performance by October 30, 2008.

D15.2 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.

D15.3 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.

D16. TOTAL PERFORMANCE

D16.1 The Contractor shall achieve Total Performance by November 30, 2008.

D16.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.

D16.3 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.

D17. LIQUIDATED DAMAGES

D17.1 If the Contractor fails to achieve Substantial Performance or Total Performance in accordance with the Contract by the days 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 – Three Hundred dollars (\$300.00);
- (b) Total Performance – Three Hundred dollars (\$300.00).

D17.2 The amounts specified for liquidated damages in D17.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve, Substantial Performance or Total Performance by the days fixed herein for same.

D17.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

CONTROL OF WORK

D18. JOB MEETINGS

D18.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City and the Contractor respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.

D18.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

D19. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D19.1 Further to C6.24, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

MEASUREMENT AND PAYMENT

D20. PAYMENT

- D20.1 Further to C12, effective January 1, 2007 the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D21. WARRANTY

- D21.1 Notwithstanding C13.2, the warranty period shall begin on the date of Total Performance and shall expire one (1) year thereafter, except where longer warranty periods are specified in the respective Specification sections, unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.
- D21.1.1 For the purpose of Performance Security, the warranty period shall be one (1) year.
- D21.2 Notwithstanding C13.2, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Total Performance if a portion of the Work cannot be completed because of unseasonable weather or other conditions reasonably beyond the control of the Contractor but that portion does not prevent the balance of the Work from being put to its intended use.
- D21.2.1 In such case, the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in C13.2 for the warranty period to begin.

FORM H1: PERFORMANCE BOND
(See D10)

KNOW ALL MEN BY THESE PRESENTS THAT

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

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

_____ dollars (\$_____)

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

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

_____ day of _____, 20____, for:

BID OPPORTUNITY NO. 500-2008

BANNATYNE FLOOD PUMPING STATION – BUILDING UPGRADE

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

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

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

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

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

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

_____ day of _____, 20____.

SIGNED AND SEALED
in the presence of:

(Witness)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

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

(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 500-2008
BANNATYNE FLOOD PUMPING STATION – BUILDING UPGRADE

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

(Name of Contractor)

(Address of Contractor)

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

_____ Canadian dollars.

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

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

Partial drawings are permitted.

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

(Address)

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

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

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

(Date)

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

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

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

(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

**FORM I: DETAILED PRICES
 (SEE D11)**

BANNATYNE FLOOD PUMPING STATION – BUILDING UPGRADE

ITEM NO.	DESCRIPTION	SPEC. REF.	UNIT	APPROX. QUANTITY	UNIT PRICE	AMOUNT
1.	Mobilization / Demobilization	E6	Lump Sum	1		
2.	Site Development & Restoration	E10	Lump Sum	1		
3.	Miscellaneous Metals	E12	Lump Sum	1		
4.	Concrete Surface Repairs	E13	Lump Sum	1		
5.	Masonry	Division 4	Lump Sum	1		
6.	Wood, Plastics and Composites	Division 6	Lump Sum	1		
7.	Thermal & Moisture Protection	Division 7	Lump Sum	1		
8.	Openings	Division 8	Lump Sum	1		
9.	Finishes	Division 9	Lump Sum	1		
10.	Ventilation System	Division 23	Lump Sum	1		
11.	Electrical	Division 26	Lump Sum	1		
12.						
13.						
14.						
15.						
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28.						
29.						

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

- E1.1 These Specifications shall apply to the Work.
- E1.2 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.
- E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.2.3 Further to C2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.3 The following are applicable to the Work:

<u>Specification NO.</u>	<u>Specification Title</u>
DIVISION 1 – GENERAL REQUIREMENTS	
01005	General Instructions
DIVISION 04 - MASONRY	
04050	Masonry Procedures
04060	Mortar and Masonry Grout
04080	Masonry Reinforcement and Connectors
04090	Masonry Accessories
04211	Brick Masonry
DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES	
06100	Rough Carpentry
DIVISION 07 – THERMAL & MOISTURE PROTECTION	
07200	Insulation
07270	Air Barriers
07500	Modified Bituminous Roofing
07900	Joint Sealers
DIVISION 08 – OPENINGS	
08100	Steel Doors and Frames
08310	Roof Scuttle
08710	Hardware
DIVISION 09 – FINISHES	
09900	Painting
09965	Graffiti-Resistant Coatings
DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING	
230500	General Provisions
230501	Ventilation System
DIVISION 26 – ELECTRICAL	
260501	Common Work Results
260520	Wire and Box Connectors 0-1000V
260521	Wires and Cables
260529	Hangers & Supports for Electrical Systems
260531	Splitters, Junction and Product Data
260532	Outlet Boxes, Conduit Boxes and Fittings
260534	Conduits, Conduit Fastenings and Conduit Fittings
262821	Moulded Case Circuit Breakers
262417	Panelboards Breaker Type
262903	Control Devices
262910	Motor Starters to 600 V.4

<u>Specification NO.</u>	<u>Specification Title</u>
265000	Lighting

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
	Cover Sheet
500-2008-Drawing-LD-5047-R0	Architectural Site Plan, Roof Plan, General Notes
500-2008-Drawing-LD-5048-R0	Architectural Plans, Plan Details, Schedules
500-2008-Drawing-LD-5049-R0	Architectural Elevations
500-2008-Drawing-LD-5050-R0	Architectural Building Section
500-2008-Drawing-LD-5051-R0	Structural Plan and Section
500-2008-Drawing-LD-5052-R0	Mechanical Ventilation Plan
500-2008-Drawing-LD-5053-R0	Electrical Plan
500-2008-Drawing-LD-5059-R0	Electrical Single Line Diagram
500-2008-Drawing-LD-5060-R0	Electrical EF-1 Schematic and Wiring Diagram
500-2008-Drawing-LD-5061-R0	Electrical EF-2 Schematic and Wiring Diagram

E2. SALVAGE AND DEMOLITION

- E2.1 All salvage material and equipment as determined by the Contract Administrator prior to demolition shall remain the property of the City unless specifically noted otherwise.
- E2.2 The Contractor shall notify the Contract Administrator at least forty-eight (48) hours prior to delivery of salvaged material.
- E2.3 All demolition material and equipment as determined by the Contract Administrator shall be removed from the construction site, hauled and legally disposed of at no additional cost to the City.

E3. TEMPORARY USE OF CITY EQUIPMENT

- E3.1 City systems and equipment shall not be used during construction without the Contract Administrator's written permission. The Contract Administrator reserves the right to withdraw said permission if, in his opinion, proper care and maintenance are not provided.

E4. DANGEROUS WORK CONDITIONS

- E4.1 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.
- E4.2 The Contractor shall be aware of the potential hazards that can be encountered in gate chambers, manholes and sewers such as explosive gases, toxic gases and oxygen deficiency.
- E4.3 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.
- E4.4 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.
- E4.5 Workers must wear a respirator or supplied air at all times when entering a chamber, manhole or sewer where live sewage is present.

E4.6 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.

E4.7 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 his 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.

E5. CITY ASSISTANCE AND CALLOUTS

E5.1 Water and Waste Department Collection System personnel will be available to provide assistance to the Contractor for station isolation and/or shutdown if required.

E6. MOBILIZATION AND DEMOBILIZATION

E6.1 Mobilization and demobilization will include but not be limited to start-up costs, equipment setup and removal, field office and storage facilities set-up and removal and Site cleanup.

E6.2 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.

E6.3 Fifty (50%) percent of the Mobilization and Demobilization unit price will be paid on the first progress payment.

E6.4 The remaining fifty (50%) percent of the Mobilization and Demobilization unit price will be paid subsequent to the completion of the Work and restoration and clean up of the Site.

E7. PROTECTION OF EXISTING TREES

E7.1 Do not remove existing trees and take the following precautionary steps to avoid damage from construction activities to existing trees within the limits of the construction area.

E7.1.1 Do not stockpile materials and soil or park vehicles and equipment within two (2) metres of trees.

E7.1.2 Strap mature tree trunks with 25 x 150 x 2400 wood planks. Smaller trees shall be similarly protected using appropriately sized wood planks.

E7.1.3 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.

E7.1.4 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.

E7.1.5 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.

E7.2 All damage to existing trees due to construction activities shall be repaired to the requirements and satisfaction of the City of Winnipeg, Public Works Department, Forestry Branch at the Contractor's expense.

E7.3 Costs for protection of trees will be included in Site Development & Restoration.

E8. PERMITS

E8.1 The Water and Waste Department will apply and pay for the building permit.

E9. SHOP DRAWINGS

E9.1 Description

- (a) This Specification provides instructions for the preparation and submission of shop drawings.
 - (i) The term 'shop drawings' means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, including Site erection drawings 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 Contract Administrator review.
- (b) Shop Drawings
 - (i) Original drawings are to be prepared by 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 structural components shall bear the seal of a registered Engineer of Manitoba.
 - (a) Metal Fabrications
- (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 subtrades 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 fourteen (14) Calendar Days before dates reviewed submissions will be needed, and allow for a fourteen (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:
 - (a) Contractor
 - (b) SubContractor
 - (c) Supplier
 - (d) Manufacturer
 - (e) 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, initialed 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.

E10. SITE DEVELOPMENT AND RESTORATION

E10.1 Description

- E10.1.1 This Specification shall cover all aspects of the Site Development and restoration Work, including erection, maintenance and removal of safety fencing, sediment control Works, snow clearing, access development including new concrete curbs and asphalt paving, access maintenance and removal, and Site restoration.

E10.2 Materials

E10.2.1 Equipment

- (a) All equipment, implements, tools and facilities used shall be of a size and type as required to complete the Work in a reasonable time, approved by the Contract Administrator. The Contractor shall keep all equipment in good Working order, and have sufficient standby equipment available at all times, as required.

E10.3 Construction Methods

E10.3.1 Site and Construction Access

- (a) The Contractor shall be responsible to develop suitable Site access. This includes but is not limited to, temporary bridging over structures, temporary removal and reinstallation of safety fencing, any landscaping and grading repairs, restoration of vegetation, etc. necessary to restore any Site and construction access areas to their pre-existing condition.
- (b) The Water and Waste Department's site access north of the building is to be upgraded as part of the current Contract by extending the curbs and asphalt paving from Ship Street as shown on the Drawings.
- (c) The Contractor must ensure that the building and the existing equipment is accessible to City operational personnel throughout construction.

E10.3.2 Existing Fence

- (a) The existing fence adjacent to the building shall be reconstructed if damaged during construction. New fence materials used for the reconstruction shall be consistent with the existing fence.

E10.3.3 Existing Parking

- (a) The Contractor shall maintain access to the existing leased parking stalls located on the Bannatyne Flood Pumping Station site throughout construction. The Contractor may, at his option, negotiate alternate parking arrangements directly with Imperial Parking (Impark).

E10.3.4 Landscaping Along Ship Street

- (a) Landscaping upgrades on the Bannatyne Flood Pumping Station site along Ship Street will be performed by others and are not included in the scope of the current contract.

E10.3.5 Vegetation Removal

- (a) Some vegetation (small trees and sod) removal will be permitted in order to facilitate construction. Existing vegetation shall not be removed without prior approval from the Contract Administrator. The Contractor shall load and haul any removed vegetation, and dispose of the material off Site immediately upon collection. Stockpiling shall not be permitted.

E10.3.6 Safety Fence

- (a) The Contractor shall erect and maintain for the duration of the project, a safety fence acceptable to the Contract Administrator to restrict access to the Site. The fencing shall enclose the entire Site with appropriate gates or openings that are closed at the end of each Work day.

E10.3.7 Environmental Regulations

- (a) The Contractor shall adhere to all relevant Federal and Provincial environmental regulations.

E10.3.8 General Site Cleanup and Restoration

- (a) All areas of the construction Site shall be restored to a condition at least equivalent to its original condition prior to initiation of Work. This may include, but is not necessarily limited to the Contractor's lay down area, the removal of the Contract Administrator Site trailer, and removal of all temporary fencing.

E10.3.9 Topsoil and Sod

- (a) All existing grassed areas disturbed by the Contractor during construction, which are not designated for construction of items to be permanently incorporated into the Work, shall be restored by the Contractor to existing condition or better using topsoil and sod at his own cost.

E10.3.10 Asphaltic Concrete Pavement

- (a) Asphaltic concrete pavement shall be supplied and installed in accordance with CW3410.

E10.3.11 Sub-grade, Sub-base and Base Course Construction

- (a) Sub-grade, sub-base and base course shall be supplied and installed in accordance with CW3110.

E10.3.12 Concrete Curb and Slab Construction

- (a) Concrete curbs and slabs shall be supplied and installed in accordance with CW3240. concrete mix design shall be Type 1 in accordance with CW3310.

E10.4 Method of Measurement and Payment

E10.4.1 Site Development and Restoration

- (a) The Site development and restoration will be measured and paid for at the Contract Lump Sum Price for "Site Development and Restoration", which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification.

E11. METAL FABRICATIONS

E11.1 Description

E11.1.1 General

- (a) This Specification shall cover the supply, fabrication, transportation, handling, delivery and placement of metal fabrications.

E11.2 Materials

E11.2.1 All materials shall be of a type acceptable to the Contract Administrator, and shall be subject to inspection and testing by the Contractor Administrator.

E11.2.2 Material intended for use in the various assemblies shall be new, straight, clean, with sharply defined profiles.

E11.2.3 Steel Sections and Plates: to CAN/CSA G40.20/G40.21, Grade 300 W, except W, HP and HSS sections, which shall be Grade 350 W.

E11.2.4 Steel Pipe: to ASTM A53/A53M, seamless, galvanized, as specified by item.

E11.2.5 Welding materials: to CSA W59.

E11.2.6 Hot dipped galvanized steel repair material: Galvalloy and Gal-Viz

E11.2.7 Stud Anchors: to ASTM A108, Grade 1020.

E11.2.8 Aluminum: to CAN/CSA S157 and the Aluminum Association 'Specifications for Aluminum Structures'. Aluminum for plates shall be Type 6061-T651. Aluminum plate shall have an approved raised oval or multi-grip pattern.

- E11.2.9 Isolating sleeves shall be “Nylite” – headed sleeve as manufactured by SPAE-Naur of Kitchener, Ontario, or approved equal.
- E11.2.10 Anchor bolts and fasteners: 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.
- E11.3 Construction Methods
- E11.3.1 Submittals
- (a) The Contractor shall submit the qualifications of the fabricator and welders to the Contractor Administrator for acceptance. Submit shop drawings in accordance with E9 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.
- E11.3.2 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 aluminum 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) Where possible, fit Work and shop assemble, ready for erection.
- (f) Angle frames shall be of the same material as the cover plate (except for existing frames designated on the drawings for re-use), and cover plates shall be hinged and be supplied with lifting handles, as shown on the Drawings. Exterior covers shall be supplied with a hasp for a padlock.
- (g) Remove and grind smooth burrs, filings, sharp protrusions, and projections from metal fabrications to prevent possible injury. Correct any dangerous or potentially harmful installations as directed by Contract Administrator.
- (h) All steel welding shall conform to CSA Standard W.59. Fabricator shall be fully approved by the Canadian Welding Bureau, in conformance with CSA Standard W.47.1. Welding shall be done by currently licensed welders only.
- (i) All aluminum welding shall be in accordance with the requirements of CSA W59.2. The fabricator shall be fully certified in conformance with CSA Standard W47.2. All welding shall be done in a licensed welding shop, and no field welding will be permitted unless approved in writing, in advance, by the Contract Administrator.
- (j) Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- (k) All steel shall be hot-dip galvanizing after fabrication, in accordance with CAN/CSAG164, to a minimum net retention of 600 gm/m².
- (l) Seal exterior steel fabrications to provide corrosion protection in accordance with CAN3-S16.1.
- (m) Use self-tapping shake-proof flat-headed screws on items requiring assembly by screws.

E11.3.3 Erection

- (a) Do steel welding Work in accordance with CSA W59 and aluminum welding Work in accordance with CSA W59.2
- (b) Erect metal Work in accordance with reviewed shop drawings, square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- (c) 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.
- (d) Provide components for building in accordance with shop drawings and schedule.
- (e) Make field connections with bolts to CAN/CSA-S16, or weld.
- (f) Touch-up rivets, bolts and burnt or scratched surfaces that are to receive paint finish, with zinc primer after completion of erection.
- (g) 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 177°C (350°F) at all times. All heating of structural steel. Work shall be done in the presence of the Contract Administrator.
- (h) 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.
- (i) All aluminum surfaces in contact with concrete shall be isolated using alkali resistant bituminous paint meeting the requirements of CGSB 31-GP-3M.
- (j) Install electrochemical isolation gaskets and sleeves to electrically isolate dissimilar metals.

E11.4 Measurement and Payment

- E11.4.1 Supply, fabrication, transportation, handling, delivery and placement of metal fabrications will be paid for at the Contract Unit Price for Miscellaneous Metals”.

E12. CONCRETE SURFACE REPAIRS

E12.1 Description

- E12.1.1 This Specification shall cover all operations related to the repair of delaminated spalled and deteriorated areas of the existing manhole chamber concrete, discharge block exterior concrete, and discharge block openings.

E12.2 Materials

E12.2.1 Surface Repair Mortar

- (a) The surface repair mortar requirements are:
 - (i) cementitious fast-setting mortar
 - (ii) designed for repair of vertical surfaces
 - (iii) high bond strength
 - (iv) 50 MPa minimum compressive strength at 28 days
- (b) Acceptable products are Sika Top 123 Plus and Emaco S66 or approved equal.

E12.2.2 Reinforcing Steel

- (a) The reinforcing steel shall meet the requirements of CAN/CSA-G30.18-M92, Grade 400W. The Contractor shall supply the reinforcing steel.

E12.3 Construction Methods

E12.3.1 Concrete Repair

- (a) The size and location of the concrete repair areas as shown on the Plans are approximate. The Contractor shall repair the spalled and deteriorated concrete in the general area as identified and as otherwise directed by the Contract Administrator in the field. After the removal of the existing stucco finish the Contractor shall provide safe access to the concrete areas for the Contract Administrator to inspect the concrete and to mark out the repair areas in the field.
- (b) All large areas requiring repair shall be saw cut around their perimeter to a depth of 25 mm. All concrete in the repair area shall be removed to the depth of unsound, spalled and deteriorated concrete. Clean the roughened concrete surface of dirt, loose chips, dust, oil etc. by pressure wash and compressed air (contain all debris). When corroded reinforcing steel is exposed additional concrete shall be removed to provide at least 20 mm clearance around the entire surface of the corroded reinforcing steel. All resulting concrete and steel surfaces shall be thoroughly cleaned by rotary powered steel brush. All rust and scale shall be thoroughly removed from exposed reinforcing steel. The repair surfaces shall be pre-soaked prior to placement of concrete.
- (c) Cast repair areas in accordance with manufacturer's specifications. Repaired areas shall receive a trowelled finish to match the existing concrete surface. Moist cure repair areas for a minimum of 3 days. Do not apply curing compounds as they may interfere with adhesion of the air/vapour barrier membrane.

E12.4 Measurement and Payment

- E12.4.1 Concrete surface repairs will be paid for at the Contract Unit Price for "Concrete Surface Repairs", which price will be payment in full for performing all operations herein described.

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DIVISION 04 – MASONRY

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

DIVISION 07 – THERMAL & MOISTURE PROTECTION

DIVISION 08 – OPENINGS

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PART 1 - GENERAL

1.1 Codes and Standards

- .1 Execute work in accordance with the Manitoba Building Code (MBC) and supplements; the editions current at time of bid closing.
- .2 Wherever codes, standards, regulations are referenced herein they shall mean the latest editions including amendments, supplements and revisions as of the date of bid closing.
- .3 In no instance shall the standard of quality of materials, products and workmanship established by these specifications and drawings be reduced by any of the codes, standards, or regulations.

1.2 Temporary Power

- .1 The City will allow Contractor to use a reasonable amount of building power required during the Work for temporary lighting and operating of power tools.

1.3 Sanitary Facilities

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances. Keep area and premises in a sanitary condition.

1.4 Water Supply

- .1 Provide own water supply.

1.5 Hoarding and Site Fencing

- .1 Provide and erect hoarding to protect the public, workers and public and private property from injury or damage, in accordance with local governing authorities or By-Laws.
- .2 Provide and erect temporary site fencing to enclose construction area around building. Maintain fence in good condition until completion of project.
- .3 Site fencing shall be 2.1 m (7'-0") high chain link or wire mesh fencing with posts at no more than 2.4 m (8'-0") on centre.

1.6 Weather Enclosures

- .1 Provide temporary weather-tight enclosures and protection to existing equipment and building interior until permanently enclosed.
- .2 Erect enclosures to allow access for installation of materials and working inside enclosure.
- .3 Design enclosures to withstand wind pressure and snow loading as required.

1.7 Protection of Building Finishes and Equipment

- .1 Provide adequate protection for finished and partially finished building finishes and equipment during the performance of Work. Provide necessary screens, covers, hoardings as may be required. Be responsible for all damages incurred due to improper or lack of protection.

1.8 Fire Protection

- .1 Provide and maintain adequate temporary fire protection on equipment during performance of Work, as required by insurance companies having jurisdiction and governing Codes, regulations and By-Laws.
- .2 Handle gasoline and like combustible materials with good safe practice.
- .3 Remove combustible debris from site daily.

~End~

PART 1 - GENERAL

1.1 References

- .1 Canadian Standards Association (CSA)
 - .1 CSA A179 Mortar and Grout for Unit Masonry.
 - .2 CSA A371 Masonry Construction for Buildings.

1.2 Delivery, Storage and Handling

- .1 Deliver materials to job site in dry condition. Keep materials dry until use, except where wetting of bricks is specified.
- .2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

1.3 Environmental Requirements

- .1 Hot Weather Requirements: protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.
- .2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashing or other permanent construction.
- .3 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .4 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

PART 2 - PRODUCTS

2.1 Materials

- .1 As specified in related section in Division 4 – Masonry.
- .2 Use same brands of materials and source of aggregate for entire project.

PART 3 - EXECUTION

3.1 Installation

- .1 Do masonry work in accordance with CSA A371 except where indicated otherwise.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.
- .4 Make masonry courses uniform in height with both vertical and horizontal joints of equal and uniform thickness.
- .5 Keep air space in cavities and weep holes free of mortar droppings and other debris to allow free air movement and positive moisture drainage to exterior.
- .6 Lay masonry units in full mortar bed. Do not shift or tap units after mortar has taken initial set. Where adjustments must be made, remove mortar and replace with fresh supply.
- .7 Bed joints evenly and fill solidly with mortar. Rock masonry into place at closures with head joints thrown against adjacent masonry units.
- .8 Where new masonry abuts set masonry, clean existing surfaces and dampen if necessary to obtain bond.

3.2 Construction

- .1 Clean unglazed clay masonry as work progresses.
- .2 Exposed Masonry:
 - .1 Remove chipped, cracked, and otherwise damaged units in exposed masonry and replace with undamaged units.
- .3 Jointing:
 - .1 Allow joints to set just enough to remove excess water, then tool with jointer to provide smooth, compressed, uniform joints.
 - .2 Use round jointer to provide concave joints where concave joints are indicated.
 - .3 Strike flush all joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.
- .4 Cutting:
 - .1 Cut out neatly for electrical switches, outlet boxes, and other recessed or built-in objects.
 - .2 Make cuts straight, clean, and free from uneven edges.
 - .3 Use masonry saw where necessary.
- .5 Building in:
 - .1 Build in items required to be built into masonry.
 - .2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
 - .3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.
- .6 Wetting of Bricks
 - .1 Except in cold weather, wet clay bricks having an initial rate of absorption exceeding 1 g/min/1000 mm²: wet to uniform degree of saturation, 3 to 24 h before laying, and do not lay until surface dry.
 - .2 Wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.
- .7 Support of loads:
 - .1 Use 20 MPa concrete where concrete fill is used in lieu of solid units.
 - .2 Install building paper below voids to be filled with concrete; keep paper 25 mm back from faces of units.
- .8 Provision for movement:
 - .1 Built masonry to tie in with stabilizers, with provision for vertical movement.
- .9 Provisions for other trades:
 - .1 Provide openings in masonry walls where required or indicated. Accurately locate chases and openings and neatly finish to the required sizes.
 - .2 Where masonry encloses conduit or piping, bring to proper level indicated and as directed.
 - .3 Do not cover pipe or conduit chases or enclosures until advised that work has been inspected and tested.
- .10 Loose steel lintels:
 - .1 Install loose steel lintels. Centre over opening width.
- .11 Control joints:
 - .1 Construct continuous control joints as indicated.
 - .2 Provide continuous vertical control joints in exterior masonry veneer as indicated, but at no more than 6 m on centre maximum spacing.
 - .3 Fill control joints with expansion joint filler and joint sealants as specified in related section in Division 4 – Masonry.

3.3 Site Tolerances

- .1 Tolerances in notes to Clause 5.3 of CSA A371 apply.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

The masonry will be measured and paid for at the Contract Lump Sum Price for "Masonry", which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

~End~

PART 1 - GENERAL

1.1 References

- .1 Canadian Standards Association (CSA)
- .1 CSA A179 Mortar and Grout For Unit Masonry.

PART 2 - PRODUCTS

2.1 Materials

- .1 Mortar: CSA A179, Type S for loadbearing masonry, Type N for non-loadbearing masonry, based on Property specifications.

PART 3 - EXECUTION

3.1 Construction

- .1 Do masonry mortar work in accordance with CSA A179.
- .2 Grout color to match masonry.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Mortar and Masonry

Mortar and Masonry shall be considered incidental to the Contract Lump Sum Price for "Masonry".

~End~

PART 1 - GENERAL

1.1 References

- .1 Canadian Standards Association (CSA)
- .1 CSA A179 Mortar and Grout For Unit Masonry.

PART 2 - PRODUCTS

2.1 Materials

- .1 Mortar: CSA A179, Type S for loadbearing masonry, Type N for non-loadbearing masonry, based on Property specifications.

PART 3 - EXECUTION

3.1 Construction

- .1 Do masonry mortar work in accordance with CSA A179.
- .2 Tie masonry veneer to backing in accordance with NBC, CSA S304, CSA A371 and as indicated.

3.3 Reinforced Lintels and Bond Beams

- .1 Reinforce masonry lintels and bond beams as indicated. Place and grout reinforcement in accordance with CSA S304, CSA-A371, and CSA-A179.

3.4 Grouting

- .1 Grout masonry in accordance with CSA S304, CSA-A371, CSA-A179 and as indicated.

3.5 Anchors

- .1 Supply and install metal anchors as indicated.

3.6 Lateral Support and Anchorage

- .1 Supply and install lateral support and anchorage per CSA S304.1 and as indicated.

3.7 Field Bending

- .1 Do not field bend reinforcement and connectors except where indicated or authorized by Contract Administrator.
- .2 When field bending is authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars and connectors that develop cracks or splits.

3.8 Field Touch-up

- .1 Touch up damaged and cut ends of galvanized reinforcement steel and connectors with compatible finish to provide continuous coating.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Masonry Reinforcement and Connectors

Masonry Reinforcement and Connectors shall be considered incidental to the Contract Lump Sum Price for "Masonry".

~End~

PART 1 - GENERAL

1.1 References

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 653/ A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 Canadian Standards Association (CSA)
 - .1 CSA A371, Masonry Construction for Buildings.

PART 2 - PRODUCTS

2.1 Materials

- .1 Control joint fillers and joint sealants: as specified in Section 07900 - Joint Sealants.
- .2 Masonry flashing: self-adhesive modified bitumen sheet membrane: minimum 1.0 mm thick. Use primers recommended by manufacturer. Acceptable products: Bakelite Blueskin SA, WR Grace Perm-A-Barrier, Soprema Colphene 1500.
- .3 Metal drip edge: brake formed of 0.6 mm galvanized sheet steel commercial quality to ASTM A653 with Z275 designation zinc coating. Prefinished with Stelcolor 8000 Series coil coating. Colour selected by Contract Administrator. Form drip edge to extend 100 mm under base course, with 6 - 9 mm formed drip at front edge.

PART 3 – EXECUTION

3.1 Installation

- .1 Install continuous control joint fillers in control joints at locations indicated.
- .2 Install weep hole vents in vertical joints immediately over flashings in masonry veneer wall construction, at maximum horizontal spacing of 600 mm on centre. Leave out the bottom 50 mm of mortar from vertical joints. Keep weep holes free from mortar droppings and debris to allow free air movement and positive drainage of moisture.

3.2 Construction

- .1 Building flashings in masonry in accordance with CSA A371 and as follows.
 - .1 Install flashings under exterior masonry bearing on foundation walls, slabs, shelf angles, angle lintels over openings and elsewhere indicated. Install flashings under weep hole courses.
 - .2 In cavity walls and veneered walls carry flashings from front edge of masonry, under outer wythe, then up backing not less than 150 mm, bond to backup wall and seal top edge water tight.
 - .3 Lap joints 150 mm and seal.
- .2 In addition to masonry flashing provide metal drip edge at angle lintels over openings. Align drip edge straight and even. Overlap joints minimum 20 mm.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Masonry Accessories

Masonry Accessories shall be considered incidental to the Contract Lump Sum Price for "Masonry".

~End~

PART 1 - GENERAL

.1 Related Work

- .1 Masonry procedures Section 04050.
- .2 Masonry mortar and grout for masonry Section 04060.
- .3 Masonry reinforcing and connectors Section 04080.
- .4 Masonry accessories Section 04090.

.2 References

- .1 CAN/CSA-A82.1M, Burned Clay Brick (Solid Masonry Units Made From Clay or Shale).
- .2 CAN3-A82.8M78, Hollow Clay Brick.

PART 2- MATERIALS

.1 Manufacturers

- .1 I-XL Industries Ltd.

.2 Burned Clay Face Brick

- .1 Dry-pressed: to CAN/CSA A82.1M, as manufactured by I-XL Industries Ltd., and as follows:
 - .1 Type: FBS.
 - .2 Grade: SW.
 - .3 Nominal dimensions: 100 Giant 3 1/2" x 3 1/2" x 15 1/2".
 - .4 Texture: Smooth.
 - .5 Colour: #114 Chateau Grey.
 - .6 Manufactured from one continuous batch to ensure minimum colour and texture variations.
 - .7 Special shapes: provide special units as shown on Drawings.
 - .8 Solid brick: use where necessary to avoid exposing brick cores.

.3 Burned Clay Face Brick

- Dry-pressed: to CAN/CSA A82.1M, as manufactured by I-XL Industries Ltd., and as follows:
 - .1 Type: FBS.
 - .2 Grade: SW.
 - .3 Nominal dimensions: 100 Giant 3 1/2" x 3 1/2" x 15 1/2".
 - .4 Texture: Smooth.
 - .5 Colour: #671 Chesnut.
 - .6 Manufactured from one continuous batch to ensure minimum colour and texture variations.
 - .7 Special shapes: provide special units as shown on Drawings.
 - .8 Solid brick: use where necessary to avoid exposing brick cores

Part 3 – EXECUTION

.1 Laying

- .1 Face brick - exterior masonry veneer:
 - .1 Bond: stack bond.
 - .2 Coursing height: 12" for three bricks and three joints.

- .3 Jointing: V- Joint
- .4 Mixing and blending: mix units within each pallet and with three or more other pallets to ensure uniform blend of colour and texture.

.2 Cleaning

- .1 Test specified cleaning agent and procedures by cleaning a small, designated sample area before start of cleaning.
- .2 Do not proceed with cleaning until sample area is approved.
- .3 Soak wall with clean water and flush off loose dirt and mortar.
- .4 Apply specified cleaning agent in accordance with the manufacturer's direction, working from top to bottom. Rinse areas thoroughly with clean water to remove cleaning solutions, dirt, and mortar residue.

PART 4- MEASUREMENT AND PYAMENT

4.1 Method of Measurement and Payment

Brick Masonry

The supply and installation of brick masonry shall be considered incidental to the Contract Lump Sum Price for "Masonry"

~End~

PART 1 – GENERAL

1.1 References

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-11.3, Hardboard.
- .2 Canadian Standards Association (CSA)
 - .1 CSA B111 - Wire Nails, Spikes and Staples.
 - .2 CSA O80 - Wood Preservation.
 - .3 CAN/CSA O141 - Softwood Lumber.
 - .4 CSA O151 - Canadian Softwood Plywood.
- .3 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber.

1.2 Quality Assurance

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

PART 2 - PRODUCTS

2.1 Materials

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% (S-dry) or less in accordance with CAN/CSA-O141, Spruce, Pine or Fir NLGA No. 2 or better grade. Glued end-jointed (finger-jointed) lumber is not acceptable
- .2 Canadian softwood plywood (CSP): to CSA 0151, standard construction, square edge. Standard sheathing grade.
- .3 Hardboard paneling: to CAN/CGSB-11.3, smooth, tempered, 1219 x 2438 x 3 mm thick panels.
- .4 Nails, spikes and staples: to CSA B111 and NBC requirements. Galvanized.
- .5 Bolts: steel, of sizes required, complete with nuts and washers. Galvanized.
- .6 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead plugs, recommended for purpose by manufacturer.
- .7 Surface-applied wood preservative: copper naphthenate or pentachlorophenol base water repellent preservative. Use clear for materials exposed in final assembly, coloured elsewhere.

2.2 Pressure Preservative Treated Wood

- .1 Provide lumber materials pressure preservative treated for:
 - .1 Rough bucks at openings.
 - .2 Wood strapping.
 - .3 Lumber used on exterior of building, above or below grade.
- .2 Treat material to CAN/CSA-O80 using Type-C (copper chromate arsenate) preservative to obtain a minimum net retention level of 6.4 kg/m³ of wood.
- .3 Materials shall be dried after treatment to a moisture content of 19% or less.
- .4 Each piece of treated material shall be identified with a tag or ink mark bearing the Canadian Wood Preservers' Bureau quality mark.
- .5 Apply surface applied wood preservative to heartwood exposed from ripping, end cutting or boring.

PART 3 - EXECUTION

3.1 Installation

- .1 Comply with requirements of NBC, Part 9 supplemented by following paragraphs.
- .2 Install members true to line, levels and elevations. Space uniformly.
- .3 Construct continuous members from pieces of longest practical length.
- .4 Install spanning members with "crown-edge" up.
- .5 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .6 Countersink bolts where necessary to provide clearance for other Work.
- .7 Use fastenings of following types, except where specific type is indicated or specified:
 - .1 To hollow masonry, plaster and panel surfaces use toggle bolt.
 - .2 To solid masonry and concrete use expansion shield with lag screw, lead plug with wood screw.
 - .3 To structural steel use bolts through drilled hole, or welded stud-bolts or power driven self-drilling screws, or welded stud-bolts or explosive actuated stud-bolts.
- .8 Install furring and blocking as required to space-out and support surface wall and ceiling finishes, facings, fascia, soffit, siding and other Work as indicated. Align and plumb faces of furring and blocking to tolerance of 1:600.
- .9 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other Work. Except where indicated otherwise, use material at least 38 mm thick.
- .10 Install fascia backing, nailers and other wood supports as required and secure using galvanized fasteners.
- .11 Install hardboard paneling with finishing nails.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Rough Carpentry

Rough Carpentry will be paid for at the Contract Lump Sum Price for "Roof Wood, Plastics and Composites", which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this specification.

~End~

PART 1 - GENERAL

1.1 Section Includes

- .1 Provide all labour, materials, methods, equipment, accessories to complete general insulation.
 - .1 Rigid insulation, furring, insulation fasteners.
 - .2 Cement insulation coating.

1.2 Related Sections

- .1 Section 06100: Rough carpentry.
- .2 Section 07500 Mod Bit Roofing

1.3 Material Delivery, Storage, Handling

- .1 Store insulating materials in weathertight structure, above ground.
- .2 Protect insulation from exposure to sun light, during storage, after application.

PART 2 - PRODUCTS

2.1 Materials

- .1 Self-adhesive air barrier membrane: modified bitumen on high-density polyethylene film, with silicone release paper on adhesive side, minimum 1.0 mm thick.
- .2 Rigid insulation on wall: to CGSB 51-GP-20-M87, thickness indicated, required, 2'-0" x 8'-0" board size, extruded, expanded, high density skins, square edges, R5/inch thickness, Dow Chemical manufacture "Styrofoam SM".
- .3 Insulation board fasteners: screw type, truss head, corrosion resistant finish, 26 gauge galvanized steel 2" x 2" hexagon washers.
 - .1 To concrete: pre-drilled, length through insulation, penetrate concrete minimum 1 1/2", Construction Fasteners Inc. manufacture "Confas" system.
 - .2 To wood: power driven, length through insulation, penetrate wood minimum 1 1/2".

PART 3 - EXECUTION

3.1 Workmanship

- .1 Examine surfaces, areas to receive insulation. Report defective, deleterious conditions. Proceed when unsatisfactory conditions corrected.
- .2 Ensure building substantially weathertight, work of other Sections, mechanical, electrical work completed, tested, approved as required prior to installation.
- .3 Install insulation to maintain continuity of thermal protection to building elements, where indicated, required.
- .4 Cut, trim insulation neatly to fit spaces, protrusions, corners, edges, butt joints tightly, offset vertical joints. Cross-lap sheets of insulation on roof at each layer.

3.2 Rigid Insulation Application

- .1 Ensure complete, firm attachment of insulations to substrate. Provide 1x4" wood furring let into cross lapped roofing insulation boards at 24" o/c.
- .2 Co-operate fully with Section 09260 for steel stud furring locations, Section 06100 for wood framing, blocking, plywood installation, etc., other Sections as required.
- .3 Apply insulation over membrane vapour retarder where indicated, required, starting from level point. Fit boards tight together.
- .4 Tape, seal joints, edges, terminations, etc. to prevent moisture intrusion.
- .5 Fasten insulation boards through membrane, plywood substrate to wood stud furring with specified insulation fasteners, washers minimum two fasteners vertically each board, 24" o.c.
- .6 Fasten insulation boards through membrane to concrete substrate with specified insulation fasteners, washers 24" o.c., both ways, minimum six fasteners each insulation board.
- .7 Ensure complete, firm attachment of rigid insulation to substrate for application of finishes. Co-operate fully with other applicable Sections.
- .8 Protect insulation below grade with protection board prior to cement insulation coating application.

3.3 Cleaning

- .1 Clean up debris minimum daily, remove from site or to container provided by Contractor.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Insulation

The supply and installation of insulation shall be considered incidental to the Contract Lump Sum Price for "Thermal and Moisture Protection"

~End~

PART 1 - GENERAL

1.1 Quality Assurance

- .1 Coordinate installation of air barrier materials with work of other trades to minimize exposure of membrane to elements or damage, and to
- .2 Overlap and seal air barrier with air and vapour barrier membranes installed by other trades to ensure continuity of building air/vapour barrier system over entire building.

1.2 Environmental Conditions

- .1 Apply primers and membranes in dry weather and only when air and surface temperature are within manufacturer's recommended limits.
- .2 For applications below recommended temperature consult manufacturer and do not proceed until approved by manufacturer or his representative.

PART 2 - PRODUCTS

2.1 Materials

- .1 Self-adhesive air barrier membrane: modified bitumen on high-density polyethylene film, with silicone release paper on adhesive side, minimum 1.0 mm thick.
 - .1 Acceptable material – exterior walls: Soprema Sopraseal Stick 1100, Bakor Blueskin SA, WR Grace Perm-A-Barrier, IKO Aquabarrier AVB.
 - .2 Acceptable material – roof deck: IKO Armour Gard Ice and Water Protector, W.R. Grace Ice and Water Shield; Domtar Eavesshield; Nordshield Water Stopper; Bakor Eave Guard; BPCO ProGard; EMCO Gripgard.
- .2 Primers: as recommended by manufacturer and suitable for substrate.
- .3 Mastics and sealants: as recommended by manufacturer, suitable for substrate.
- .4 Flashing and stripping membranes: as recommended by air barrier membrane manufacturer.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that surfaces and conditions are cured, dry and acceptable for installation of air barrier membranes.
- .2 Notify Contract Administrator in writing of unsuitable surfaces or working conditions and await remedial measures. Commencement of Work shall imply acceptance of surfaces and working conditions.

3.2 Preparation

- .1 Clean substrates of all snow, ice, loose particles, oil, grease, dirt, curing compounds, or other foreign matter detrimental to installation and bonding of air barrier membrane.

- .2 Repair defects in concrete and masonry surfaces such as mortar droppings spalled or poorly consolidated areas, honeycombing. Patch rough areas with a well-adhered parge coat to provide smooth surface. Allow to fully cure and dry.
- .3 Remove sharp protrusions, form lines and rough edges.

3.3 Priming

- .1 Prime all surfaces and substrates to receive self-adhesive air barrier membranes.
- .2 Apply primers in accordance with manufacturer's instructions, at recommended rate of application.
- .3 Do not apply to frozen or damp surfaces. Apply in dry weather when air and surface temperatures are within manufacturer's recommended limits.
- .4 Avoid pooling of primer and allow to cure until tack-free.
- .5 Prime only an area that can be covered in a working day. Re-prime areas which over dry or become soiled or dusty.

3.4 Workmanship

- .1 Install materials in accordance with manufacturer's instructions using only materials approved for use with their products.
- .2 Apply with good construction practice to maintain continuity of air barrier membrane over building elements.
- .3 Do not commence Work until all other work penetrating substrates has been completed, and reviewed by Contract Administrator.
- .4 Use largest lengths possible to minimize joints. Overlap side and end laps minimum 50 mm. Stagger end laps minimum 300 mm in adjacent rows.
- .5 Locate end joints minimum 300 mm from internal and external corners.
- .6 Masonry cavity walls:
 - .1 Install sheets horizontally between masonry ties penetrating membrane.
 - .2 Overlap horizontal joints minimum 50 mm. Slit membrane at each tie and seal making air tight.
- .7 Roof deck:
 - .1 Install sheets starting at low point parallel to roof eave. Overlap succeeding sheets minimum 50 mm to shed water.
- .8 Place membrane in position without stretching, taking care to avoid trapped air, creases or fishmouths. As installation progresses roll membrane with hand roller to ensure full contact and bond to substrates.

- .9 Flash and seal around all penetrations and protrusions such as pipes, conduits, steel angle supports, masonry ties, anchors. Cut and fit membrane neatly and snug fitting, leave no gaps. Seal and make airtight.
- .10 Seal with mastic all difficult detail areas that do not allow easy installation of membrane. Make airtight.
- .11 At rough openings cut air barrier membrane to form opening. Return membrane into opening and seal to rough bucks. Reinforce corners with additional piece of membrane cut and formed to seal corners.
- .12 Overlap and seal air barrier membrane to air and vapour barriers installed by other trades. Maintain continuity of building air/vapour barrier system over entire building.

3.5 Installation Self-Adhesive Air Barrier

- .1 Apply membrane in accordance with manufacturer's instructions.
- .2 Roll out sheets and press firmly to substrate. As installation progresses roll with hand roller to ensure positive bond.
- .3 At all internal corners, both vertical and horizontal, provide a fillet strip formed of liquid mastic. Do not use fibre or wood cants.
- .4 Flash and seal around all penetrations and protrusions such as pipes, conduits, steel angle supports, masonry ties and anchors. Cut and fit membrane neatly and snug fitting, leave no gaps. Seal around all protrusions with mastic sealant. Make airtight.

3.6 Patching and Repairing

- .1 Inspect membrane for defects and poor workmanship before covering and make corrections immediately.
- .2 Ensure full contact and bond to substrates. Patch and repair loose or poorly bonded areas.
- .3 Patch and repair misaligned or inadequately lapped seams, tears, punctures or fishmouths to the satisfaction of the Contract Administrator.
- .4 Patch cuts, tears, and punctures by bonding an additional layer of air barrier membrane over damaged area. Patch shall extending minimum 150 mm in all directions from fault. Seal and make airtight.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Air Barriers

The supply and installation of air barriers will be considered incidental to the Contract Lump Sum Price for "Thermal and Moisture Protection".

~End~

PART 1 - GENERAL

1.1 Section Includes

- .1 Provide all labour, materials, methods, equipment, accessories to complete membrane roofing system Work.
- .2 Membrane Roofing system: 2 ply S.B.S. Modified Membrane (Mop-Torch)

1.2 Related Sections

- .1 Rough Carpentry Section 06100
- .2 Thermal and Moisture Protection Division 7
 - .1 Insulation Section 07200

1.3 Complementary Work to be Executed by the Sub-Contractor

- .1 Metal flashings and accessories.
- .2 Connection to Roof Drainage System.

1.4 Contractor Qualifications

- .1 The Roofing Subcontractor to be, during the bidding period as well as during installation, officially recognized as an approved Contractor by the roofing materials manufacturer.
- .2 Roofing Work to be performed only by skilled applicators, employed by a company operating all adequate and necessary equipment to execute such Work.

1.5 Warranties

- .1 The membrane manufacturer must supply a written and signed document issued in the name of The City, certifying the product's performance for a ten (10) year period starting from the date of acceptance of the Work and once all the material had been installed in accordance with the manufacturer's requirements.
- .2 The Roofing Subcontractor will supply a written and signed document issued in the name of The City certifying that the Work completed to remain as installed, free from any application defect, for a period of two (2) years from the date of acceptance.

1.6 Manufacturer's Representative

- .1 The membrane manufacturer may delegate a representative to visit the Work it at commencement of Work and throughout the installation.
- .2 At all times, the Contractor must permit and facilitate access to the Work Site to said manufacturer's rep.

1.7 Materials Storage

- .1 Deliver and store materials in original containers with manufacturer's labels and seals intact.
- .2 Stored materials must be elevated from ground level and protected from weather.
- .3 Store membrane rolls on end, selvege edge up, on pallets or platforms. Do not lean.
- .4 For ease of installation in colder weather (<0°C(32°F)), it is suggested that rolls be stored in a

heated area (>5°C(41°F)) prior to application.

1.8 Site Protection

- .1 During roof Work, exposed surfaces of finished walls must be protected with tarps in order to prevent damage. Contractor will assume full responsibility for any damage.

PART 2 - PRODUCTS

2.1 Materials

- .1 Asphalt Primer: Elastocol Stick by Soprema or approved equal in accordance with B6.
- .2 Asphalt: Type II or Type III (based on slope) in compliance with C.S.A. A 123.4-M.
- .3 Air/ Vapour Barrier: Soprapap'r by Soprema or approved equal in accordance with B6.
- .4 Tapered Insulation: Posi-Slope extruded polystyrene insulation (type 4, to CAN / CGSB 51.20m) or approved equal in accordance with B6. Tapered panels shall not be less than 13mm at any point of the roof. All tapered panels shall have a butt edge and a uniform slope, and all valley corners and crickets to be factory mitred by Posi-Slope Ent. Inc. All boards to be clearly coded & shall provide arrows to indicate the slope direction of each board. Manufacture in accordance with Contract Administrator approved pre-engineered shop drawings by Posi-Slope.
- .5 Overlay/ Barrier Board: Sopraboard by Soprema or approved equal in accordance with B6.
- .6 Mechanical Fasteners: Roofcraft round-top cap nails: 1" or 1 1/2" or approved equal in accordance with B6 or: Dekfast screws and plates or approved equal in accordance with B6.
- .7 Membranes:
 - .1 Membrane Base Sheet Options: Soprema Sopraply 510 or approved equal in accordance with B6.
 1. Reinforcement: Non-woven polyester 250 g/m2 or nominal 180 g/m2 min.
 2. Reinforcement to be saturated with modified asphalt only.
 3. Self Adhesive Elastomeric Asphalt: selected bitumen and thermoplastic polymers.
 - .2 Base Sheet Stripping Options: Self Adhesive Sopraflash by Soprema or approved equal in accordance with B6.
 1. Reinforcement: Non-woven polyester 250 g/m2 or nominal 180 g/m2 min.
 2. Reinforcement to be saturated with modified asphalt only.
 3. Self Adhesive Elastomeric Asphalt: selected bitumen and thermoplastic polymers.
 - .3 Membrane Cap Sheet Options:
 1. Reinforcement: Non-woven polyester 250 g/m2 or nominal 180 g/m2 min.

2. Reinforcement to be saturated with modified asphalt only.
 3. Thermofusible Elastomeric Asphalt: selected bitumen and thermoplastic polymers.
- .4 Cap sheet Stripping Options:
1. Reinforcement: Non-woven polyester 250 g/m2 or nominal 180 g/m2 min.
 2. Reinforcement to be saturated with modified asphalt only.
 3. Thermofusible Elastomeric Asphalt: selected bitumen and thermoplastic polymers.
- .8 Alternatives:
- .1 Applicators seeking approvals for substitute materials must submit their request in writing to the design authority at least ten (10) days before closing of bids.

PART 3 - EXECUTION

3.1 Surface Inspection and Preparation

- .1 Before commencing Work, The City's representative , together with the Roofing Subcontractor must inspect and approve the deck condition (slopes and nailing supports, if applicable) as well as parapet walls, roof drains, stack vents, vent outlets, building joints, etc. If applicable, a non-compliance notice to be submitted to the proper authorities so adjustments can be made. Commencement of Work will imply acceptance of surfaces and conditions.
- .2 Before commencing Work, all surfaces must be smooth, dry, clean and free of ice and debris. Neither salt nor calcium shall be used to remove ice or snow.
- .3 Check to ascertain if the Work of other associated trades has been properly completed.
- .4 Do not install materials in conditions of rain, snow or fog.

3.2 Installation

- .1 Install roofing elements on clean and dry surfaces.
- .2 Roofing Work will be performed on a continuous basis as surface and weather conditions allow.
- .3 Adjoining surfaces to be protected against any damage that could result from the roofing installation.

3.3 Equipment

- .1 Maintain all equipment and tools in good working order.
- .2 Use torch types recommended by the roofing manufacturer.

3.4 Base Sheet Installation

- .1 Unroll base sheet dry onto substrate with first side lap lined up with drain centre (parallel to roof edge).

- .2 Overlap side laps by 75 mm along lines provided to this end, and overlap end laps by 150 mm. Stagger end joints by at least 300 mm.
- .3 Re-roll base sheet and unroll again onto bed of hot asphalt. Do not apply Hot asphalt on side and end laps; they must be torched on the entire length of the selvage and at end side of roll..
- .4 Pour hot asphalt in front of each roll at a temperature of about 230°C and heat in kettle at about 250°C; minimum temperature at point of contact should be 220-230°C. Do not spread more than three metres of hot asphalt in front of each roll. [Below 15°C, do not spread more than one metre of hot asphalt in front of each roll. Below 10°C, re-heat membrane underside asphalt by sweeping torch over roll's entire width and burn plastic film of top face in a zig zag fashion; Unless advised otherwise by supplier, kettle heating must not exceed asphalt flash point. Ensure hot asphalt in kettle is in constant use to avoid distillation.
- .5 Hot asphalt must never be applied on vertical surfaces at levels higher than 25 mm from horizontal base-sheet roofing surface.
- .6 Avoid forming wrinkles, air pockets or fishmouths.

3.7 Base Sheet Stripping (Flashing) Installation

- .1 Primer coating must be dry before application of the base sheet stripping.
- .2 Base sheet stripping to be applied in strips one metre wide to the vertical surfaces, extending on to the flat surface of the roof a minimum of 100 mm (4 in.). Side laps to be 90mm (3 1/2 in) and staggered a minimum of 200 mm (8 in) with the laps of the base sheet.
- .3 Base sheet stripping to be applied directly on its support from bottom to top. When allowed by the support, the base sheet top edge must be nailed on 300 mm (12 in) centres.

3.8 Cap Sheet Installation

- .1 Once base sheet is applied and no defects are apparent, proceed with cap sheet installation.
- .2 Begin with double-selvage starter roll. If starter roll is not used, side laps covered in granules must be degranulated by embedding side laps in torch-heated bitumen over a [75]- [100] mm width.
- .3 Unroll cap sheet at drain. Carefully align first side lap (parallel to roof edge).
- .4 Weld cap sheet onto base sheet with torch recommended by membrane manufacturer. During application, simultaneously melt both designated contact surfaces so a bead of bitumen is apparent as cap sheet unrolls.
- .5 Avoid overheating.
- .6 Make sure joints between the two layers are staggered by at least 300 mm.
- .7 Overlap cap sheet side laps by [75]- [100] mm and end laps by 150 mm. Cut off corners at end laps to be covered by next roll. All overlap surfaces must be degranulated.
- .8 Complete perfect welds between two membranes. Leave no zone unwelded. In cold weather, adjust welding time to obtain homogenous seam (it may be necessary to slow down in certain cases.)
- .9 Once cap sheet is installed, carefully check all overlapped joints.

3.9 Cap Sheet Stripping (Flashing) Installation

- .1 Cap sheet stripping to be laid in strips one metre (3'-3") wide. Side laps to be 90 mm (3 1/2 in) and to be staggered a minimum of 200 mm (8 in) from cap sheet laps.

- .2 Using a chalk line, lay out a straight line on the cap sheet surface, parallel to roof edge, 150 mm (6 in) inside the roof from the base of the cant strip.
- .3 Using a torch and round-nosed roofing trowel, embed the surface granules into the heated and soft bitumen, from the chalk line to the edge of the cap sheet.
- .4 Cap sheet stripping shall be torch-welded directly on its base sheet, proceeding from bottom to top. Torching shall soften the two membranes to ensure a uniform weld.
- .5 Cap sheet stripping shall be applied to extend down the outside face of exterior edge, across top of parapet, down interior vertical surface and on to flat roof a distance of 150 mm (6 in), to the extent of area of embedded granules. Cut roll into required lengths and use width of roll (1 metre or 39 in) down length of roof, maintaining specified 90 mm (3 1/2) side laps.

3.10 End Laps

- .1 Only prefinished end laps similar to the "IKO End Lap" will be accepted for a better quality controlled application.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Modified Bituminous Roofing

The supply and installation of modified bituminous roofing shall be considered incidental to the Contract Lump Sum Price for "Thermal & Moisture Protection"

~End~

PART 1 - GENERAL

1.1 References

- .1 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-19.13, Sealing Compound, One-component, Elastomeric, Chemical Curing.

1.2 Environmental and Safety Requirements

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

PART 2 - PRODUCTS

2.1 Sealant Materials

- .1 Urethanes, One Part, Self-Leveling.
 - .1 To CAN/CGSB-19.13, Type 1.
 - .2 Acceptable material: Sikaflex 1cSL, Bostik Chem-Calk 950.
- .2 Urethanes, One Part, Non-Sag.
 - .1 To CAN/CGSB-19.13, Type 2.
 - .2 Acceptable products: Sikaflex 1a, Tremco DyMonic, Bostik Chem-Calk 900.
- .3 Sealant colours: selected by Contact Administrator from manufacturer's standard colour selection.
- .4 Foam backer rods: extruded polyethylene foam, compressible, oversized 30 to 50%.
 - .1 Acceptable material: Tremco Tundra Foam.
- .5 Bond breaker tape: polyethylene bond breaker tape that will not bond to sealants.
- .6 Expanding foam sealant: high-density open cell polyurethane foam, pre-compressed, impregnated with water-based, stabilized acrylic, self-adhesive. Secondary seal requiring primary seal of wet sealant.
 - .1 Acceptable material: Emseal Greyflex.
- .7 Adhesives: type recommended by expanding foam sealant manufacturer.
- .8 Primers: type recommended by sealant manufacturer, for appropriate sealant and corresponding substrate.
- .9 Joint cleaner: non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

2.2 Sealant Selection

- .1 Perimeters of exterior openings where frames meet exterior facade of building: Urethanes One Part, Non-Sag.
- .2 Expansion and control joints in exterior surfaces of precast, architectural wall panels: Urethanes One Part, Non-Sag.
- .3 Expansion and control joints in exterior surfaces of unit masonry walls: Urethanes One Part, Non-Sag.
- .4 Coping joints and coping-to-facade joints: Sealant type: Urethanes One Part, Non-Sag.
- .5 Cornice and wash (or horizontal surface joints): Sealant type: Urethanes One Part, Selfleveling.
- .6 Exterior joints in horizontal wearing surfaces (as itemized): Sealant type: Urethanes One Part, Self-leveling.

- .7 Perimeters of interior frames where frames meet interior finishes: Urethanes One Part, Non-Sag.
- .8 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls): Sealant type: Urethanes One Part, Non-Sag.
- .9 Under thresholds at exterior doors. Sealant type: Urethanes, One Part, Non-Sag.
- .10 As itemized in other sections.

PART 3 - EXECUTION

3.1 Protection

- .1 Protect installed Work of other trades from staining or contamination.

3.2 Preparation of Joint Surfaces

- .1 Before commencing application of sealants test materials for indications of staining or poor adhesion.
- .2 Ascertain that sealers and coatings applied to sealant substrates are compatible with sealant used and that full bond between the sealant and substrate is attained. Request samples of the sealed or coated substrate from their fabricators for testing of compatibility and bond, if necessary.
- .3 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .4 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter that may impair Work.
- .5 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .6 Ensure joint surfaces are dry and frost free.
- .7 Prepare surfaces in accordance with manufacturer's directions.

3.3 Priming

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 Backup Material

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install foam backer rod to achieve correct joint depth and shape, with approximately 30% compression.

3.5 Expanding Foam Sealants

- .1 Install expanding foam sealants in accordance with manufacturer's instructions.
- .2 Coordinate installation with Work of other trades to ensure foam sealants are installed before building joints are covered.
- .3 For expansion and control joints above grade in exterior walls install as secondary seal with wet caulking as primary seal.
- .4 Where used as a secondary seal together with field applied wet caulking provide bond breaker tape or backer rod between foam sealant and caulking.
- .5 Size preformed foam sealant to suit joint depth and width allowing for proper compression of the material.
- .6 Use adhesives recommended by manufacturer, suitable for substrate and application.

- .7 Install in longest possible lengths. Keep number of joints to a minimum. Join individual strips by means of scarf joint, cut at approximately 30°.

3.6 Application

- .1 Sealant:
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as Work progresses and upon completion.
- .2 Curing:
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup:
 - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
 - .2 Remove excess and droppings, using recommended cleaners as Work progresses.
 - .3 Remove masking tape after initial set of sealant.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Joint Sealers

The supply and installation of joint sealers shall be considered incidental to the Contract Lump Sum Price for "Thermal & Moisture Protection".

~End~

PART 1 - GENERAL

1.1 References

- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.181 - Ready-Mixed Organic Zinc-Rich Coating.
 - .2 CGSB 41-GP-19 - Rigid Vinyl Extrusions for Windows and Doors.
- .3 Canadian Standards Association (CSA).
 - .1 CSA W59 - Welded Steel Construction (Metal Arc Welding).
- .4 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA):
 - .1 CSDFMA Specifications for Commercial Steel Doors and Frames.
 - .2 CSDFMA Recommended Selection and Usage Guide for Commercial Steel Doors.

1.2 Shop Drawings

- .1 Submit six copies of shop drawings to Contract Administrator. Indicate each type of door and frame, materials, core thickness, mortises, reinforcements, arrangement of hardware, location and methods of anchors, exposed fastenings and reinforcing, and finishes. Indicate details of jamb and head, frame types.

1.3 Delivery, Storage and Handling

- .1 Store in a dry location, above ground to prevent corrosion. Protect by suitable means until installed. Brace and stack to prevent warping, bending, twisting or other damage. Replace or make good materials that become damaged or defective as directed by Contract Administrator.

PART 2 - PRODUCTS

2.1 Materials

- .1 Hot dipped galvanized steel sheet: to ASTM A 653 coating designation Z275 (G90).
- .2 Minimum base steel thicknesses for components per CSDFMA Table 1, except:
 - .1 Doors: 1.2 mm (18 gauge).
 - .2 Frames: 1.6 mm (16 gauge).
- .3 Door core materials: polyurethane core bonded to face sheets with heat resistant, epoxy resin based, low viscosity, contact cement.
- .4 Primer: to CAN/CGSB -1.181.
- .5 Door silencers: single stud rubber/neoprene type.
- .6 Top and bottom caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19M
- .7 Sealant (caulking): as specified in Section 07900 – Joint Sealants.
- .8 Foam sealant: spray-applied polyurethane foam sealant, CFC and urea formaldehyde free, non-shrinking after cure. Ener-Foam, Insta-Seal or approved equal in accordance with B6.
- .9 Metallic paste filler: to manufacturer's standard.

2.2 Door Hardware

- .1 Hardware Items
 - .1 Hinges CB1960 114 x 102 NRP 630 Stanley
 - .2 Rim Exit Device 2100 x 217F 626 Yale
 - .3 Weatherstrip W50 Crowder
 - .4 Sweep seals W13S Crowder
 - .5 Threshold CT10 Crowder
 - .6 Door stop/holder 100H Series 630 Glynn Johnson

- .2 Provide exit device with Medeco cylinder keyed to City of Winnipeg requirements. The City will provide lock number before keying.

2.3 Frames Fabrication

- .1 Fabricate frames in accordance with CSDFMA specifications, welded, thermally broken type construction.
- .2 Blank, mortise, reinforce, drill and tap frames and reinforcements to receive hardware using templates provided by door hardware supplier. Reinforce internally for surface mounted hardware.
- .3 Weld in top hinge reinforcement with 20 mm leg to hinge reinforcement, 25 mm leg to frame. Reinforce head of frames wider than 1200 mm.
- .4 Protect mortised cutouts with steel guard boxes for frames installed in masonry and concrete walls.
- .5 Prepare frame for door silencers.
- .6 Welding in accordance with CSA W59. Accurately mitre or mechanically joint frame product and securely weld on inside of profile. Spot welding not acceptable.
- .7 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .8 Securely attach floor anchors to inside of each jamb profile.
- .9 Weld in two temporary jamb spreaders per frame to maintain proper alignment during shipment.

2.4 Frame Anchorage

- .1 Provide appropriate anchorage to floor and wall construction.
- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
- .3 Provide two anchors for rebate opening heights up to 1520 mm and one additional anchor for each additional 760 mm of height or fraction thereof.

2.5 Door Fabrication

- .1 Doors: swing type, flush, steel stiffened, insulated core construction.
- .2 Fabricate doors with longitudinal edges welded. Seams: grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.
- .3 Blank, reinforce, drill doors and tap for mortised, templated hardware. Reinforce doors for surface mounted hardware.
- .4 Reinforce doors with vertical stiffeners, securely laminated to each face sheet at 150 mm on centre maximum. Fill voids between stiffeners with polyurethane core.

2.6 Shop Priming

- .1 Provide touch-up primer at areas where zinc coating has been removed during fabrication or installation.
- .2 Apply in factory one coat of zinc-rich primer CAN/CGSB-1.181 to all exposed surfaces. Properly pre-treat and prepare surfaces before application of primer to ensure good primer adhesion.

PART 3 - EXECUTION

3.1 Installation

- .1 Install doors and frames to CSDFMA Installation Guide.
- .2 Set frames plumb, square, level and at correct elevation. Secure anchorages and connections to adjacent construction.
- .3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support

- at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
 - .5 Install doors and hardware in accordance with hardware templates and manufacturer's instructions. Adjust operable parts for correct function.
 - .6 Touch up with primer finishes damaged during installation.

3.2 Caulking and Sealing

- .1 Fill head and jamb frame sections with spray foam sealant. Fill shim space around perimeter of frames with spray foam sealant.
- .2 Seal joint between frames and adjacent construction with sealant (caulking). Apply sealant around full perimeter of frames, on both sides of opening. Provide foam backer rod or bond breaker tape behind sealant. Apply sealants in accordance with Section 07900 – Joint Sealants.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Steel Door and Frames

The supply and installation of steel doors and frame will be measured and paid for at the Contract Lump Sum Price for "Openings", which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification.

~End~

PART 1 - GENERAL

1.1 Summary

- .1 Furnish and install where indicated on plans metal roof scuttle Model 'AG', size as per plan, as manufactured by Grillage Bolar Inc. (Bolar) or approved equal.

1.2 Related Work

- .1 Rough Carpentry Section 06100
- .2 Thermal and Moisture Protection Division 7

1.3 Design Requirements

- .1 Roof hatches to withstand snow load of 40 psf (195 kg/m²) with maximum deflection of 1/150th of span, and wind uplift of 20 psf (97 kg/m²), and temperature range of 80°C without damage to unit or permanent deformation to seals.

1.4 Shop Drawings

- .1 Submit five (5) copies of shop drawings to Contrat Administrator in accordance with E9. Indicate size and description of components, materials, attachment devices, description of frame and finish, and construction details.

PART 2 - PRODUCTS

2.1 Roof Scuttle

- .1 Cover shall be 11 gauge mill finished aluminum, R20 rated insulation.
- .2 Curb shall be 12" in height and made of 16 gauge galvanized steel, grey primer paint finish. It shall be formed with a roof flange with holes provided for securing to the roof deck. Curb shall be R20 rated insulated, full welded at the corners for weathertightness. Curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, full welded at the corners for weathertightness.
- .3 Scuttle shall be completely assembled with stainless steel hinges, positive snap latch with turn handles, padlock hasps inside and outside, and a mechanically retained thermoplastic rubber gasket. Compression spring operators enclosed in telescopic tubes shall be provided for smooth, easy and controlled door operation throughout the entire arc of opening and closing. Operation shall not be affected by temperature. Cover shall be equipped with an automatic hold-open arm complete with red vinyl grip handle to permit easy release and one-hand control of the cover to its closed and latched position. All hardware shall be zinc plated and chromate sealed. Factory finish shall be grey primer on steel .

PART 3 - EXECUTION

3.1 Installation

- .1 Installation shall be in accordance with manufacturer's instructions. Manufacturer shall guarantee against defects in material or workmanship for a period of five years.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

.1 Roof Scuttle

The supply and installation of roof scuttles shall be considered incidental to the Contract Lump Sum Price for "Openings".

~End~

PART 1 - GENERAL

1.1 Related Work

- .1 Steel doors and frames: Section 08100.

1.2 References

- .1 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA)
 - .1 Canadian Manufacturing Specification for Steel Doors and Frames.

1.3 Requirements of Industry

- .1 Hardware for doors in fire separations and exit doors shall be certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Use UL or ULC approved and labeled hardware for exit doors and doors in fire separations.

1.4 Hardware List

- .1 Submit vertical form hardware schedule. Indicate hardware proposed including make, model, material, function, finish and other pertinent information.

1.5 Shop Drawings

- .1 Submit shop drawings at time of submittal of hardware list.
- .2 Submit shop drawings for electric and electronic door hardware. List each item separately. Indicate schematic wiring diagrams, electrical service requirements, interconnection diagrams, parts lists and part numbers for each item.

1.6 Maintenance Materials

- .1 Supply two sets of wrenches for door closers, locksets, and fire exit hardware.

1.7 Delivery, Storage and Handling

- .1 Store finishing hardware in locked, clean, and dry area.
- .2 Package each item of hardware including fastenings, separately or in like groups of hardware. Label each package as to item. Maintain inventory list with hardware schedule.

PART 2 - PRODUCTS

1.1 Hardware Items

- .1 As specified in the Wall Openings Schedule, Drawing 3 / A2.0. Use one manufacturer's products only for all similar items.

1.2 Template and Reinforcing Units

- .1 Supply all necessary templates, blueprints and reinforcing units to Subcontractors requiring such items for completion of their portion of the Work.

1.3 Locksets

- .1 Bring in locksets from factory properly itemized as to keying and location.
- .2 All locks to have 5" backset unless design of door makes this impossible. In that case, backset shall be 2-3/4" or as specified in the Hardware Schedule.

1.4 Butts

- .1 Provide doors up to and including 7'-0" in height and 3'-0" in width with 1.5 pair butts. Provide doors over these sizes with two pair butts, or as specified in the Hardware Schedule.

1.5 Fastening

- .1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .2 Use fasteners supplied by manufacturers with each specific hardware item only. No substitutions will be permitted.
- .3 Exposed fastening devices to match material and finish of hardware.
- .4 Where pull is required on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plates to cover fasteners.
- .5 Include provisions for drilling push/pull plates to accept lock cylinder where both items occur on the same door.
- .6 Use fasteners compatible with material through which they pass.

1.6 Keying

- .1 Key all door locks under existing master key system as directed.
- .2 Submit keying schedule for approval.
- .3 Stamp keying code numbers cylinders.

PART 3 - INSTALLATION

1.7 Installation Instructions

- .1 Furnish door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .2 Furnish manufacturers' instructions for proper installation of each hardware component.
- .3 Install hardware to standard hardware location dimensions in accordance with CSDFMA Canadian Manufacturing Specification for Steel Doors and Frames.

1.8 Mounting Heights

- .1 The following dimensions are only to be used as a general guide in the placement of hardware. Where special items are concerned, or uncertainty exists, check with the Contract Administrator before fitting.
- .2 Dimensions indicated are from finish floor to centre line of item, except as noted
 - .1 Knob Locksets:..... 40-5/16"
 - .2 Push/Pull Plates: 42"
 - .3 Guard Bars:..... 43"
 - .4 Exit Device (to cross bar):..... 40-5/16"

- .3 Push and pull plates: install 5" from edge of door to centre of plate, unless indicated otherwise. Where pulls are mounted back to back use #5 mounting.

1.9 Final Inspection and Certification

- .1 The hardware supplier shall, upon completion of the Work, visit the job Site, check the installation of all hardware, and certify in writing to the Contract Administrator that the hardware, as specified, has been correctly installed and is in proper working order.

PART 4-MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Hardware

The supply and installation of hardware shall be considered incidental to the Contract Lump Sum Price for "Openings"

~End~

PART 1 - GENERAL

1.1 Related Work

- .1 Plywood paneling, Section 06100.
- .2 Steel doors and frames, Section 08100.
- .3 Graffiti resistant coatings, Section 09965

1.2 References

- .1 Master Painters Institute (MPI)
 - .1 Architectural Painting Specifications Manual.
- .2 Society for Protective Coatings (SSPC)
 - .1 Systems and Specifications Manual, SSPC Painting Manual, Volume Two.
- .3 National Fire Code of Canada

1.3 Quality Assurance

- .1 Conform to latest MPI requirements for painting Work including preparation and priming.

1.4 Delivery, Handling and Storage

- .1 Deliver, store materials in original containers with labels intact. Observe manufacturer's recommendations for storage and handling.
- .2 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

1.5 Site Requirements

- .1 Unless specifically pre-approved by product manufacturer, perform no painting Work when:
 - .1 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
 - .2 Rain or snow is forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at Site.
 - .3 The maximum moisture content of the substrate exceeds MPI or paint manufacturer's prescribed limits
- .2 Apply paint finish only:
 - .1 In areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint only to adequately prepared surfaces and to surfaces within moisture limits noted herein.
 - .3 Apply paint only when previous coat of paint is dry or adequately cured.

PART 2 - PRODUCTS

2.1 Materials

- .1 Only paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Paint materials for paint systems shall be products of a single manufacturer.
- .3 Contract Administrator will select colours and determine total number of colours to be used on project and their locations.

2.2 Gloss/Sheen Ratings

- .1 Paint gloss shall be as defined in MPI Architectural Painting Specifications Manual.
- .2 Gloss level ratings of painted surfaces shall be as specified herein.

2.3 Painting Systems

- .1 Shop primed steel:
 - .1 EXT 5.1D - Alkyd semi-gloss finish premium grade.
- .2 Galvanized metal:
 - .1 EXT 5.3B - Alkyd semi-gloss finish premium grade.
- .3 Plywood paneling:
 - .1 EXT 6.4B - Alkyd semi-gloss finish premium grade.

PART 3 - EXECUTION

3.1 General

- .1 Perform preparation and operations for painting in accordance with MPI Painting Specifications Manual except where specified otherwise.
- .2 Do repainting of previously painted surfaces in accordance with MPI Maintenance Repainting Manual, except where specified otherwise.
- .3 Apply paint materials in accordance with paint manufacturers' written application instructions.
- .4 Paint all new Work, except prefinished items or where indicated otherwise.
- .5 Do not paint structural steel and roof decking, mechanical and electrical equipment.

3.2 Existing Conditions

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report damages, defects, unsatisfactory or unfavorable conditions to Contract Administrator before proceeding with Work.
- .2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter and report findings to Contract Administrator. Do not proceed with Work until conditions fall within acceptable range as recommended by manufacturer.

3.3 Protection

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Contract Administrator.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 Protect passing pedestrians and general public in and about the building.
- .5 Remove electrical cover plates, light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings prior to undertaking any painting operations. Store securely store items and re-installed after painting is completed.

3.4 Cleaning and Preparation

- .1 Clean and prepare surfaces in accordance with MPI Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements.
- .2 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .3 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted.
- .4 Touch up of shop primers with primer as specified in applicable section. Major touch-up including cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas, shall be by supplier of fabricated material.
- .5 Lift gate mechanism:
 - .1 Degrease lift gate mechanism by steam cleaning or pressure washing and solvent cleaning to remove oil and grease soiling from gear mechanism.
 - .2 Remove flaked paint and rust by wire brushing and power tool cleaning.

3.5 Application

- .1 Apply paint by brush, roller, airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .3 Painting coats specified are intended to cover surface completely. If necessary apply additional coats until satisfactory coverage is obtained. Provide additional coats at not additional cost to Contract.
- .4 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .5 Sand and dust between coats to remove visible defects.
- .6 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .7 Do not paint door and miscellaneous hardware, unless indicated otherwise.
- .8 Do not paint nameplates, signage, fire labels, or other markers or signs indicated to remain.
- .9 Do not paint copper, bronze, chromium plate, nickel, stainless steel, aluminum, lead and other bright metals, unless specified otherwise.
- .10 Clean shop applied paint surfaces that become marked. Touch up with primer and paint as required.

3.6 Mechanical/Electrical Equipment

- .1 Do not paint conduits, piping, hangers, ductwork and other mechanical and electrical equipment. Leave in original finish.

3.7 Restoration

- .1 Clean and re-install all hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Painting

Painting will be considered incidental to the Contract Lump Sum Price for "Finishes".

~End~

PART 1 - GENERAL

1.1 Product Data

- .1 Submit manufacturer's printed product literature, specifications and application instructions to Contract Administrator before commencing application.

1.2 Environmental Conditions

- .1 Maintain ambient and structural base temperature at installation area within limits specified by coating manufacturer. Apply coating during dry weather. Do not apply coating to wet or damp surfaces.

1.3 Protection

- .1 Protect plants and vegetation that might be damaged by coating. Protect surfaces not intended to have application of 1coatings. Provide adequate ventilation or isolation measures to protect against toxic fumes.

PART 2 - PRODUCTS

2.1 Materials

- .1 Graffiti-resistant coating: one component, water based, non-sacrificial, clear penetrating sealer and liquid repellent.
 - .1 Acceptable products: Fabrikem Fabrishield Paint Repellent PR-60 for precast concrete and PR-61 for clay brick.

PART 3 - EXECUTION

3.1 Preparation

- .1 Prepare and clean substrate surfaces in accordance with coating manufacturer's instructions.
- .2 Mix and prepare coatings to manufacturer's instructions.
- .3 Take moisture tests on substrates to receive coating to ensure moisture levels are within limits specified by coating manufacturer.

3.2 Application

- .1 Apply coating using low pressure spraying apparatus, at recommended coverage rate for product and substrate.
- .2 Apply in uniform, even coat to fully wet substrate, without flooding or rundowns.
- .3 Allow area to dry completely before applying additional coats.

3.3 Schedule

- .1 Apply graffiti-resistant coating to clay brick and architectural precast concrete units.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Graffiti-Resistant Coatings

The supply and installation of graffiti-resistant coatings shall be considered incidental to the Contract Lump Sum Price for "finishes".

~End~

PART 1 - GENERAL

1.1 Intent

- .1 Provide complete, fully tested and operational mechanical systems to meet the requirements described herein and in complete accord with applicable codes.
- .2 In general Work in this Division includes:
 - Upgrade of the existing ventilation system as specified and as shown on drawings M1.
- .3 Drawings are diagrammatic. They establish scope, material and installation quality and are not detailed installation instructions.
- .4 Follow Manufacturers' recommended installation details and procedures for equipment, supplemented by requirements of Contract Documents.
- .5 Part E - Division 1 shall apply to Work in this system.
- .6 Connect to equipment specified in other Sections and to equipment supplied and installed by other Contractors or by the City of Winnipeg (City). Uncrate equipment, move in place, install complete; start-up and test.
- .7 'Provide' shall mean; "supply and install".

1.2 Co-ordination of Work

- .1 Make reference to electrical, mechanical, structural and architectural Drawings when setting out Work. Consult with respective Divisions in setting out locations for ductwork, equipment, and piping, so that conflicts are avoided. Jointly resolve all conflicts on-site before fabricating or installing any materials or equipment.
- .2 Where dimensional details are required, coordinate with the applicable architectural and structural Drawings. Extreme care and co-ordination is required to ensure ventilation system fans and louvers are installed in exactly the right location. Contractor shall ensure this issue is well co-ordinated with the Contract Administrator.

1.3 Examination of Site

- .1 Site will be available for viewing during Bid period. Note all characteristics and features affecting the Work. No allowances will be made for any difficulties encountered or any expenses incurred because of any conditions of the Site or item existing thereon, which is visible or known to exist at the time of Bid.

1.4 Quality of Work

- .1 All Work shall be by qualified tradesmen with valid Provincial Trade Qualification Certificates. Spot checks will be made by the Contract Administrator.
- .2 Work which does not conform to standards accepted by the Contract Administrator and the trade may be rejected by the Contract Administrator.

PART 1 - GENERAL

1.1 Scope

- .1 Supply and install a drywell and electrical room ventilation system as shown on the drawing and as specified.
- .2 Section 230500 shall apply to Work in this section.

1.2 References

- .1 AMCA 210, Laboratory Methods of Testing Fans for Rating Purposes
- .2 National Electrical Code (NEC)
- .3 National Electrical Manufacturers Association (NEMA) MG1, Motors and Generators
- .4 National Fire Protection Association (NFPA) 70, National Fire Protection Code
- .5 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), Heating, Ventilation, and Air Conditioning (HVAC) Duct Construction Standards – Metal and Flexible

PART 2 - PRODUCTS

2.1 Supply Fan

- .1 Provide new fans as specified on the contract drawings.

2.2 Ductwork

- .1 Fabricate in accordance with Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) duct manuals and American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) handbooks.

2.3 Flexible Connections

- .1 Fabricate of ULC approved neoprene coated flameproof glass fabric approximately 150 mm (6 in.) wide tightly crimped into metal edging strip and attached to ducting and equipment by screws or bolts at 150 mm (6 in.) intervals. Flexible connection airtight at 500 Pa (2 in wg).
- .2 Install on fan / duct connections as shown on drawings.

PART 3 - EXECUTION

3.1 Installation

- .1 Rigidly construct metal ducts with joints substantially airtight, braced and stiffened so as not to rattle, vibrate or sag. Caulk duct joints and connections with sealant as ducts are being assembled. Seal duct seams watertight with mastic or low velocity duct sealant.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

Ventilation System

The supply and installation of the electrical room ventilation system will be measured and paid for at the Contract Lump Sum Price for "Division 23 – Ventilation System", which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification.

PART 1-GENERAL

1.1 Related Sections

- .1 The City of Winnipeg Standard Construction Specifications Section CW1110 – General Instructions.

1.2 References

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.1-06, Canadian Electrical Code, Part 1 (20th Edition), Safety Standard for Electrical Installations.
 - .2 CAN3-C235-83(R2000), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
 - .1 EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.
- .3 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.3 Definitions

- .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.4 Design Requirements

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: provide identification nameplates and labels for control items in English.

1.5 Submittals

- .1 Submittals: in accordance with The City of Winnipeg Standard Construction Specifications Section CW1110 – General Instructions.
- .2 Product Data: submit WHMIS MSDS.
- .3 Shop drawings in accordance with E9:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.
 - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.

- .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- .4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- .5 Submit copies of 600 x 600 mm minimum size drawings and product data to inspection authorities.
- .6 If changes are required, notify Contract Administrator of these changes before they are made.
- .4 Quality Control: in accordance with The City of Winnipeg Standard Construction Specifications Section CW1110 – General Instructions..
 - .1 Provide CSA certified equipment and material. Where CSA certified equipment and material is not available, submit such equipment and material to inspection authorities for special approval before delivery to Site.
 - .2 Submit test results of installed electrical systems and instrumentation.
 - .3 Permits and fees: in accordance with General Conditions of contract.
 - .4 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
 - .5 Submit certificate of acceptance from inspection authority upon completion of Work to Contract Administrator.
- .5 Manufacturer's Field Reports: submit to Contract Administrator manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.6 Quality Assurance

- .1 Quality Assurance: in accordance with The City of Winnipeg Standard Construction Specifications Section CW1110 – General Instructions.
- .2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices as per the conditions of Provincial Act respecting manpower vocational training and qualification.
 - .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.

1.7 Delivery, Storage and Handling

- .1 Material Delivery Schedule: provide Contract Administrator with schedule within 2 weeks after award of Contract.
- .2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling.

1.8 System Start-up

- .1 Instruct Contract Administrator and operating personnel in operation, care and maintenance of systems, system equipment and components.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

1.9 Operating Instructions

- .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
- .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment failure.
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
- .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
- .4 Post instructions where directed.
- .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
- .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

PART 2-PRODUCTS

2.1 Materials and Equipment

- .1 Material and equipment to be CSA certified. Where CSA certified material and equipment is not available, obtain special approval from inspection authorities before delivery to Site and submit such approval as described in PART 1 - SUBMITTALS.
- .2 Factory assemble control panels and component assemblies.

2.2 Electric Motors, Equipment and Controls

- .1 Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated.
- .2 Control wiring and conduit: in accordance with Section 26 29 03 - Control Devices except for conduit, wiring and connections below 50 V which are related to control systems specified in mechanical sections and as shown on mechanical drawings.

2.3 Warning Signs

- .1 Warning Signs: in accordance with requirements of inspection authorities and Contract Administrator.
- .2 Decal signs, minimum size 175 x 250 mm.

2.4 Wiring Terminations

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.5 Equipment Identification

- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: lamicoid 3 mm melamine, black face, white core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.
 - .2 Sizes as follows:

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
- .2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Contract Administrator prior to manufacture.
- .4 Allow for minimum of twenty-five (25) letters per nameplate and label.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .6 Identify equipment with Size 3 labels engraved as directed by Contract Administrator. Eg. "MCC 1P"
- .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .8 Terminal cabinets and pull boxes: indicate system and voltage.
- .9 Transformers: indicate capacity, primary and secondary voltages.

2.6 Wiring Identification

- .1 Identify wiring with permanent indelible identifying markings, coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.7 Conduit and Cable Identification

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green

	Prime	Auxiliary
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

2.8 Finishes

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1.

Part 3 -EXECUTION

3.1 Installation

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

3.2 Nameplates and Labels

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3 Conduit and Cable Installation

- .1 Install conduit and sleeves prior to pouring of concrete.
 - .1 Sleeves through concrete: plastic, sized for free passage of conduit, and protruding 50 mm.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .3 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.4 Location of Outlets

- .1 Locate outlets in accordance with Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.
- .2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.
- .4 Locate light switches on latch side of doors.
 - .1 Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.

3.5 Mounting Heights

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation. Install electrical equipment at following heights unless indicated otherwise.
 - .1 Local switches: 1400 mm.
 - .2 Wall receptacles:
 - General: 300 mm.
 - Above top of continuous baseboard heater: 200 mm.
 - Above top of counters or counter splash backs: 175 mm.
 - In mechanical rooms: 1400 mm.
 - .3 Panelboards: as required by Code or as indicated.
 - .4 Telephone and interphone outlets: 300 mm.
 - .5 Wall mounted telephone and interphone outlets: 1500 mm.
 - .6 Fire alarm stations: 1500 mm.
 - .7 Fire alarm bells: 2100 mm.
 - .8 Television outlets: 300 mm.
 - .9 Wall mounted speakers: 2100 mm.
 - .10 Clocks: 2100 mm.
 - .11 Door bell pushbuttons: 1500 mm.

3.6 Co-Ordination of Protective Devices

- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.7 Field Quality Control

- .1 Load Balance:
 - .1 Measure phase current to panelboards with normal loads operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
 - .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
 - .3 Provide upon completion of Work, load balance report as directed in PART 1 - SUBMITTALS: phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.
- .2 Conduct following tests in accordance with The City of Winnipeg Standard Construction Specifications Section CW1110 – General Instructions.
 - .1 Power distribution system including phasing, voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Lighting and its control.
 - .4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
 - .5 Systems: fire alarm system and communications.
 - .6 Insulation resistance testing:

Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.

Check resistance to ground before energizing.

- .3 Carry out tests in presence of Contract Administrator.
- .4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .5 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic Site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule Site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.8 Cleaning

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

The supply and installation of all common Work electrical shall be considered incidental to the Contract Lump Sum Price for "Electrical"

END OF SECTION

PART 1 -GENERAL

1.1 Section Includes

- .1 Materials and installation for wire and box connectors.

1.2 References

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-C22.2 No.18-98, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.
 - .2 CSA C22.2 No.65-93(R1999), Wire Connectors.

1.3 Waste Management and Disposal

- .1 Separate and recycle waste materials.
- .2 Remove from Site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused wiring materials from landfill to metal recycling facility as approved by Contract Administrator.

PART 2 -Products

2.1 Materials

- .1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.
- .2 Fixture type splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Clamps or connectors for armoured cable as required to: CAN/CSA-C22.2 No.18.

PART 3 - Execution

3.1 Installation

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
 - .2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.
 - .3 Install fixture type connectors and tighten. Replace insulating cap.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

The supply and installation of all Wire and box connectors shall be considered incidental to the Contract Lump Sum Price for "Electrical"

END OF SECTION

PART 1- GENERAL

1.1 Related Sections

- .1 Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.
- .2 The City of Winnipeg Standard Construction Specifications Section CW1110 – General Instructions.

1.2 References

- .1 CSA C22.2 No .0.3-96, Test Methods for Electrical Wires and Cables.
- .2 CAN/CSA-C22.2 No. 131-M89(R1994), Type TECK 90 Cable.

1.3 Product Data

- .1 Submit product data in accordance with The City of Winnipeg Standard Construction Specifications Section CW1110 – General Instructions.

1.4 Waste Management And Disposal

- .1 Separate and recycle waste materials.
- .2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
- .3 Fold up metal banding, flatten and place in designated area for recycling.

PART 2- PRODUCTS

2.1 Building Wires

- .1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper conductors: size as indicated, with 1000 V insulation of chemically cross-linked thermosetting polyethylene material rated RW90.

2.2 1000 V Teck90 Power Cable

- .1 Cable: to CAN/CSA-C22.2 No. 131.
- .2 Conductors:
 - .1 Grounding conductor: copper
 - .2 Circuit conductors: copper, size as indicated. 12 AWG minimum where size is not indicated.
- .3 Insulation: chemically cross-linked thermosetting polyethylene rated type RW90, 1000 V.
- .4 Inner jacket: polyvinyl chloride material.
- .5 Armour: interlocking aluminum.

- .6 Overall covering: thermoplastic polyvinyl chloride material.
- .7 Fastenings:
 - .1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
 - .2 Channel type supports for two or more cables at 300 mm centers to prevent cable from drooping.
 - .3 Threaded rods: 6 mm dia. to support suspended channels.
- .8 Connectors: watertight, explosion-proof approved for TECK cable.

2.3 600 V Teck90 Control Cable

- .1 Conductors:
 - .1 Grounding conductor: copper
 - .2 Circuit conductors: 14 AWG copper, number coded.
- .2 Insulation: chemically cross-linked thermosetting polyethylene rated type RW90, 600 V.
- .3 Inner jacket: polyvinyl chloride material.
- .4 Armour: interlocking aluminum.
- .5 Overall covering: thermoplastic polyvinyl chloride material.
- .6 Fastenings:
 - .1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
 - .2 Channel type supports for two or more cables at 300 mm centers to prevent cable from drooping.
 - .3 Threaded rods: 6 mm dia. to support suspended channels.
- .7 Connectors: watertight, explosion-proof approved for TECK cable.

2.4 300 V Instrument Cable - Armoured

- .1 Conductors: 18 AWG minimum unless indicated otherwise, 7 strand concentric lay, Class B tinned copper, twisted pairs/triads.
- .2 Insulation: PVC TW75, 75 °C Wet, 105 °C Dry (-40 °C), 300 V.
- .3 Twisted pairs/triads cables with staggered lays.
- .4 Shielding:
 - .1 Individual twisted pair(s)/triad(s), 100% aluminum/mylar shield with ST drain wire.
 - .2 Individual drain wires one size smaller than conductor AWG.
 - .3 Overall drain wire the same AWG as conductors.
- .5 Armour: interlocking aluminum.
- .6 Overall covering: thermoplastic polyvinyl chloride material.
- .7 Fastenings:

- .1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
- .2 Channel type supports for two or more cables at 300 mm centers to prevent cable from drooping.
- .3 Threaded rods: 6 mm dia. to support suspended channels.
- .8 Connectors: Watertight, explosion-proof approved for TECK cable.

2.5 Type RW90 Conductor

- .1 Cable: to CAN/CSA-C22.2 No. 38.
- .2 Conductors: concentric stranded soft copper, size as indicated. 12 AWG minimum where size is not indicated.
- .3 Insulation: chemically cross-linked thermosetting polyethylene rated type RW90 XLP, 600 V.
- .4 Suitable for installation in temperatures down to -40 °C and a conductor operating temperature of 90 °C.

2.6 Type TEW CONDUCTOR

- .1 Cable: to CAN/CSA-C22.2 No.127
- .2 Conductors: 18 AWG, unless noted otherwise, for PLC/DCS cabinet internal wiring.
- .3 Insulation: thermoplastic compound, 600V.
- .4 Suitable for installation in temperatures down to -40 °C and a conductor operating temperature of 105 °C.

2.7 Wiring Identification

- .1 Provide wiring identification in accordance with Section 26 05 01 - Common Work Results – For Electrical

PART 3- EXECUTION

3.1 Installation of Building Wires

- .1 Install wiring as follows:
 - .1 In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

3.2 Installation of Teck Cable 0 -1000 V

- .1 Install cables.
 - .1 Group cables wherever possible on channels or in cabletroughs.
- .2 Terminate cables in accordance with Section 26 05 20- Wire and Box Connectors - 0 - 1000 V.

3.3 Installation of Armoured Instrument Cables

- .1 Install cables.
 - .1 Group cables wherever possible on channels or in cabletroughs.
- .2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

3.4 Installation of Control Cables

- .1 Install control cables in cable troughs where quantity warrants it.
- .2 Ground control cable shield at one end only.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

The supply and installation of all Wires and cables shall be considered incidental to the Contract Lump Sum Price for "Electrical"

END OF SECTION

PART 1- GENERAL

1.1 Waste Management And Disposal

- .1 Separate and recycle waste materials.
- .2 Remove from Site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling.
- .4 Divert unused metal materials from landfill to metal recycling facility as approved by Contract Administrator.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

PART 2- PRODUCTS

2.1 Support Channels

- .1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted or suspended.

PART 3-EXECUTION

3.1 Installation

- .1 Secure equipment to solid masonry, tile and plaster surfaces with lead anchors or nylon shields.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.
- .5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .6 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
 - .3 Beam clamps to secure conduit to exposed steel Work.
- .7 Suspended support systems.
 - .1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.

- .2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.
- .8 For surface mounting of two or more conduits use channels at 1.5 m on centre spacing.
- .9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .11 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Contract Administrator.
- .13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

The supply and installation of all hangers and supports for electrical systems shall be considered incidental to the Contract Lump Sum Price for "Electrical"

END OF SECTION

Part 1 GENERAL

1.1 Shop Drawings And Product Data

- .1 Submit shop drawings and product data for cabinets in accordance with E9.

1.2 Waste Management And Disposal

- .1 Separate and recycle waste materials.
- .2 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling.
- .3 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 PRODUCTS

2.1 Splitters

- .1 Sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.
- .2 Main and branch lugs to match required size and number of incoming and outgoing conductors as indicated.
- .3 At least three spare terminals on each set of lugs in splitters less than 400 A.

2.2 Junction And Pull Boxes

- .1 Welded steel construction with screw-on flat covers for surface mounting.
- .2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.

2.3 Cabinets

- .1 Type E: sheet steel, hinged door and return flange overlapping sides, handle, lock and catch, for surface mounting.
- .2 Type T: sheet steel cabinet, with hinged door, latch, lock, 2 keys, containing sheet steel backboard for surface mounting.

Part 3 Execution

3.1 Splitter Installation

- .1 Install splitters and mount plumb, true and square to the building lines.
- .2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2 Junction, Pull Boxes And Cabinets Installation

- .1 Install pull boxes in inconspicuous but accessible locations.

- .2 Mount cabinets with top not higher than 2 m above finished floor.
- .3 Install terminal block as indicated in Type T cabinets.
- .4 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 30 m of conduit run between pull boxes.

3.3 Identification

- .1 Provide equipment identification in accordance with Section 26 05 01 - Common Work Results - Electrical.
- .2 Install size 2 identification labels indicating system name, voltage and phase.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

The supply and installation of all splitters, junction boxes, pull boxes and cabinets shall be considered incidental to the Contract Lump Sum Price for "Electrical"

~End~

Part 1 GENERAL

1.1 References

- .1 CSA C22.1-2006, Canadian Electrical Code, Part 1.

1.2 Waste Management And Disposal

- .1 Separate and recycle waste materials.
- .2 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling.

Part 2 PRODUCTS

2.1 Outlet And Conduit Boxes General

- .1 Size boxes in accordance with CSA C22.1.
- .2 102 mm square or larger outlet boxes as required for special devices.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.
- .5 347 V outlet boxes for 347 V switching devices.
- .6 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 Sheet Steel Outlet Boxes

- .1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
- .2 102 mm square or octagonal outlet boxes for lighting fixture outlets.
- .3 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished walls.

2.3 Masonry Boxes

- .1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

2.4 Concrete Boxes

- .1 Electro-glvanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

2.5 Floor Boxes

- .1 Concrete tight electro-galvanized sheet steel floor boxes with adjustable finishing rings to suit floor finish with brass faceplate. Device mounting plate to accommodate short or long ear

duplex receptacles. Minimum depth: 28 mm for receptacles; 73 mm for communication equipment.

- .2 Adjustable, watertight, concrete tight, cast floor boxes with openings drilled and tapped for 12 mm and 19 mm conduit. Minimum size: 73 mm deep.

2.6 Conduit Boxes

- .1 Cast FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

2.7 Fittings - General

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.

Part 3 EXECUTION

3.1 Installation

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of Work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.
- .4 Provide correct size of openings in boxes for conduit and armoured cable connections. Reducing washers are not allowed.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

The supply and installation of all Outlet boxes, conduit boxes and fittings shall be considered incidental to the Contract Lump Sum Price for "Electrical"

~End~

Part 1 GENERAL

1.1 References

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA C22.2 No. 18-98, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware.
 - .2 CSA C22.2 No. 45-M1981(R1992), Rigid Metal Conduit.

1.2 Waste Management And Disposal

- .1 Separate and recycle waste materials.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .4 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling.

Part 2 PRODUCTS

2.1 Conduits

- .1 Rigid Metal Conduit: To CSA C22.2 No. 45, Aluminum Threaded.

2.2 Conduit Fastenings

- .1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel Work.
- .3 Channel type supports for two or more conduits at 1.5 m oc.
- .4 Threaded rods, 6 mm dia., to support suspended channels.

2.3 Conduit Fittings

- .1 Fittings: Manufactured For Use With Conduit Specified. Coating: Same As Conduit.
- .2 Factory "Ells" Where 90° Bends Are Required For 25 mm And Larger Conduits.
- .3 Watertight Connectors And Couplings For Emt. Set-Screws Are Not Acceptable.

2.4 Expansion Fittings For Rigid Conduit

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.

- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 Fish Cord

- .1 Polypropylene.

Part 3 EXECUTION

3.1 Installation

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits in finished areas.
- .3 Surface mount conduits except in mechanical and electrical service rooms and in unfinished areas.
- .4 Use rigid aluminum threaded conduit except where specified otherwise.
- .5 Use explosion proof flexible connection for connection to explosion proof motors.
- .6 Install conduit sealing fittings in hazardous areas. Fill with compound.
- .7 Minimum conduit size for lighting and power circuits: 19 mm.
- .8 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .9 Mechanically bend steel conduit over 19 mm dia.
- .10 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .11 Install fish cord in empty conduits.
- .12 Run 2-25 mm spare conduits up to ceiling space and 2-25 mm spare conduits down to ceiling space from each flush panel. Terminate these conduits in 152 x 152 x 102 mm junction boxes in ceiling space or in case of an exposed concrete slab, terminate each conduit in surface type box.
- .13 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .14 Dry conduits out before installing wire.

3.2 Surface Conduits

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on suspended or surface channels.
- .5 Do not pass conduits through structural members except as indicated.

- .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.3 Concealed Conduits

- .1 Run Parallel or Perpendicular To Building Lines.
- .2 Do not install horizontal runs in masonry walls.

3.4 Conduits Underground

- .1 Slope conduits to provide drainage.
- .2 Waterproof joints (pvc excepted) with heavy coat of bituminous paint.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

The supply and installation of all conduits, conduit fastenings and conduit fittings shall be considered incidental to the Contract Lump Sum Price for "Electrical"

~End~

Part 1 GENERAL

1.1 Section Includes

- .1 Materials and Installation for Standard and Custom Breaker Type Panelboards.

1.2 Related Sections

- .1 Section 26 05 01 - Common Work Results - Electrical.
- .2 Section 26 28 21 - Moulded Case Circuit Breakers.

1.3 References

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.2 No.29-M1989(R2000), Panelboards and Enclosed Panelboards.

1.4 Shop Drawings

- .1 Submit shop drawings in accordance with E9.
- .2 Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

Part 2 PRODUCTS

2.1 Panelboards

- .1 Panelboards: to CSA C22.2 No.29 and product of one manufacturer.
 - .1 Install circuit breakers in panelboards before shipment.
 - .2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.
- .2 600V panelboards: bus and breakers rated for 22 kA (symmetrical) interrupting capacity or as indicated.
- .3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.
- .4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.
- .5 Two keys for each panelboard and key panelboards alike.
- .6 Tin plated copper bus with neutral of same ampere rating as mains and 200% neutral where indicated.
- .7 Mains: suitable for bolt-on breakers.
- .8 Trim with concealed front bolts and hinges.
- .9 Trim and door finish: baked grey enamel.

2.2 Custom Built Panelboard Assemblies

- .1 Double Stack Panels As Indicated.

- .2 Contactors In Mains As Indicated.
- .3 Feed Through Lugs As Indicated.

2.3 Breakers

- .1 Breakers: to Section 26 28 21 - Moulded Case Circuit Breakers.
- .2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.
- .3 Main breaker: separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.

2.4 Equipment Identification

- .1 Provide Equipment Identification In Accordance With Section 26 05 01 - Common Work Results - Electrical.
- .2 Nameplate For Each Panelboard Size 4 Engraved As Indicated.
- .3 Nameplate For Each Circuit In Distribution Panelboards Size 2 Engraved As Indicated.
- .4 Complete Circuit Directory With Typewritten Legend Showing Location And Load Of Each Circuit.

Part 3 EXECUTION

3.1 Installation

- .1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.
- .2 Install surface mounted panelboards on plywood backboards. Where practical, group panelboards on common backboard.
- .3 Mount panelboards to height specified in Section 26 05 01 - Common Work Results - Electrical or as indicated.
- .4 Connect loads to circuits.
- .5 Connect neutral conductors to common neutral bus with respective neutral identified.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

The supply and installation of all Panelboards (Breaker type) shall be considered incidental to the Contract Lump Sum Price for "Electrical"

~End~

PART 1- GENERAL

1.1 Section Includes

- .1 Materials For Moulded-Case Circuit Breakers,And Ground-Fault Circuit-Interruption.,.

1.2 Related Sections

- .1 CW1110 – General Instructions.

1.3 References

- .1 Canadian Standards Association (CSA International).
- .1 CSA-C22.2 No. 5-02, Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, tenth edition, and the second edition of NMX-J-266-ANCE).

1.4 Submittals

- .1 Submit product data in accordance with CW1110.
- .2 Include time-current characteristic curves for breakers with ampacity of 100 A and over or with interrupting capacity of 22,000 A symmetrical (rms) and over at system voltage.

Part 2 - PRODUCTS

2.1 Breakers General

- .1 Moulded-case circuit breakers, and Ground-fault circuit-interruption.,; to CSA C22.2 No. 5
- .2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation.
- .3 Common-trip breakers: with single handle for multi-pole applications.
- .4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
 - .1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
- .5 Circuit breakers with interchangeable trips as indicated.
- .6 Circuit breakers to have minimum 22kA symmetrical rms interrupting capacity rating.

2.2 Thermal Magnetic Breakers

- .1 Moulded Case Circuit Breaker To Operate Automatically By Means Of Thermal And Magnetic Tripping Devices To Provide Inverse Time Current Tripping And Instantaneous Tripping For Short Circuit Protection.

2.3 Enclosure

- .1 Surface Mount.

Part 3 - EXECUTION

3.1 Installation

- .1 Install circuit breakers as indicated on drawings.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

The supply and installation of all Moulded case circuit breakers shall be considered incidental to the Contract Lump Sum Price for "Electrical"

~End~

Part 1 GENERAL

1.1 Section Includes

- .1 Materials And Installation For Industrial Control Devices Including Pushbutton Stations, Control And Relay Panels.

1.2 Related Sections

- .1 Section 26 05 01 - Common Work Results - Electrical.
- .2 The City Of Winnipeg Standard Construction Specifications Section CW1110 – General Instructions.

1.3 References

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.2 No.14-95(R2001), Industrial Control Equipment.
- .2 National Electrical Manufacturers Association (Nema)
 - .1 Nema ICS 1-2001, Industrial Control And Systems: General Requirements.

1.4 Shop Drawings

- .1 Submit shop drawings in accordance with The City of Winnipeg Standard Construction Specifications Section CW1110 – General Instructions.
- .2 Include schematic, wiring, interconnection diagrams.

1.5 Quality Assurance

- .1 Submit To Contract Administrator One Copy Of Test Results.

1.6 Waste Management And Disposal

- .1 Separate and recycle waste materials.
- .2 Remove from Site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Contract Administrator.

Part 2 Products

2.1 AC Control Relays

- .1 Control Relays: To CSA C22.2 No.14 and Nema Ics 1.
- .2 Convertible Contact Type: Contacts Field Convertible From No To Nc, Electrically Held, With Poles To Suit. Coil Rating: 120 V. Contact Rating: 120 V, 2 A Minimum.

- .3 Fixed Contact Plug-In Type: General Purpose With Poles To Suit. Coil Rating: 120 V. Contact Rating: 120 V, 2 A Minimum.

2.2 Relay Accessories

- .1 Standard Contact Cartridges: Normally-Open - Convertible To Normally-Closed In Field.

2.3 Solid State Timing Relays

- .1 Construction: Ac Operated Electronic Timing Relay With Solid-State Timing Circuit To operate output contact. Timing circuit and output contact completely encapsulated to protect against vibration, humidity and atmospheric contaminants.
- .2 Operation: on-delay or off-delay.
- .3 Supply voltage: 120 V, AC, 60 Hz.
- .4 Temperature range: minus 20 degrees C to 60 degrees C.
- .5 Output contact rating: maximum voltage 300 V AC or DC. Current: NEMA ICS 1.
- .6 Timing ranges: minimum 1.0 s, maximum 5, 30 or 60 s.

2.4 Operator Control Stations

- .1 Enclosure:
 - .1 In General Csa Type 4x, Surface Mounting.

2.5 Pushbuttons

- .1 Heavy Duty Oil Tight. Operator Extend Type. Black, With 1-No And 1-Nc Contacts Rated At 2 A Minimum, Ac, Labels As Indicated. Stop Pushbuttons Coloured Red, Labelled As Indicated.

2.6 Selector Switches

- .1 Maintained, 2 or 3 position as required labelled as indicated heavy duty oil tight, operators standard, contact arrangement as indicated, rated 120 V, 2 A, AC minimum.

2.7 Indicating Lights

- .1 Heavy Duty Oil Tight, Full Voltage, Led Type, Lens Colour: As Indicated, Supply Voltage: 120 V, Lamp Voltage: 120 V, Labels As Indicated.

2.8 Control And Relay Panels

- .1 Csa Type 1 Sheet Steel Enclosure With Hinged Padlockable Access Door, Accommodating Relays Timers, Labels, As Indicated, Factory Installed And Wired To Identified Terminals.

2.9 Control Circuit Transformers

- .1 Single Phase, Dry Type.
- .2 Primary: 600 V, 60 Hz Ac.
- .3 Secondary: 120 V, AC.

- .4 VA Rating: as required by loads plus 20%.
- .5 Secondary fuse rating: as required by loads
- .6 Close voltage regulation as required by magnet coils and solenoid valves.

2.10 Thermostats

- .1 Industrial type Thermostat c/w liquid filled stainless steel bulb and tube.
- .2 Rugged Design.
- .3 Dust-tight micro-switches with switching contacts for heating and cooling.
- .4 Single Stage – Single Pole Double Throw
- .5 Adjustable deadband to at least a 10 degree Celsius span
- .6 Sensing range from 0 to 50 degrees Celsius.
- .7 Capable of switching 10A at 240VAC or 5A @ 30VDC.
- .8 Design Basis Material: Honeywell T6120 Series.

PART 3 EXECUTION

3.1 Installation

- .1 Install pushbutton stations, control and relay panels, control devices and interconnect.
- .2 Mount thermostats on walls at indicated locations. Thermostats shall be labelled with Lamacoids which indicate - "Fan control thermostat for Fan (EF-XX)" and a small indication that "Fans are also interlocked to run only on a Pump-Run Signal when in automatic mode."

3.2 Field Quality Control

- .1 Perform tests in accordance with Section 26 05 01 - Common Work Results - Electrical.
- .2 Depending upon magnitude and complexity, divide control system into convenient sections, energize one section at time and check out operation of section.
- .3 Upon completion of sectional test, undertake group testing.
- .4 Check out complete system for operational sequencing.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

The supply and installation of all control devices shall be considered incidental to the Contract Lump Sum Price for "Electrical"

PART 1- GENERAL

1.1 Related Sections

- .1 Section 26 05 01 - Common Work Results - Electrical.

1.2 References

- .1 National Electrical Manufacturer's Association (Nema)
 - .1 Nema Standards Publication ICS 2-2000: Industrial Control and Systems Controllers, Contactors And Overload Relays Rated 600 Volts.

1.3 Shop Drawings And Product Data

- .1 Submit shop drawings in accordance with The City of Winnipeg Standard Construction Specifications Section CW1110 – General Instructions.
- .2 Indicate:
 - .1 Mounting method and dimensions.
 - .2 Starter size and type.
 - .3 Layout of identified internal and front panel components.
 - .4 Enclosure types.
 - .5 Wiring diagram for each type of starter.
 - .6 Interconnection diagrams.

1.4 Closeout Submittals

- .1 Provide Operation And Maintenance Data For Motor Starters For Incorporation Into Operation and Maintenance Manual.
- .2 Include Operation And Maintenance Data For Each Type And Style Of Starter.

1.5 Extra Materials

- .1 Provide maintenance materials in accordance with CW1110.
- .2 Provide listed spare parts for each different size and type of starter:
 - .1 3 contacts, stationary.
 - .2 3 contacts, movable.
 - .3 1 contacts, auxiliary.
 - .4 1 control transformer.
 - .5 1 operating coil.
 - .6 2 fuses.
 - .7 10% indicating lamp bulbs used.

1.6 Waste Management And Disposal

- .1 Separate and recycle waste materials.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

PART 2- PRODUCTS

2.1 Materials

- .1 Starters: To Nema ICS 2-2000

2.2 Manual Motor Starters

- .1 Three phase manual motor starters of size, type, rating, and enclosure type as indicated, with components as follows:
 - .1 Switching mechanism, quick make and break.
 - .2 Three overload heaters, manual reset, trip indicating handle.
- .2 Accessories:
 - .1 Pushbutton: heavy duty oil tight labelled as indicated.
 - .2 Indicating light: heavy duty oil tight type and colour as indicated.
 - .3 Locking tab to permit padlocking in "ON" or "OFF" position.

2.3 Full Voltage Magnetic Starters

- .1 Magnetic and combination magnetic starters of size, type, rating and enclosure type as indicated with components as follows:
 - .1 Contactor solenoid operated, rapid action type.
 - .2 Motor overload protective device in each phase, manually reset from outside enclosure.
 - .3 Wiring and schematic diagram inside starter enclosure in visible location.
 - .4 Identify each wire and terminal for external connections, within starter, with permanent number marking identical to diagram.
- .2 Combination type starters to include motor circuit interrupter with operating lever on outside of enclosure to control motor circuit interrupter, and provision for:
 - .1 Locking in "OFF" position with up to 3 padlocks.
 - .2 Independent locking of enclosure door.
 - .3 Provision for preventing switching to "ON" position while enclosure door open.
- .3 Accessories:
 - .1 Pushbuttons and selector switches: heavy duty oil tight labelled as indicated.
 - .2 Indicating lights: heavy duty oil tight type and color as indicated.
 - .3 1-N/O and 1-N/C spare auxiliary contacts unless otherwise indicated.

2.4 Control Transformer

- .1 Single Phase, Dry Type, Control Transformer With Primary Voltage As Indicated And 120 V Secondary, Complete With Secondary Fuse, Installed In With Starter As Indicated.
- .2 Size Control Transformer For Control Circuit Load Plus 20% Spare Capacity.

2.5 Finishes

- .1 Apply Finishes To Enclosure In Accordance With Section 26 05 01 - Common Work Results - Electrical.

2.6 Equipment Identification

- .1 Provide equipment identification in accordance with Section 26 05 01 - Common Work Results - Electrical.
- .2 Manual starter designation label, white plate, black letters, size 1, engraved as indicated.
- .3 Magnetic starter designation label, white plate, black letters, size 4 engraved as indicated.

PART 3- EXECUTION

3.1 Installation

- .1 Install Starters, Connect Power And Control As Indicated.
- .2 Ensure Correct Fuses And Overload Devices Elements Installed.

3.2 Field Quality Control

- .1 Perform tests in accordance with Section 26 05 01 - Common Work Results - Electrical and manufacturer's instructions.
- .2 Operate switches, contactors to verify correct functioning.
- .3 Perform starting and stopping sequences of contactors and relays.
- .4 Check that sequence controls, interlocking with other separate related starters, equipment, control devices, operate as indicated.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

The supply and installation of all motor starters to 600V shall be considered incidental to the Contract Lump Sum Price for "Electrical"

~End~

PART 1 - GENERAL

1.1 References

- .1 American National Standards Institute (ANSI)
 - .1 ANSI C82.1-97, Electric Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
- .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE C62.41-1991, Surge Voltages in Low-Voltage AC Power Circuits.
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM F1137-88(1993), Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .4 United States of America, Federal Communications Commission (FCC)
 - .1 FCC (CFR47) EM and RF Interference Suppression.

1.2 Related Sections

- .1 The City Of Winnipeg Standard Construction Specifications Section CW1110 – General Instructions.

1.3 Shop Drawings And Product Data

- .1 Submit Shop Drawings In Accordance With E9.
- .2 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Contract Administrator.
- .3 Photometric data to include: VCP Table and spacing criterion.

1.4 Waste Management And Disposal

- .1 Separate and recycle waste.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .4 Disposal of fluorescent lamps.

PART 2 PRODUCTS

2.1 Lamps

.1 Fluorescent lamps.

Lamp Design	Bulb shape Wattage	Base	Type	Initial Lumens	Life h	Description	Colour °K
A	T8-32	md.bip	RS	3150	18000	Cool white	4100

.2 Metal Halide Lamp

Lamp Design	Bulb shape Wattage		Type				
B	T4.5		35W				

2.2 BALLASTS

.1 Fluorescent ballast: CBM and CSA certified, energy efficient type, IC electronic design A.

- .1 Rating: 120 V, 60 Hz, for use with 2-32W, rapid start lamps.
- .2 RFI/EMI suppression circuit to: FCC (CFR47) Part 18, sub-part C, Class A and Part 15, sub-part B, Class B.
- .3 Totally encased and designed for 40 °C ambient temperature.
- .4 Power factor: minimum 95 % with 95% of rated lamp lumens.
- .5 Crest factor: 1.5 maximum current, 2.0 maximum voltage.
- .6 Capacitor: thermally protected.
- .7 Thermal protection: non-resettable on coil.
- .8 Harmonics: 10 % maximum THD, including 49th for electronic discrete and hybrid ballasts, 25 % maximum THD including 49th for electromagnetic ballasts.
- .9 Operating frequency of electronic ballast: 21 khz minimum.
- .10 Total Circuit Power: 62 Watts.
- .11 Ballast Factor: greater than 0.90.
- .12 Sound rated: Class A.
- .13 Mounting: integral with luminaire.

.2 Metal Halide Ballast: CSA certified, energy efficient type, electronic design.

- .1 Rating: 120 V, 60 Hz, for use with 35W, T4.5 Metal Halide lamps.
- .2 Mounting: integral with luminaire.

2.3 FINISHES

.1 Reflector and other inside surfaces finished as follows:

- .1 White or Specular, minimum reflection factor 85%.
- .2 Colour fastness: yellowness factor not above 0.02 and after 250 hours exposure in Atlas fade-ometer not to exceed 0.05.
- .3 Gloss not less than 80 units as measured with Gardner 60° gloss meter.

2.4 Light Control Devices

.1 Design A.

- .1 Material: Polycarbonate.

- .2 Frame: Hinged Gasketed Latched.

2.5 Luminaires

- .1 Fluorescent Luminaire Design: A.
 - .1 No. of lamps: 2.
 - .2 Enclosed and gasketed industrial explosion proof fluorescent luminaire for use in hazardous locations.
 - .3 Mounting: surface.
 - .4 Nominal dimensions: 1219 mm long x 305 mm wide.
 - .5 Lamp design: A.
 - .6 Light control device design: A.
 - .7 Ballast design: A.
 - .8 Ballast chamber: built-in.
 - .9 Housing: Fiberglass reinforced polyester material.
 - .10 Internal Reflector: Highly reflective white polycarbonate material.

2.6 Design Basis Material

- .1 Beghelli: Illumina
- .2 Systemalux: EOS Square

PART 3- EXECUTION

3.1 Installation

- .1 Locate And Install Luminaires As Indicated.

3.2 Wiring

- .1 Connect Luminaires To Lighting Circuits Using Wiring Methods Appropriate For Hazardous Locations.

3.3 Luminaire Alignment

- .1 Align luminaires mounted individually parallel or perpendicular to building grid lines.

PART 4- MEASUREMENT AND PAYMENT

4.1 Method of Measurement and Payment

- .1 The supply and installation of all lighting shall be considered incidental to the Contract Lump Sum Price for "Electrical"

~End~