



**THE CITY OF WINNIPEG**

# **BID OPPORTUNITY**

**BID OPPORTUNITY NO. 722-2018**

**NORTH END SEWAGE TREATMENT PLANT (NEWPCC) DIGESTER 11 RELINING**

**Note to Bidders: Please be aware of revisions to B15.4**

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## **PART B - BIDDING PROCEDURES**

### **B1. CONTRACT TITLE**

B1.1 NORTH END SEWAGE TREATMENT PLANT (NEWPCC) DIGESTER 11 RELINING

### **B2. SUBMISSION DEADLINE**

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, January 25, 2019.

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

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

### **B3. SITE INVESTIGATION**

B3.1 Further to C3.1, the Bidder shall attend a Site meeting from 1:30 p.m. to 3:30 p.m. on Thursday January 10, 2019 or 9:00 a.m. to 11:00 a.m. on Friday January 11, 2019. Attendance is mandatory, and the Bid of any Bidder not having attended will be rejected on the basis that it is non-responsive.

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

B3.3 The Bidder shall note that the following personal protective equipment is required to enter the site:

- (a) Hard hat (CSA / ANSI approved)
- (b) Steel toe footwear (CSA / ANSI approved)

B3.4 The Bidder shall note that the Digester is a confined space and if a Bidder wishes to enter the Digester, the Bidder is required to abide by the Manitoba Workplace Safety and Health Act Regulations for confined space entry. The Bidder is required to provide their own confined space entry equipment.

### **B4. ENQUIRIES**

B4.1 All enquiries shall be directed to the Contract Administrator identified in D4.1.

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. CONFIDENTIALITY**

- B5.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:
- (a) was known to the Bidder before receipt hereof; or
  - (b) becomes publicly known other than through the Bidder; or
  - (c) is disclosed pursuant to the requirements of a governmental authority or judicial order.
- B5.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Bid Opportunity to the media or any member of the public without the prior written authorization of the Contract Administrator.

## **B6. ADDENDA**

- B6.1 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.
- B6.2 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.
- B6.3 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgmt/bidopp.asp>
- B6.4 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B6.5 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.
- B6.6 Notwithstanding B4, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D4.

## **B7. SUBSTITUTES**

- B7.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.
- B7.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B7.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least ten (10) Business Days prior to the Submission Deadline.
- B7.4 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.

B7.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.

B7.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.

B7.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.

B7.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

B7.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B18.

B7.9 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.

## **B8. BID COMPONENTS**

B8.1 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;

B8.2 Further to B8.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B7.

B8.3 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.

B8.4 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.

B8.4.1 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.

B8.5 Bidders are advised not to include any information/literature except as requested in accordance with B8.1.

B8.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B18.1(a).

B8.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B8.8 Bids shall be submitted to:

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

## **B9. BID**

B9.1 The Bidder shall complete Form A: Bid, making all required entries.

B9.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:

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

B9.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B9.2.

B9.3 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.

B9.4 Paragraph 13 of Form A: Bid shall be signed in accordance with the following requirements:

- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, it shall be signed by the Bidder;
- (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
- (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers 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/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

B9.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.

B9.5 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.

## **B10. PRICES**

B10.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B10.1.1 Notwithstanding C12.2.3(c), prices on Form B: Prices shall not include the Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable.

- B10.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.
- B10.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.
- B10.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

**B11. DISCLOSURE**

- B11.1 Various Persons provided information or services with respect to this Work. In the City's opinion, this relationship or association does not create a conflict of interest because of this full disclosure. Where applicable, additional material available as a result of contact with these Persons is listed below.
- B11.2 The Persons are:
- (a) N/A

**B12. CONFLICT OF INTEREST AND GOOD FAITH**

- B12.1 Bidders, by responding to this Bid Opportunity, declare that no Conflict of Interest currently exists, or is reasonably expected to exist in the future.
- B12.2 Conflict of Interest means any situation or circumstance where a Bidder or employee of the Bidder proposed for the Work has:
- (a) other commitments;
  - (b) relationships;
  - (c) financial interests; or
  - (d) involvement in ongoing litigation;
- that could or would be seen to:
- (i) exercise an improper influence over the objective, unbiased and impartial exercise of the independent judgment of the City with respect to the evaluation of Bids or award of the Contract; or
  - (ii) compromise, impair or be incompatible with the effective performance of a Bidder's obligations under the Contract;
- (e) has contractual or other obligations to the City that could or would be seen to have been compromised or impaired as a result of its participation in the Bid Opportunity process or the Work; or
  - (f) has knowledge of confidential information (other than confidential information disclosed by the City in the normal course of the Bid Opportunity process) of strategic and/or material relevance to the Bid Opportunity process or to the Work that is not available to other bidders and that could or would be seen to give that Bidder an unfair competitive advantage.
- B12.3 In connection with its Bid, each entity identified in B12.2 shall:
- (a) avoid any perceived, potential or actual Conflict of Interest in relation to the procurement process and the Work;
  - (b) upon discovering any perceived, potential or actual Conflict of Interest at any time during the Bid Opportunity process, promptly disclose a detailed description of the Conflict of Interest to the City in a written statement to the Contract Administrator; and
  - (c) provide the City with the proposed means to avoid or mitigate, to the greatest extent practicable, any perceived, potential or actual Conflict of Interest and shall submit any

additional information to the City that the City considers necessary to properly assess the perceived, potential or actual Conflict of Interest.

- B12.4 Without limiting B12.3, the City may, in its sole discretion, waive any and all perceived, potential or actual Conflicts of Interest. The City's waiver may be based upon such terms and conditions as the City, in its sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately avoided or mitigated, including requiring the Bidder to put into place such policies, procedures, measures and other safeguards as may be required by and be acceptable to the City, in its sole discretion, to avoid or mitigate the impact of such Conflict of Interest.
- B12.5 Without limiting B12.3, and in addition to all contractual or other rights or rights at law or in equity or legislation that may be available to the City, the City may, in its sole discretion:
- (a) disqualify a Bidder that fails to disclose a perceived, potential or actual Conflict of Interest of the Bidder or any of its employees proposed for the Work;
  - (b) require the removal or replacement of any employees proposed for the Work that has a perceived, actual or potential Conflict of Interest that the City, in its sole discretion, determines cannot be avoided or mitigated;
  - (c) disqualify a Bidder or employees proposed for the Work that fails to comply with any requirements prescribed by the City pursuant to B12.4 to avoid or mitigate a Conflict of Interest; and
  - (d) disqualify a Bidder if the Bidder, or one of its employees proposed for the Work, has a perceived, potential or actual Conflict of Interest that, in the City's sole discretion, cannot be avoided or mitigated, or otherwise resolved.
- B12.6 The final determination of whether a perceived, potential or actual Conflict of Interest exists shall be made by the City, in its sole discretion.

### **B13. QUALIFICATION**

- B13.1 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.
- B13.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:
- (a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/debar.stm>
- B13.3 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 pursuant to The Workplace Safety and Health Act (Manitoba); and
- B13.4 Further to B13.3(c), the Bidder shall, within five (5) 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) Written confirmation of a safety and health certification meeting SAFE Work Manitoba's SAFE Work Certified Standard (e.g., COR™ and SECOR™) or
  - (i) a copy of their valid Manitoba COR certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Certificate of Recognition (COR) Program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or
  - (ii) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ 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 Division website at <http://www.winnipeg.ca/matmgt/>).

B13.5 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.

B13.6 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.

#### **B14. BID SECURITY**

B14.1 The Bidder shall provide bid security in the form of 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).

B14.1.1 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.

B14.1.2 All signatures on bid securities shall be original.

B14.1.3 The Bidder shall sign the Bid Bond.

B14.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.

B14.2 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 contract securities are furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B14.2.1 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.

B14.3 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.

## **B15. OPENING OF BIDS AND RELEASE OF INFORMATION**

- B15.1 Bids will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Division, or in such other office as may be designated by the Manager of Materials.
- B15.1.1 Bidders or their representatives may attend.
- B15.1.2 Bids determined by the Manager of Materials, or his/her designate, to not include the bid security specified in B14 will not be read out.
- B15.2 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 Division website at <http://www.winnipeg.ca/matmgt/>
- B15.3 After award of Contract, the name(s) of the successful Bidder(s), their address(es) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>
- B15.4 The Bidder is advised that any information contained in any Bid may be released if required by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law or by City policy or procedures (which may include access by members of City Council).
- B15.4.1 To the extent permitted, the City shall treat as confidential information, those aspects of a Bid Submission identified by the Bidder as such in accordance with and by reference to Part 2, Section 17 or Section 18 or Section 26 of The Freedom of Information and Protection of Privacy Act (Manitoba), as amended.

## **B16. IRREVOCABLE BID**

- B16.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.
- B16.2 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.

## **B17. WITHDRAWAL OF BIDS**

- B17.1 A Bidder may withdraw his/her Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.
- B17.1.1 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.
- B17.1.2 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 13 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B17.1.3 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 13 of Form A: Bid; and

- (c) if the notice has been given by any one of the persons specified in B17.1.3(b), declare the Bid withdrawn.

B17.2 A Bidder who withdraws his/her Bid after the Submission Deadline but before his/her Bid has been released or has lapsed as provided for in B16.2 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.

## **B18. EVALUATION OF BIDS**

B18.1 Award of the Contract shall be based on the following bid evaluation criteria:

- (a) compliance by the Bidder with the requirements of the Bid Opportunity, or acceptable deviation there from (pass/fail);
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B13 (pass/fail);
- (c) Total Bid Price;
- (d) economic analysis of any approved alternative pursuant to B7.

B18.2 Further to B18.1(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.

B18.3 Further to B18.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his/her Bid or in other information required to be submitted, that he/she is responsible and qualified.

B18.4 Further to B18.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.

B18.4.1 Further to B18.1(a), in the event that a unit price is not provided on Form B: Prices, the City will determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

## **B19. AWARD OF CONTRACT**

B19.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B19.2 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.

B19.2.1 Without limiting the generality of B19.2, 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.

B19.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B18.

**B19.3.1** Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Bid upon written request to the Contract Administrator.

## **PART C - GENERAL CONDITIONS**

### **C0. GENERAL CONDITIONS**

- C0.1 The *General Conditions for Construction* (Revision 2006 12 15) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at [http://www.winnipeg.ca/matmgt/gen\\_cond.stm](http://www.winnipeg.ca/matmgt/gen_cond.stm)
- C0.2 A reference in the Bid Opportunity to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for 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 the items identified in detail in the Drawings and Specifications attached. The major components of the Work include:

- (a) Surface preparation, severe crack repair, concrete resurfacing and relining of the roof and top 4 metres of the wall of Digester 11,
- (b) Surface preparation, void repair and severe crack repair of the remainder of the wall surfaces of Digester 11
- (c) All quality checks including hydraulic tests if required
- (d) All installations removal as many times as required scaffoldings, cleaning, water for tests and products, removal and repair of cladding, roofing etc. as required
- (e) Air tightness testing of Digester 11 tank to meet CSA B149.6-11. Contractor is responsible for all costs of the Air Tightness Testing but the City will consider a Change in Work if the first test fails. If the second test fails, the Contractor will be responsible for any subsequent testing at no additional cost to the City.
- (f) Water will be available on site but the Contractor will be required to meter and pay for all water use for the duration of the project. This includes but is not limited to all equipment for filling such as pumps, hoses, etc.

#### D3. DEFINITIONS

D3.1 When used in this Bid Opportunity:

- (a) "CPI" means Corrosion Probe, Inc.;
- (b) "CSM" means Coating System Manufacturer.
- (c) "LSA" means Lining System Applicator;
- (d) "NEWPCC" means North End Sewage Treatment Plant;

#### D4. CONTRACT ADMINISTRATOR

D4.1 The Contract Administrator is Corrosion Probe, Inc. (CPI), represented by:

Steve Roetter, PE

Principal Consultant

Telephone No. 317-513-3708

Email Address roetters@cpiengineering.com

D4.2 At the pre-construction meeting, CPI will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

#### D5. CONTRACTOR'S SUPERVISOR

D5.1 At the pre-construction meeting, the Contractor shall identify his/her designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D5.2 No substitutions of key personnel or subcontractors will be allowed without approval from the Contract Administrator.

**D6. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE**

D6.1 The Contract, all deliverables produced or developed, and information provided to or acquired by the Contractor are the property of the City and shall not be appropriated for the Contractors own use, or for the use of any third party.

D6.2 The Contractor shall not make any public announcements or press releases regarding the Contract, without the prior written authorization of the Contract Administrator.

D6.3 The following shall be confidential and shall not be disclosed by the Contractor to the media or any member of the public without the prior written authorization of the Contract Administrator;

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

D6.4 A Contractor who violates any provision of D6 may be determined to be in breach of Contract.

**D7. NOTICES**

D7.1 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.

D7.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D7.3, D7.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator identified in D4.1.

D7.3 Notwithstanding C21., all notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following:

The City of Winnipeg  
Attn: Chief Financial Officer  
Office of the Chief Administrative Officer  
Susan A. Thompson Building  
2nd Floor, 510 Main Street  
Winnipeg MB R3B 1B9

D7.4 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 facsimile number:

The City of Winnipeg  
Legal Services Department  
Attn: Director of Legal Services  
Facsimile No.: 204 947-9155

**D7.5 Bids Submissions must not be submitted to the above facsimile number. Bids must be submitted in accordance with B8.**

## **D8. FURNISHING OF DOCUMENTS**

- D8.1 Upon award of the Contract, the Contractor will be provided with three (3) 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**

### **D9. AUTHORITY TO CARRY ON BUSINESS**

- D9.1 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.

### **D10. SAFE WORK PLAN**

- D10.1 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.
- D10.2 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 Division website at <http://www.winnipeg.ca/matmgt/Safety/default.stm>

### **D11. INSURANCE**

- D11.1 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 covering all motor vehicles, owned and operated and used or to be used by the Contractor directly or indirectly in the performance of the Work. The Limit of Liability shall not be less than \$2,000,000 inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence.
- D11.2 Deductibles shall be borne by the Contractor.
- D11.3 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.
- D11.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

### **D12. CONTRACT SECURITY**

- D12.1 The Contractor shall provide and maintain the performance bond and the labour and material payment bond 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; and
- (b) a labour and material payment bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H2: Labour and Material Payment Bond), in an amount equal to fifty percent (50%) of the Contract Price.

D12.2 The Contractor shall provide the City Solicitor with the required performance and labour and material payment bonds 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.

D12.3 The Contractor shall, as soon as practicable after entering into a contract with a Subcontractor:

- (a) give the Subcontractor written notice of the existence of the labour and material payment bond in D12.1(b); and
- (b) post a notice of the bond and/or a copy of that bond in a conspicuous location at the Site of the Work.

### **D13. SUBCONTRACTOR LIST**

D13.1 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.

### **D14. EQUIPMENT LIST**

D14.1 The Contractor shall provide the Contract Administrator with a complete list of the equipment which the Contractor proposes to utilize (Form K: Equipment 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.

### **D15. DETAILED WORK SCHEDULE**

D15.1 The Contractor shall provide the Contract Administrator with a detailed work schedule (Form L: 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.

D15.2 The detailed work schedule shall consist of the following:

- (a) a critical path method (C.P.M.) schedule for the Work; and
- (b) a Gantt chart for the Work based on the C.P.M. schedule; and
- (c) a manpower schedule detailing the average crew size for each phase of the Work, all acceptable to the Contract Administrator.

D15.3 Further to D15.2(a), the C.P.M. schedule shall clearly identify the start and completion dates of all of the following activities/tasks making up the Work as well as showing those activities/tasks on the critical path:

- (a) Commencement date;
- (b) Mobilization to site;
- (c) Scaffolding installation;
- (d) Protection;
- (e) Containment;

- (f) Surface preparation;
- (g) Concrete crack repair;
- (h) Air Tightness Testing;
- (i) Lining and coating application;
- (j) Substantial Performance; and
- (k) Total Performance

D15.4 Further to D15.2(b), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each trade, or specification division. The time shall be on the horizontal axis, and the type of trade shall be on the vertical axis.

## **SCHEDULE OF WORK**

### **D16. COMMENCEMENT**

D16.1 The Contractor shall not commence any Work until he/she is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.

D16.2 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 D9;
  - (ii) evidence of the workers compensation coverage specified in C6.15;
  - (iii) the Safe Work Plan specified in D10;
  - (iv) evidence of the insurance specified in D11;
  - (v) the performance security specified in D12;
  - (vi) the Subcontractor list specified in D12;
  - (vii) the equipment list specified in D14; and
  - (viii) the detailed work schedule specified in D15.
- (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.

D16.3 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the letter of intent.

D16.4 The City intends to award this Contract by March 22, 2019.

D16.4.1 If the actual date of award is later than the intended date, the dates specified for Critical Stages, Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

### **D17. CRITICAL STAGES**

D17.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

- (a) Completion of Scaffolding within twenty (20) consecutive Working Days of the commencement of the Work as specified in D16;
- (b) Completion of Surface Preparation within sixty (60) consecutive Working Days of the commencement of the Work as specified in D16;
- (c) Successful Air Tightness Testing achieved within eighty (80) consecutive Working Days of the commencement of the Work as specified in D16;

## **D18. SUBSTANTIAL PERFORMANCE**

- D18.1 The Contractor shall achieve Substantial Performance within eighty-five (85) consecutive Working Days of the commencement of the Work as specified in D16.
- D18.2 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.
- D18.3 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.

## **D19. TOTAL PERFORMANCE**

- D19.1 The Contractor shall achieve Total Performance within one hundred (100) consecutive Working Days of the commencement of the Work as specified in D16.
- D19.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.
- D19.3 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.

## **D20. LIQUIDATED DAMAGES**

- D20.1 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 Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:
- (a) Substantial Performance - two thousand six hundred dollars (\$2,600);
  - (b) Total Performance - five hundred dollars (\$500).
- D20.2 The amounts specified for liquidated damages in D20.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve critical stages, Substantial Performance or Total Performance by the days fixed herein for same.
- D20.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

## **CONTROL OF WORK**

### **D21. JOB MEETINGS**

- D21.1 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.

D21.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

**D22. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)**

D22.1 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).

**D23. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS**

D23.1 Further to B13.4, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B13.4.

**MEASUREMENT AND PAYMENT**

**D24. INVOICES**

D24.1 Further to C12, the Contractor shall submit an invoice for each portion of Work performed :

The City of Winnipeg  
Corporate Finance - Accounts Payable  
4th Floor, Administration Building, 510 Main Street  
Winnipeg MB R3B 1B9

Facsimile No.: 204 949-0864  
Email: [CityWpgAP@winnipeg.ca](mailto:CityWpgAP@winnipeg.ca)

D24.2 Invoices must clearly indicate, as a minimum:

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

D24.3 The City will bear no responsibility for delays in approval of invoices which are improperly submitted.

**D24.4 Bid Submissions must not be submitted to the above facsimile number. Bids must be submitted in accordance with B8.**

**D25. PAYMENT**

D25.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

**WARRANTY**

**D26. WARRANTY**

D26.1 Notwithstanding C13.2, the warranty period shall begin on the date of Substantial Performance and shall expire five (5) years thereafter unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

**FORM H1: PERFORMANCE BOND**  
(See D12)

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 for

BID OPPORTUNITY NO. 722-2018

NORTH END SEWAGE TREATMENT PLANT (NEWPCC) DIGESTER 11 RELINING

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 as to Principal if no seal)

\_\_\_\_\_  
(Name of Principal)

Per: \_\_\_\_\_ (Seal)

Per: \_\_\_\_\_

\_\_\_\_\_  
(Name of Surety)

By: \_\_\_\_\_ (Seal)  
(Attorney-in-Fact)

**FORM H2: LABOUR AND MATERIAL PAYMENT BOND**  
(See D12)

KNOW ALL MEN BY THESE PRESENTS THAT

\_\_\_\_\_  
his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Principal"), and

\_\_\_\_\_  
his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), for the use and benefit of claimants as herein below defined, in the amount of

\_\_\_\_\_ dollars (\$\_\_\_\_\_)

of lawful money of Canada, for the payment whereof we, the Principal and the Surety jointly and severally bind ourselves firmly by these presents.

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

BID OPPORTUNITY NO. 722-2018

NORTH END SEWAGE TREATMENT PLANT (NEWPCC) DIGESTER 11 RELINING

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 promptly make payment to all claimants as hereinafter defined, for all labour, service and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void, otherwise it shall remain in full force and effect subject, however, to the following conditions:

- (a) A claimant is defined as one having a direct contract with the Principal for labour, service and material, or any of them, used or reasonably required for use in the performance of the contract, labour, service and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment (but excluding rent of equipment where the rent pursuant to an agreement is to be applied towards the purchase price thereof) directly applicable to the Contract;
- (b) The above-named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work, labour or service was done or performed, or materials were furnished by such claimant, may sue on this bond, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon;
- (c) No suit or action shall be commenced hereunder by any claimant
  - (i) unless claimant shall have given written notice to the Principal and the Surety above-named, within one hundred and twenty (120) days after such claimant did or performed the last of the work, labour or service, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work, labour or service was done or performed. Such notice shall be served by mailing the same by registered mail to the Principal, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the Province of Manitoba;

- (ii) after the expiration of one (1) year following the date on which Principal ceased work on said Contract; including work performed under the guarantees provided in the Contract;
  - (iii) other than in a court of competent jurisdiction in the Province of Manitoba.
- (d) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.
- (e) The Surety shall not be liable for a greater sum than the specified penalty of this bond.

The Principal and Surety hereby agree that The Guarantors' Liability Act (Manitoba) shall apply to this Bond.

IN TESTIMONY WHEREOF, the Principal has hereunto set its hand affixed its seal, and the Surety has caused these presents to be sealed and with its corporate seal duly attested by the authorized signature of its signing authority this

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ .

SIGNED AND SEALED  
in the presence of:

\_\_\_\_\_  
(Witness as to Principal if no seal)

\_\_\_\_\_  
(Name of Principal)

Per: \_\_\_\_\_ (Seal)

Per: \_\_\_\_\_

\_\_\_\_\_  
(Name of Surety)

By: \_\_\_\_\_ (Seal)  
(Attorney-in-Fact)



**FORM K: EQUIPMENT**  
(See D14)

**NORTH END SEWAGE TREATMENT PLANT (NEWPCC) DIGESTER 11 RELINING**

<p>1. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>2. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>3. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>

**FORM K: EQUIPMENT**  
(See D14)

**NORTH END SEWAGE TREATMENT PLANT (NEWPCC) DIGESTER 11 RELINING**

<p><b>4. Category/type:</b></p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p><b>5. Category/type:</b></p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p><b>6. Category/type:</b></p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>



## 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 Division website at <http://www.winnipeg.ca/matmgt/Spec/Default.stm>
- 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*.

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
VW030-S101	Sections and Details Penetrations and Terminations Epoxy Lining System – I
VW030-S102	Sections and Details Penetrations and Terminations Epoxy Lining System – II
VW030-S103	Plans , Sections and Details Crack Repairs and Overlay Epoxy Lining System - III

#### E2. DESCRIPTION OF WORK

- E2.1 Pursuant to and in compliance with the Contract Documents relating hereto, the Contractor shall include all workmanship, materials, and quality requirements for concrete surface preparation, repair and resurfacing; and protective lining work including severe crack repair in Digester 11. The scope of work also includes all lining system terminations, environmental controls and the removal of all debris. All of the work covered by this section is located in Digester No. 11 at the North End Water Pollution Control Centre (NEWPCC) in Winnipeg, MB.
- E2.2 The major components of the Work are as follows:
- (a) Digester No. 11
- (i) Preparation of the top 4 metres of the interior wall, roof, column capitals and gas dome surfaces.
  - (ii) Repair of voids and severe cracks in the roof and walls. Note this item will apply to the entire interior wall surface as required.
  - (iii) Installation of required terminations.
  - (iv) Application of Concrete Repair Mortar (Tnemec Series 217 or approved substitute in accordance with B7) over areas of deep concrete deterioration (over 6.5 mm) in the top 4 metres of the interior wall, roof, column capitals and gas dome surfaces.
  - (v) Surface preparation of the cured Concrete Repair Mortar in areas where epoxy modified filler/surfacer (Tnemec Series 218-1000 or approved substitute in accordance with B7) will be applied over it.
  - (vi) Application of epoxy modified filler/surfacer (Tnemec Series 218-1000 or approved substitute in accordance with B7) over the top 4 metres of the interior wall, roof, column capitals and gas dome surfaces.

- (vii) Conduct air testing of the digester in accordance with CSA B149.6, CSA 149.6 Annex A and this specification.
- (viii) Repair areas of air leakage if the digester fails the air test and repeat until air test is successful.
- (ix) Application of the epoxy lining system over the top 4 metres of the interior wall and all column capital, roof and gas dome surfaces.
- (x) Providing all necessary environmental controls necessary to comply with the CSM's requirements for storage, application and curing of all specified materials.
- (xi) Providing all testing as required in this specification.

### E2.3 Limits of Construction

- (a) The scope of this specification includes:
  - (i) Concrete surface preparation – Interior wall, roof and gas dome including all roof penetrations.
  - (ii) Repair of severe cracking and filling of voids – Interior wall, roof and gas dome.
  - (iii) Concrete Resurfacing – Roof (including all roof penetrations), gas dome, column capitals and top 4 meters of the wall.
  - (iv) Epoxy Coating – Roof (including all roof penetrations), gas dome, column capitals and top 4 metres of the wall.

## E3. RELATED WORK

- E3.1 Related work shall include protection of all unlined concrete, metal piping, and piping supports from damage during the surface preparation and protective coating work. Related work will also include protection of all concrete surfaces inside the digester from structural damage due to scour or lingering contact with the ultrahigh pressure water jet or abrasive stream. All drains to be protected and water pumped out and disposed of properly by the Contractor.

## E4. EXTRA WORK ALLOWANCE

- E4.1 The Extra Work Allowance is intended to address general site maintenance and additional upgrade work authorized by the Contract Administrator.
- E4.2 The City reserves the right to delete any or all of the Extra Work Allowance from the Contract if the Work intended to be covered by the Extra Work Allowance is not required, or if the Works intended are found to be more extensive than the provisional Extra Work Allowance.
- E4.3 Air Tightness Testing
- (a) If the first Air Tightness Testing procedure fails, the Contractor may submit a notice for Change in Work for a second test, at a cost no greater than as submitted under Item 4 of Form B: Prices and provided the Contractor has identified a clear failure point and is confident the leak can be corrected, subject to the approval of the Contract Administrator. If the second test fails, the Contractor will be responsible for all subsequent Air Tightness Tests at no additional cost to the City.
- E4.4 Additional Crack Repair
- (a) If any Additional Crack Repair is identified by the Contract Administrator, a Change Order will be issued to repair the cracks at the price submitted by the Contractor on Form B: Prices.
- E4.5 Cost of all other Extra Work shall be evaluated by the methods outlined in C7.4, and a Change Order prepared by the Contract Administrator. Cost of the Change Order will be paid on the Progress Estimate and deducted from the Extra Work Allowance. If the valuation of the authorized work exceeds the Value of the Extra Work Allowance, the Contract Value will be adjusted by the shortfall.

## **E5. DEFINITIONS**

- E5.1 Terminology used in this section is in accordance with definitions contained in ASTM D 16, ASTM D 3960, and the following definitions:
- (a) Abrasive: Material used for blast cleaning, such as sand, grit or shot.
  - (b) Abrasive Blast Cleaning: Cleaning/surface preparation by abrasive propelled at high speed.
  - (c) Anchor Pattern: Profile or texture of prepared surface(s).
  - (d) Bug Holes: Small cavities, usually not exceeding 15 mm in diameter, resulting from entrapment of air bubbles in the surface of formed concrete during placement and compaction.
  - (e) Coating/Paint/Lining Thickness: The total thickness of primer, intermediate and/or finish coats.
  - (f) Contract Administrator: as defined in the General Conditions and designated for this project as Corrosion Probe, Inc.
  - (g) Contractor: means the person undertaking the performance of the Work under the terms of the Contract..
  - (h) Dew point: Temperature of a given air/water vapor mixture at which condensation starts.
  - (i) Drying Time: Time interval between application and curing of material.
  - (j) Dry to Recoat: Time interval between application of material and ability to receive next coat.
  - (k) Dry to Touch: Time interval between application of material and ability to touch lightly without damage.
  - (l) Feather Edging: Reducing the thickness of the edge of paint.
  - (m) Feathering: Operation of tapering off the edge of a point with a comparatively dry brush.
  - (n) Field Coat: The application or the completion of application of the coating system after installation of the surface at the site of the work.
  - (o) Hold Point: A defined point, specified in this Section, at which work shall be halted for inspection.
  - (p) Holiday: a discontinuity, skip, or void in coating or coating system film that exposes the substrate.
  - (q) Honeycomb: Segregated condition of hardened concrete due to nonconsolidation.
  - (r) Hydroblast: A term meaning the same as high or ultra-high pressure water jetting.
  - (s) Incompatibility: Inability of a coating to perform well over another coating because of bleeding, poor bonding, or lifting of old coating; inability of a coating to perform well on a substrate.
  - (t) Immersion: Refers to a service condition in which the substrate is below the waterline or submerged in water or wastewater at least intermittently if not constantly.
  - (u) Inspection & Testing Plan: A plan by the CSA that incorporates all of the required QC testing into the CSA's work plan for the project. The I&TP systematically lists the inspection hold points, test methods, and acceptance criteria for each procedure in each phase of the project Work.
  - (v) Laitance: A layer of weak, non-durable concrete containing cement fines that is brought to the surface through bleed water because of concrete finishing and/or over-finishing.
  - (w) Mil: 0.001 inch or 25.4 microns.
  - (x) Overspray: Dry spray, particularly such paint that failed to strike the intended surface.

- (y) Pinhole: A small diameter discontinuity in a coating or coating system film that is typically created by outgassing of air from a void in a concrete substrate resulting in exposure of the substrate or a void between coats.
- (z) Pot Life: Time interval after mixing of components during which the coating can be satisfactorily applied.
- (aa) Process Control Procedure: Documents one process, such as mobilization and setup, abrasive blasting, coating mixing, coating application and curing, clean-up, etc. that together make up the work plan.
- (bb) Resurfacer/Resurfacing Material: Also filler/surfacer, a layer of cementitious and/or resin-base material used to fill or otherwise restore surface continuity to worn or damaged concrete surfaces.
- (cc) Shelf Life: Maximum storage time for which a material may be stored without losing its usefulness.
- (dd) Shop Coat: One or more coats applied in a shop or plant prior to shipment to the site of the work, where the field or finishing coat is applied.
- (ee) Spreading Rate: Area covered by a unit volume of paint at a specific thickness.
- (ff) Stripe Coat: A separate coat of paint applied to all weld seams, pits, nuts/bolts/washers and edges by brush. This coat shall not be applied until any previous coat(s) have cured and, once applied, shall be allowed to cure prior to the application of the subsequent coat(s).
- (gg) Tie Coat: An intermediate coat used to bond different types of paint coats. Coatings used to improve the adhesion of a succeeding coat.
- (hh) Touch-Up Painting: The application of paint on areas of painted surfaces to repair marks, scratches, and areas where the coating has deteriorated to restore the coating film to an unbroken condition.
- (ii) Ultrahigh-Pressure Waterjetting (UHPWJ) – A method of surface preparation employing clean water as the media at or above 210 MPa.
- (jj) Weld Spatter: Beads of metal scattered near seam during welding.

E5.2 The following abbreviations may be used herein:

- (a) ANSI - American National Standards Institute
- (b) CSM - Coating System Manufacturer. Refers to the acceptable coating system manufacturer.
- (c) CMU - Concrete Masonry Unit
- (d) CTR - Coating System Manufacturer's Technical Representative. Refers to the technical representative(s) of the acceptable Coating System Manufacturer and is abbreviated as CTR.
- (e) DFT - Dry Film Thickness. Thickness of cured film, usually expressed in microns.
- (f) I&TP – Inspection & Testing Plan
- (g) ICRI - International Concrete Repair Institute
- (h) LSA - Lining System Applicator. A generic reference to the specialty subcontractor or subcontractors retained by the Contractor to install the coating systems specified in this Section.
- (i) NACE - National Association of Corrosion Engineers
- (j) NSF – National Sanitation Foundation
- (k) PCP – Process Control Procedure
- (l) SSD - Surface Saturated Dry. Refers to concrete surface condition where the surface is saturated (damp) without the presence of standing water.
- (m) SSPC - The Society for Protective Coatings

- (n) TPC - Technical Practice Committee
- (o) VOC - Volatile Organic Compound. The portion of the coating that is a compound of carbon, is photochemically reactive, and evaporates during drying or curing, expressed in grams per liter (g/l). VOC is determined by EPA Method 24.
- (p) WFT - Wet Film Thickness. The primer or coating film's thickness immediately following application. Wet film thickness is measured in microns and is abbreviated WFT.

**E6. REFERENCE STANDARDS**

- E6.1 This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.
- E6.2 Unless otherwise specified, references to documents shall mean the documents in effect at the time of the Bid Opportunity posting. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued, or replaced.

REFERENCE STANDARDS	
Reference	Title
ANSI (American National Standards Institute)	
ANSI/ASC 29.4 Exhaust Systems	Abrasive Blasting Operations – Ventilation and Safe Practices
ANSI/NSF 61	Drinking Water System Components Health Effects
ANSI B74.18	Grading of Certain Abrasive Grain on Coated Abrasive Material
ASTM D16	Standard Terminology for Paint, Related Coatings, Materials, and Applications
ASTM (American Society for Testing and Materials)	
ASTM D2200 (SSPC-VISI)	Pictorial Surface Preparation Standards for Painting Steel Surfaces
ASTM D3960	Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
ASTM D4262	Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces
ASTM D4263	Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
ASTM D4414	Standard Practice for Measurement of Wet Film Thickness by Notch Gates
ASTM D4417	Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
ASTM D4541	Standard Test Methods for Pull-Off Strength of Coating on Metal Substrates Using Portable Adhesion Testers
ASTM D4787	Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates
ASTM D5162	Standard Practice for Discontinuity (holiday) Testing of Nonconductive Protective Coating on Metallic Substrates

ASTM D7234	Standard Test Method for Pull-Off Strength of Coating on Concrete Using Portable Adhesion Testers
ASTM E337	Standard Test Method for Measuring Humidity With a Psychrometer
ASTM F1869	Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
CSA (Canadian Standards Association)	
CSA B149.6	Code for Digester Gas, Landfill Gas, and Biogas Generation and Utilization
CSA Z797-09	Code of Practice for Access Scaffold
ICRI (International Concrete Restoration Institute)	
ICRI 310.2	Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair
NACE (National Association of Corrosion Engineers)	
NACE Publication 6D-163	A Manual for Painter Safety
NACE Publication 6F-163	Surface Preparation of Steel or Concrete Tank/Interiors
NACE Publication 6G-164 A	Surface Preparation Abrasives for Industrial Maintenance Painting
NACE Standards	January 1988 Edition of the National Association of Corrosion Engineers, TPC.
NACE SP0188	Standard Practice – Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
NACE SP0288	Standard Recommended Practice, Inspection of Linings on Steel and Concrete
NACE SP0892	Standard Recommended Practice, Linings Over Concrete in Immersion Service
NACE Publication TPC2	Coatings and Linings for Immersion Service
NACE SP0178	Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service
NAPF (National Association of Pipe Fabricators)	
NAPF 500-03	Surface Preparation Standard for Ductile Iron Pipe and Fittings in Exposed Locations Receiving Special External Coatings and/or Special Internal Linings
NAPF 500-03-04	Abrasive Blast Cleaning for Ductile Iron Pipe
NAPF 500-03-05	Abrasive Blast Cleaning for Cast Ductile Iron Fittings
WSH Act (Manitoba Workplace Safety and Health Act)	
WSH Act Reg W217 Part 35.9	Identification of product in piping system or vessel
WSH Act Reg W217 Part 36	–Chemical and Biological Substances
SSPC (The Society for Protective Coatings)	
SSPC	Paint Application Specification No. 1.
SSPC-AB 1	Mineral and Slag Abrasives
SSPC-PA 1	Shop, Field, and Maintenance Painting of Steel
SSPC-PA 2	Measurement of Dry Coating Thickness with Magnetic Gages

SSPC-PA 9	Measurement of Dry Coating Thickness on Cementitious Substrates Using Ultrasonic Gages
SSPC-PA Guide 1	Guide for Illumination of Industrial Painting Project
SSPC-PA Guide 3	A Guide to Safety in Paint Application
SSPC-PA Guide 6	Guide for Containing Debris Generated During Paint Removal Operations
SSPC-PA Guide 11	Guide for Coating Concrete
SSPC SP1	Solvent Cleaning
SSPC SP2	Hand Tool Cleaning
SSPC SP3	Power Tool Cleaning
SSPC SP5	White Metal Blast Cleaning
SSPC SP6	Commercial Blast Cleaning
SSPC SP7	Brush-Off Blast Cleaning
SSPC SP10	Near-White Blast Cleaning
SSPC SP11	Power Tool Cleaning to Bare Metal
SSPC SP12	Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultra-High Pressure Water Jetting Prior to Recoating
SSPC SP13	Surface Preparation of Concrete
SSPC-TR2	Wet Abrasive Blast Cleaning
SSPC-TU-3	Overcoating
SSPC- Guide 15	Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates
SSPC V2	Systems and Specifications: Steel Structures Painting Manual, Volume 2
SSPC-VIS 1	Visual Standard for Abrasive Blast Cleaned Steel
SSPC-VIS 4	Visual Standards (Waterjetting)
SSPC-VIS 5	Visual Standards (Wet Abrasive Blast Cleaning)
WPCF (Water Pollution Control Federation)	
WPCF Manual of Practice No. 17	Paints and Protective Coatings for Wastewater Treatment Facilities Guide and Paint Application Specifications

## E7. QUALITY REQUIREMENTS

### E7.1 Contractor Qualifications:

- (a) The entity installing the coating/lining system shall be an approved applicator of that system by the CSM. This will be documented in writing by the CSM and accepted by the Contract Administrator prior to starting the work.
- (b) Employ only supervisory and lead applicator trades people who have at least five (5) years of experience performing similar work to perform any of the preparation and installation work as specified herein.
- (c) The LSA shall be a firm with at least five (5) years of experience properly preparing concrete substrates by ultrahigh-pressure waterjetting and abrasive blast cleaning as well as applying specialty spray applied epoxy coating and lining materials over concrete substrates in corrosive environments. This experience requirement shall be documented with at least five (5) verifiable project references going back five (5) years with contact name, telephone numbers, and email addresses.
- (d) All of the LSA's application crew to be assigned to the work covered by this Section shall be trained in the proper, hands-on application of the concrete restoration materials, specified resurfacing materials, and epoxy lining materials by the CSM.

- (i) This training to be performed off-site at the LSA's shop facilities or elsewhere shall ensure that the same application tools, equipment, and methods to be used in the Digester are used by the LSA's application personnel during the training exercise.
- (ii) All application crew personnel shall have mixed and applied the specified materials during the training.
- (iii) This training shall be documented in writing by the CSM and the LSA in letters stating the employees' names, the dates of the training, the products applied, and certifying that all listed personnel received the training and submitted to the Contract Administrator for acceptance prior to commencement of the work. All employees' signatures shall also be provided in these letters from both the CSM and the LSA. This can be done as a joint letter.
- (iv) The training provided shall be given by technical service personnel from the CSM experienced in the application of all of the specified materials.
- (v) This training shall not be given by regional or national sales or marketing personnel from the CSM or its agents.
- (vi) This training shall consist of a minimum of eight (8) hours of hands-on/classroom training.

#### E7.2 Minimum Contractor Quality Control Requirements

- (a) The Contractor is ultimately responsible for the workmanship and quality of the work. Inspections by the CSM, Contract Administrator, the City, or others, do not limit the Contractor's responsibility for the quality of the work covered by this section.
- (b) The Contractor shall prepare an Inspection and Test Plan (I&TP) that complies with this Section for all aspects of the resurfacing and lining application.
- (c) A pre-job meeting shall be conducted with the Contractor to review the quality program I&TP and the production schedule. Coating Inspection requirements shall be based on NACE SP0288.
- (d) The LSA shall at all times have a competent superintendent or supervisor in charge who is thoroughly familiar with the work in progress. The superintendent or supervisor shall represent the LSA and shall have authority to receive and respond to all questions and non-conformance issues raised by the Contract Administrator and the City.
- (e) The LSA's methods shall conform to requirements of this specification and the standards referenced in this Section. Changes in the coating system installation requirements will be allowed only with the written acceptance of the Contract Administrator before work commences.
- (f) Contaminated, outdated, diluted materials, and/or materials from previously opened containers shall not be used.
- (g) The LSA shall identify the points of access for inspection by the City's Inspector. The LSA shall provide ventilation, ingress and egress, and other means necessary for the City's Inspector personnel to access safely the work areas.
- (h) The Contractor shall conduct the work so that the coating system is installed as specified and shall inspect the work continually to ensure that the coating system is installed as specified. Coating system work that does not conform to the specifications or is otherwise not acceptable shall be corrected as specified or as required in writing by the CSM.
- (i) The LSA shall prepare Process Control Procedures (PCP) for all processes to be utilized on this project and combine these in to a coherent Work Plan which describes in detail the LSAs schedule and plan to effectively execute these specifications and complete the Work.
- (j) The LSA shall provide written daily QC reports that present, in summary form, test data, work progress, surfaces covered, ambient conditions, quality control inspection test findings, and other information pertinent to the coating system installation. The LSA's QC manager shall certify the Work is in compliance with these specifications.
- (k) The LSA shall provide all the necessary environmental control required to complete the work and maintain the required environmental conditions (including air temperature and

humidity) including, but not limited to, shelters, enclosures, dehumidification equipment, fans, heating equipment, and fuels for all equipment at no additional cost to the City.

### E7.3 Minimum Contractor Quality Control Inspection Requirements

As part of its overall Quality Control program, the LSA shall conduct Quality Control inspections during the concrete resurfacing and coating system installation and record the results from those inspections. These daily inspection reports shall be provided to the Contract Administrator on a weekly basis. The LSA shall coordinate such inspections with the Contract Administrator such that the Contract Administrator may observe LSA's inspections or conduct separate independent Quality Assurance inspections on a scheduled basis. The minimum QC milestones shall be as follows:

- (a) Inspect all materials upon receipt to ensure that all are supplied by the approved manufacturer.
- (b) Provide specified storage conditions for the all materials, solvents, and abrasives.
- (c) Conditions Prior to Surface Preparation - Prior to coating application all surfaces shall be inspected by the LSA and any issues or conditions that would prevent compliance with this Section shall be brought to the attention of the City in writing.
- (d) If dry abrasive blast cleaning is required, a paper blotter test in accordance with ASTM D 4285 shall be performed by the LSA on each air compressor being used at the beginning of each work day and again once for every 4 hours worked to determine if the air is sufficiently free of oil to not produce detrimental effects on coating system adhesion.
- (e) Post Surface Preparation Cementitious Surfaces – Upon completion of the surface preparation, the LSA shall inspect for proper degree of surface preparation as specified in this Section and in the CSM's written instructions. Degree of surface preparation shall be in accordance with ICRI 310.2. This shall include inspecting for the achievement of the specified concrete surface profile in accordance with ICRI 310.2.
- (f) Post Surface Preparation Metallic Surfaces – Following initial blast cleaning, test for the presence of soluble salts using the retrieval and analysis method designated as Method 4.2.2, Adhesively Bonded Latex Patch or Cell as described in SSPC-TG 15 (2013). Testing shall be in accordance with ISO 8502-6/8502-9 at the rate of one (1) tests per metallic item.
- (g) Post Surface Preparation Metallic Surfaces – Following initial blast cleaning, measure the surface profile of the prepared surface in accordance with ASTM D4417.
- (h) Post Surface Preparation Metallic Surfaces – Upon completion of the surface preparation, the LSA shall inspect for proper degree of surface cleanliness as specified in this Section and in the CSM's written instructions. Degree of surface preparation shall be in accordance with ASTM D2200.
- (i) Unless stipulated otherwise by the CSM, after application of all cementitious resurfacing materials but prior to application of any polymer-based liners, perform concrete substrate moisture tests per ASTM D 4263 on the roof and wall. The plastic sheet test shall be performed to assure there is no moisture problem with the coating. The test shall be performed over the resurfaced concrete prior to lining to assure proper sealing of the plastic sheet to the substrate. Do not apply coating or lining materials until acceptable results are obtained. The presence of no moisture on plastic sheet constitutes an acceptable result.
- (j) pH testing of the concrete by the LSA shall be performed at the minimum rate of one test per every 10 square metres (or any part thereof) of surface area using Hydrion Insta-Check Jumbo 0-13 or equal. The paper shall be touched to the surface once using moderate pressure. The surface shall not be wiped or moved laterally to disturb the surface during pH testing. Following the one touch, lift the paper vertically to not "wipe" the surface. Compare the color indicated with the scale provided and record the pH.

When a dry substrate is encountered, the surface where the pH test is to be performed shall be sprayed lightly with distilled, de-ionized water from a commercially available spray bottle that has been properly rinsed to preclude any dissolved solids. The spray shall just

wet the surface to a "shiny" appearance and water shall not run. Wait 60 seconds to allow chemical equilibrium to be established and then test the pH of the water on the surface and record the value.

- (k) Environment and Site Conditions - Prior to commencing an activity associated with coating system installation, the LSA shall measure, record, and confirm acceptability of ambient air temperature, substrate surface temperature and relative humidity as well as other conditions such as proper protective measures for surfaces not to be coated at a minimum of once prior to the start of coating application and thereafter every two hours during coating application. Perform relative humidity measurements in accordance with ASTM E337. The acceptability of the weather and/or environmental conditions within the structure shall be determined by the requirements specified by the CSM of the coating system being used.
- (l) Provide correct mixing of all materials in accordance with the manufacturer instructions. If less than full kits are mixed, accurate measuring vessels or scales (depending on whether the materials are mixed by volume or weight) shall be used.
- (m) Conduct adhesion testing in accordance with ASTM C1583 at three (3) locations in the roof and three (3) locations on the wall on the cementitious resurfacing material applied to concrete substrates. The locations tested shall be equally distributed throughout the digester and shall be representative of all surfaces. Repair of these locations will be the Contractor's responsibility in accordance with the CSM's recommendations at no additional cost to the City. Each test location shall consist of three separate adhesion tests within a 300 mm by 300 mm area. The average of the three tests (excluding cohesive failure of the concrete) shall be reported as a single value. The Contractor shall be responsible for lining system removal and replacement in areas demonstrating unacceptable adhesion.
- (n) Monitoring of Coatings Application – The LSA shall inspect, measure, and record the wet film thickness and general film quality (visual inspection) for lack of runs, sags, pinholes, holidays, etc. as the application work proceeds. Perform WFT measurements in accordance with ASTM D4414 at a minimum rate of one measurement for every 1 square metre coated.
- (o) Post Application Inspection – The LSA shall identify defects in application work including pinholes, holidays, excessive runs or sags, inadequate or excessive film thickness and other problems as may be observed.
- (p) Verify curing of the coating in accordance with the manufacturer instructions.
- (q) Post Cure Evaluation – Upon completion of the lining system installation, surfaces shall be cleaned and prepared to permit close visual inspection by the Contract Administrator at any given location. Any and all deficiencies or defective work (not in compliance with this section or related sections) will be marked for repair or removal/replacement by the LSA at no additional cost to the City. Following cure, coatings and linings shall be measured for dry film thickness by the LSA. For concrete surfaces, this shall be performed in accordance with SSPC-PA 9 using ultrasonic thickness gauges calibrated in accordance with the instrument manufacturer's instructions. For carbon steel surfaces, this shall be performed in accordance with SSPC-PA 2. Any coating found to be below the specified DFT shall receive additional applications of the coating or lining or shall be removed or reapplied as required to meet the total DFT requirements specified in this Section.
- (r) Conduct high voltage holiday detection over 100% of coated surfaces in accordance with ASTM D4787 and follow the CSM's recommendations for appropriate voltage settings.
- (s) Conduct adhesion testing in accordance with ASTM D7234 in each Settling Tank at a minimum of three (3) locations on the roof and three (3) locations on the wall. The locations tested shall be representative of all surfaces. Repair of these locations will be the Contractor's responsibility in accordance with the CSM's recommendations at no additional cost to the City. Each test location shall consist of three separate adhesion tests within a 300 mm by 300 mm area. The Contractor shall be responsible for lining system removal and replacement in areas demonstrating unacceptable adhesion.
- (t) Follow-up to corrective actions and Final Inspection. The LSA shall measure and re-inspect corrective coating work performed to repair defects identified at prior Hold Points. This

activity also includes final visual inspection along with follow-up tests such as holiday detection, adhesion tests, and DFT surveys.

#### E7.4 Inspection by the CSM

The Contractor shall provide and coordinate the work such that a Technical representative from the CSM shall perform Hold Point inspections in Digester No. 11 with a superintendent from the Contractor and a representative from the Contract Administrator. The required Hold Point inspections will be as follows:

- (a) Inspection of the surface preparation of the concrete surfaces prior to application of any materials.
- (b) Initial application of the concrete restoration materials prior to lining materials application.
- (c) Initial application of the concrete resurfacing materials prior to spray application of any lining materials over the resurfacing material or concrete restoration materials.
- (d) Final application of the resurfacing and concrete restoration materials prior to epoxy lining spray application work.
- (e) Initial inspection of spray application of the epoxy lining material.
- (f) Final inspection of the spray applied epoxy lining material.
- (g) Overall inspection of the completed lining and coating work to identify repair work. This must include witnessing of both discontinuity testing and adhesion testing.
- (h) Final inspection of all lining and coating work following repairs made by the LSA. The Technical representative from the CSM must provide a letter to the Contractor to be submitted to the City that states that the work inspected by the CSM for each Hold Point met the CSM's requirements. The Technical representative cannot be a regional or national sales or marketing representative of the CSM, but rather a technical service representative experienced with the products specified and applied for this project.

### E8. SUBMITTALS

- E8.1 Submit required submittals to the Contract Administrator promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Schedule and no claim for extension by reason of such default is allowed.
- E8.2 Submit 6 hard copies or 1 electronic copy of each submittal, test report, certificates, and manufacturer's instructions as requested in the specifications and as Contract Administrator may reasonably request.
- E8.3 Do not proceed with Work affected by submittal until review is complete.
- E8.4 Review submittals prior to submission to the Contract Administrator. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- E8.5 Notify Contract Administrator, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviation.
- E8.6 Verify that field measurements and affected adjacent Work are co-ordinated.
- E8.7 Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrators review of submittals.
- E8.8 The review of submittals by the Contract Administrator is for the sole purpose of ascertaining conformance with the general concept. The review does not relieve the Contractor of responsibility for errors or omissions or of responsibility for meeting requirements of the Work.

- E8.9 Contractor's responsibility for deviations in submission is not relieved by Contract Administrators review of submittals.
- E8.10 Adjustments or comments made on any submittals by the Contract Administrator are not intended to change the Contract Price. If adjustments affect the value of the Work, state such in writing to the Contract Administrator prior to proceeding with the work.
- E8.11 Make changes as required by the Contract Administrator
- E8.12 Keep one reviewed copy of each submission on site.
- E8.13 Allow 10 days for Contractor Administrator's review of each submission.
- E8.14 Submit the following:
- (a) A detailed work plan including scope of work, methods of staging, equipment and methods to be used for cleaning and coating application, contingencies and a bar chart schedule which shall include at a minimum:
    - (i) Mobilization
    - (ii) Erection of staging/scaffolding (Certified by a P.Eng.)
    - (iii) Protection
    - (iv) Containment
    - (v) Surface preparation
    - (vi) Concrete crack treatment
    - (vii) Lining and coating application
    - (viii) Air tightness testing procedure
    - (ix) Quality Control and Testing
    - (x) Clean-up
    - (xi) De-mobilization
  - (b) Quality Control Plan that includes an I&TP and PCP's for all of the Work and complies with Paragraph E7E7.1(d).
  - (c) Manufacturer's current printed recommendations and product data sheets for all products including performance criteria, surface preparation and application requirements, volatile organic compound (VOC) data, and safety requirements.
  - (d) Material Safety Data Sheets (MSDS) for any materials brought on-site including all coating materials, solvents, abrasive blast media or any other materials intended to be used for the work specified.
  - (e) Storage requirements including temperature, humidity, and ventilation for all materials to be used for the specified work.
  - (f) Submit applicators' certification that materials comply with federal, provincial, and local regulations for VOC (Volatile Organic Compounds).
  - (g) Submit letter(s) certifying that surfaces to be treated have been prepared in accordance with manufacturer's printed instructions and are ready for installation work, citing location thereof. Marked-up drawings that show location of work will be submitted to show the location of the work.
  - (h) Submit letter signed by CSM certifying that submitted products are suitable for application on the surfaces to be treated and for the service conditions.
  - (i) Submit certification that the entity installing the coating/lining system is an approved applicator of the CSM for the specified coating system.
  - (j) Submit (with Tender package) documentation evidencing work experience of project superintendent, supervisors, abrasive blasters, and lining applicators.
  - (k) Submit letter(s) certifying that all of the LSA's application personnel received hands-on training by the CSM in accordance with Clause E7.1(d).

- (l) Submit all ten (10) letters from the CSM's Technical representative for Hold Point inspections as required in Clause E7.4. All letters are to be submitted prior to further work being initiated including application of the next materials in the coating or lining systems.
- (m) Submit written letter of approval from CSM, product data sheets, and material safety data sheets for concrete restoration curing compound products to be used on this project.
- (n) 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. 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 Division website at:  
<http://www.winnipeg.ca/matmgt/Safety/default.stm>
- (o) Submit the scaffold plan for the project such that it can be reviewed by the Contract Administrator a minimum of 10 days prior to the planned scaffold installation.
- (p) Submit the procedure for air testing Digester 11 in accordance with CSA B149.6 such that it can be reviewed by the Contract Administrator a minimum of 21 days prior to the planned air test.

## **E9. DELIVERY AND STORAGE**

- E9.1 Materials shall be stored in enclosed structures and shall be protected from weather and excessive heat or cold. Flammable materials shall be stored in accordance with Provincial and Local codes. Materials exceeding storage life recommended by the manufacturer shall be removed from the site. Cold storage or heated storage to be provided by the Contractor if required to ensure proper storage of the materials.
- E9.2 Store all materials only in areas designated by the City solely for this purpose. Confine mixing, thinning, associated operations, clean up and storage of materials and related debris to authorized areas. All materials are to be stored on pallets or similar storage/handling skids off the ground in sheltered areas in which the storage temperature is maintained in accordance with the manufacturer recommendations.
- E9.3 Mix all materials in various areas as needed to complete the work. These enclosed areas must protect the mixing operation and materials from direct sunlight, inclement weather, freezing, or other means of damage or contamination. Protect all other concrete and metallic surfaces and finishes from any spillage of material(s) within the mixing area. Protect the ground from splash or spillage of all materials using plastic, drop cloths and other appropriate materials.
- E9.4 Do not use any process drains or storm drains within the treatment facility for disposal of waste or materials.
- E9.5 The Contractor shall take all precautions and implement all measures necessary to avert potential hazards associated with all materials as described on the pertinent Material Safety Data Sheets and container labels.
- E9.6 Deliver all materials to the job site in their original, unopened containers. Each container shall bear the manufacturer's name and label.
  - (a) Labels on all material containers must show the following information:
    - (i) Name or title of product.
    - (ii) Federal specification number if applicable.
    - (iii) Manufacturer's batch number and date of manufacture.
    - (iv) Manufacturer's name.
    - (v) Generic type of material.
    - (vi) Application and mixing instructions.
    - (vii) Hazardous material identification label.
    - (viii) Shelf life date.

- (ix) Storage requirements.
- (b) All containers shall be clearly marked indicating any personnel safety hazards associated with the use of or exposure to the materials.
- (c) All materials shall be handled and stored to prevent damage or loss of label.

## **E10. COORDINATION OF WORK**

### **E10.1 Work Areas:**

- (a) The work areas on the job site will be designated by the City. The Contractor's personnel shall not be permitted in any area other than those expressly designated by the City.

### **E10.2 Use of Facilities:**

- (a) The City will make available a hydrant from which the Contractor may obtain potable water. The hydrant will be metered and the Contractor will be required to pay for supply and disposal of the volume of water used.

## **E11. SAFETY**

E11.1 General - Personnel safety is the Contractor's responsibility. The Contractor is responsible for assuring compliance with all applicable federal, provincial, and local safety requirements and the Contractor's own approved Safe Work Plan.

E11.2 The Contractor's work forces should comply with any and all applicable federal, provincial, and local regulations and the provisions outlined in the following documents:

- (a) SSPC-PA 10 - "Guide to Safety and Health Requirements for Industrial Painting Projects"
- (b) NACE Publication - "A Manual for Painter Safety"
- (c) Fall Protection – CSA Z259.
- (d) Management of Work in Confined Spaces – CSA Z1006

E11.3 The Contractor shall provide personnel with all safety equipment necessary to protect them during any phase of the work. This shall include, but not be limited to safety glasses, face shields, fresh air breathing hoods, goggles, earplugs, hard hats, steel toed work shoes, appropriate protective clothing, gloves, and plant approved respirators where required.

E11.4 Keep any flammable materials such as solvents, thinners, coating or sealant materials away from open flames, sparks or temperatures higher than 38°C (100°F). Drums containing flammable materials will be properly grounded at all times. Only small quantities of solvents for smoothing the lining will be allowed inside containment enclosures or permitted confined spaces during installation work.

E11.5 Power tools are to be in good working order to avoid open sparking. All electrical tools used on this project will be equipped with ground fault interrupters (GFIs).

E11.6 The Contractor shall fireproof all work areas by maintaining a clean work area and having Underwriter's Laboratories of Canada approved fire extinguishers on-hand. The Contractor shall furnish these fire extinguishers.

E11.7 Workers doing abrasive blasting or water jetting operations shall wear a fresh air supplied protective helmet and hood and personal protective clothing acceptable to industry standards and all government regulations.

E11.8 Dispose of rags used for wiping up coating materials, solvents, and thinners by drenching them with water and placing in a metal container with a tight fitting metal cover. Complete this disposal process at the end of each day. Remove these materials from the plant site at the end of every shift. Final disposal of these materials is the Contractor's responsibility.

- E11.9 Matches, flames, or sparks resulting from any source including welding, must be remote from the work area during coating work. Smoking is only permitted in areas designated by the City.
- E11.10 The Digester is considered a confined space requiring a confined space permit and attendant. Anyone entering the Digester will be required to have:
- (a) Confined Space Training
  - (b) Respiratory Medical and Respirator Fit Testing
  - (c) Personal Gas Meters: Testing for Hydrogen Sulphide (H<sub>2</sub>S), Oxygen (O<sub>2</sub>), Methane (LEL) and Carbon Monoxide (CO), and exposivity.

## **E12. JOB CONDITIONS**

- E12.1 The jobsite is an operating wastewater treatment facility that will continue to operate prior to and during the work specified herein. No work performed by the Contractor shall interrupt plant operations.

## **E13. CLEANING**

- E13.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by City or other Contractors not associated with this project.
- E13.2 Reuse and recycle the maximum amount of waste as possible.
- E13.3 Remove waste material from site at daily

## **E14. WARRANTY**

- E14.1 Contractor's Warranty:
- (a) For a period of five (5) years from the date of substantial completion, the Contractor warrants to the City that the concrete restoration and lining installation work provided under this specification Section conforms to these specifications and is free from defects in materials and workmanship. The date of Substantial Performance shall be concurrent with the date of the final inspection indicated in Clause E31, provided the requirements of said clause have been accomplished by the Contractor. The Contractor shall repair or replace, at the sole option of and at no cost to the City, any work found to be defective within said warranty period. Such repair or replacement shall include the cost of removal and reinstallation of the material, cleaning and emptying of the Digester, scaffolding, testing, and Consultant fees to oversee the work.
  - (b) The quality of both materials and workmanship for the installed concrete restoration and lining work shall be the sole responsibility of the Contractor. It is hereby warranted that should these installed materials delaminate, disbond, crack cohesively, blister, or otherwise fail due to improper surface preparation, improper mixing or application, or lack of proper cure of the materials due to inadequate control of substrate or ambient conditions within the structures by the Contractor or due to a lack of quality of the materials provided by the Coating System Manufacturer, the Contractor shall be solely responsible for performing and or paying for the repair or replacement work required by the City to remedy the failed materials and workmanship to meet the original requirements of this Section and all contract drawings at no cost to the City and at the City's convenience. This warranty further stipulates that any incompatibility with or error in formulation or manufacturing of the restoration or lining materials installed which results in an installed restoration or lining material failure be and remain a financial matter strictly between the Contractor and the Coating System Manufacturer. The financial responsibility and accountability for such a material related failure would remain solely with the Contractor with respect to this warranty made to the City.
  - (c) The Contractor guaranties to replace or repair defective work for which he is accountable in an expeditious manner at the City's convenience and at no cost to the City. Any failure of

the installed restoration or lining materials which results from mechanical or physical damage from plant maintenance or process work performed by the City, or other conditions which are not considered normal to the digester operation will not be the Contractor's responsibility for repair or replacement under this warranty to the City.

**E14.2 Coating System Manufacturer's Warranty:**

- (a) The Contractor shall obtain from the manufacturer its warranty that the restoration and lining products provided will be free from defects in formulated or manufactured material quality which could cause the installed work to fail. Said warranty, containing no exclusions or limitations, shall be in a form acceptable to, and for the benefit of the City, and shall be submitted by the Contractor as a condition of final payment. The Coating System Manufacturer's Warranty shall be provided on the CSM's letterhead and shall be signed and dated by a company officer of the CSM.

**E14.3 Warranty Period Inspections:**

- (a) The City shall perform periodic inspections (as operating conditions permit) within the established warranty periods to determine the need for remedial work as required under f this Section.
- (b) The Contractor is encouraged to participate in each periodic inspection, however mandatory contractor attendance shall be required only one time, at a date to be established by the owner prior to expiration of the Contractor warranty. The City shall notify the Contractor thirty (30) days prior to the required mandatory inspection.

**E15. MANUFACTURER**

**E15.1** The following Coatings, Linings and Resurfacing Materials and Manufacturers are approved for this project:

Resurfacing materials, protective lining and coating materials and concrete restoration products shall be provided by Tnemec Company, 123 W. 23rd Avenue, Kansas City, MO 64116, or approved substitute in accordance with B7. Local contact Ron Garrett – (780) 292-6090.

**E16. APPROVED MATERIALS**

**E16.1** Coating, Lining and Repair Materials

- (a) Crack Repair – Tnemec Series 215 surfacing epoxy with TnemeTape or approved substitute in accordance with B7.
- (b) Metallic Surfacer – Tnemec Series 215 surfacing epoxy or approved substitute in accordance with B7.
- (c) Concrete Resurfacer (Concrete Repair Mortar) – Tnemec Series 217 cementitious repair mortar or approved substitute in accordance with B7.
- (d) Concrete Filler/Surfacer – Tnemec Series 218-1000 epoxy modified cementitious mortar or approved substitute in accordance with B7.
- (e) Lining – Tnemec Series 436 fiber-reinforced modified polyamine epoxy or approved substitute in accordance with B7.
- (f) Lining – Tnemec Series 435 modified polyamine epoxy or approved substitute in accordance with B7.

**E16.2** Abrasive Material

- (a) Abrasive Blast Media shall comply with SSPC AB1. Contractor may use any supplier approved by Contract Administrator in accordance with B7.
  - (i) The Contractor shall utilize blast media free of all chlorides or other materials which may contaminate or become imbedded in the profile of the metallic or concrete substrates.

- (ii) The blast media shall be of a size and shape capable of producing the specified concrete surface profile on metallic and concrete substrates.
- (iii) Blast media shall be used once. No recycling of blast media will be permitted.

## **E17. GENERAL EXECUTION REQUIREMENTS**

### **E17.1 Scaffolding System Erection and Access Requirements**

- (a) The scaffolding must meet minimum code requirements in CSA Z797 and Part 28, sections 28.3 and 28.4 of the WSH Regulation.
- (b) The scaffolding system shall have the following types of platforms and platform elevations from the digester ceiling and between platforms to provide safe and adequate access for the concrete repair and lining work:
  - (i) Entire platform for full access to digester ceiling – top of platform elevation approximately 7'-0" or 2.2 metres from bottom of digester ceiling at low point (digester wall to ceiling junction). The platform shall be designed and erected in a manner that reduces or eliminates trip hazards. In the event trip hazards cannot be eliminated in their entirety, all such hazards shall be clearly marked and/or modified as directed by the Contract Administrator. Marking and modification may include; spray painting with fluorescent paint, caution tape, or extending scaffolding components (i.e. posts) to a minimum of 1.0 metres above the base of the platform.
  - (ii) Partial circumferential platforms to provide access to the interior walls of the digester and SHT along the entire work area. The vertical distance between platforms shall be approximately 2200 mm and approximately the horizontal distance of 460 mm off the digester walls. The top of the first platform below the bottom of the ceiling platform shall be 2200 mm below the bottom of the ceiling platform.
  - (iii) Platforms which provide access around the entire circumference and full height of the columns which support the ceiling shall be provided and located at the same elevations as the partial circumferential platforms for the digester wall access. The distance between the scaffold platform and all faces of the columns shall not exceed 460 mm.
- (c) The scaffolding system shall include two (2) stairwells or towers which meet all pertinent scaffolding safety requirements to be located approximately 180 degrees apart. One stair tower shall be located just to one side or the other from the existing access manway. All scaffolding materials shall be installed using the existing manway for access and egress.
- (d) The scaffolding system shall provide sufficient framing and removable platform panels at the ceiling platform and all partial circumferential platforms for safe operation of an electric or pneumatic powered hoist with the capacity of lifting or lowering at least 45 kg at one time. The removable panels must be at least 1220 mm x 1220 mm. The removable panels shall be aligned such that direct access to the floor can be achieved from the upper most platform. Two (2) hoisting areas will be required, each within 3000 mm of each stair tower.
- (e) Erect the scaffolding system to ensure that the necessary minimum load support capacity, strength, rigidity, and durability are provided to reliably support the concrete repair and lining work.
- (f) Shoring shall be installed securely against the digester floor slab to provide sufficient support to scaffolding system for all dead and live loads during construction. However, it shall not be wedged, or jacked in such a way that floor slab is deformed, destabilized, or damaged.
- (g) Lateral bracing/anchorage shall be provided as required to maintain stability of the scaffolding system. Shoring shall have sufficient strength and rigidity to withstand loads and vibrations caused by construction operations during repair and lining work in the digester. When outriggers or lateral bracing is used or removed and reinstalled for the scaffolding system, a neoprene pad or similar material shall be placed between the digester wall and the outrigger pad to protect the concrete repair work or new lining from damage. Bracing will have to be removed and reinstalled as work progresses.

- (h) Adjustment of the scaffolding system shall be performed if necessary to maintain support for the structure as construction progresses.
- (i) Scaffolding shall bear against the structure only at areas of sound concrete.

**E17.2 Initial Inspection Of Surfaces To Be Lined:**

- (a) The Contractor shall assure that the LSA examines the areas and conditions under which the protective coating Work is to be performed in accordance with NACE SP0892, Table 1 and SSPC-SP13/NACE No. 6, and notifies the Contract Administrator in writing of conditions detrimental to the proper and timely completion of the Work. It is the responsibility of the LSA to inspect and report unacceptable surface conditions to the Contract Administrator prior to the commencement of surface preparation activities. Unacceptable surface conditions are defined as the presence of deteriorated substrates with deep depressions or other substrate conditions not acceptable for quality coating or lining material application.
- (b) Commencement of the Work shall be an indication that the Contractor and the LSA believe that the substrate and other conditions of installation are acceptable to the Contractor and the LSA, and will produce a finished product meeting the requirements of the Specifications and Drawings. All defects resulting from accepted conditions shall be corrected by Contractor at their own expense.

**E17.3 Removal of Shell Attachments:**

- (a) All piping supports, ladders, handholds or other items bolted to the shell and roof of the Digester; shall be removed prior to surface preparation and reinstalled by the Contractor at the completion of the Work. Any temporary support required to prevent damage to the piping shall be provided by the Contractor for the duration of the project.

**E17.4 Air Tightness Testing:**

- (a) After completion of surface preparation, crack repair, application of the Tnemec Series 217 and application of the Tnemec Series 218 but prior to the application of the epoxy lining system, the Contractor shall conduct air testing of the digester in accordance with CSA B149.6 and the following procedure.

**E17.5 Environmental**

- (a) Comply with CSM's recommendations regarding environmental conditions under which the specified materials may be applied and cured.
- (b) Contractor is responsible for all environmental controls necessary to maintain the CSM's recommended environmental conditions throughout the duration of the project. These controls include but are not limited to enclosure, heating with indirect fired heaters, dehumidification, etc.
- (c) Do not apply materials when dust is being generated.
- (d) The Contractor shall provide all temporary lighting inside the structure and at all levels of the scaffold during the work equivalent to 200 foot candles per Table 1 of SSPC-Guide 12.

**E17.6 Protection**

- (a) Cover or otherwise protect finish work or other surfaces not being coated.
- (b) Do not coat over nameplates, tagging or other identification devices on equipment, piping, etc.
- (c) Erect and maintain protective tarps, enclosures and/or masking to contain debris generated during any and all work activities from adversely affecting personnel or property outside the work area. This includes, but is not limited to, the use of dust/debris collection apparatus as required.
- (d) Provide protection of the Digester's internal piping during abrasive blast cleaning and concrete restoration material and lining installation work to prevent over blast cleaning of ductile iron substrates and to prevent application of the concrete restoration or protective

lining materials from being applied on the pipe surfaces where not specifically required by these specifications.

- (e) Cover or otherwise protect all scaffolding components from damage caused by waterjetting and/or abrasive blasting.
- (f) Protect drains during waterjetting or for cleaning and all water from these processes to be pumped out and properly disposed of by the Contractor.
- (g) Cover or otherwise protect all scaffolding components from damage or accumulation resulting from application of resurfacing and epoxy lining materials.

#### E17.7 Enclosures

- (a) Provide the following per SSPC-Guide 6 based on surface preparation method:
  - (i) Class 2A – Containment A2, B1, C2, D1, E2, Ventilation F2, G2, H2, I1, J1, Level 2 Emissions.
  - (ii) Class 2W – Containment A2, B3a, C2, D1, E3, Ventilation F2, G2, H3, I2, J2, Level 2 Emissions.
  - (iii) Class 3P – Containment A2, B2a, C3, D2, E4, Ventilation F2, G2, H3, I2, J2, Level 2 Emissions.

#### E17.8 Thinners and Solvents

- (a) The Contractor shall use only solvents and thinners approved by the CSM.

### **E18. LINING SYSTEM TERMINATION DETAILS**

- E18.1 Prior to performing overall surface preparation work on steel and concrete substrates, perform all work necessary to complete all detail treatment for lining system termination as shown on the attached detail drawings. The following table defines all of the terminations which were identified and the drawing with which the termination detail must comply. The Contractor shall be responsible for verifying that no additional termination details are required. Any terminations that are not included in the following table, shall conform to the standard termination details required by the CSM. Drawings of these additional terminations and CSM's approval shall be submitted to and approved by the Contract Administrator.

<b>Digester 11</b>				
Location	Number	Size (Approx.)	Description	Drawing Reference
Roof	3	24 in. dia.	Flush SS penetrations. Two north of the gas dome and 1 south.	Section 2
Roof	2	18 in. dia.	Flush stainless SS penetrations.	Section 2
Roof	2	12 in. dia.	Flanged CS pipes projecting approx. 36 in.	Section 3
Roof	2	24 in. dia.	Flush SS penetrations adjacent to the wall on opposite sides of the tank.	Section 2
Roof	1	48 in. dia.	Flush SS penetration adjacent to east wall.	Section 2
Roof	1	6 in. dia.	Flush SS penetration.	Section 2
Roof	1	7 ft. square	Gas dome in approximate center of roof.	Section 4
Gas Dome	1		Embedded angle at top edge of dome.	Section 4
Gas Dome	1		Square flange plate around pipe penetration.	Section 4
Shell	3	8 in. dia.	Flanged SS penetration. Approx. 8 in. projection.	Section 3
Shell	6	8 in. dia.	Apparent CI penetrations. Approx. 6 in. projection.	Section 3
Shell	1	8 in. dia.	Bell joint for 8 in. CI or CS pipe embedded in wall.	Section 3
Shell			Termination at the coating line three (3) metres down shell.	Section 6
Roof/Shell			All interior corners	Section 5
Roof/Shell			All exterior corners	Detail A

E18.2 All lining system details must be inspected and approved by the Contract Administrator prior to the commencement of lining system installation work.

**E19. CONTROL OF AMBIENT CONDITIONS**

E19.1 It shall be the Contractor's responsibility to control ambient conditions within the digester via protective enclosures, heating/ventilation and/or dehumidification apparatus during surface preparation, application, and curing, to meet the specified conditions or conditions recommended by the CSM for application and curing of the specified materials.

E19.2 The minimum ambient condition requirements for application work shall be in strict accordance with CSM's written recommendations.

E19.3 The Contractor shall provide all means necessary to exhaust harmful gases/fumes, dust and odors during execution of the work specified herein. No dust generation shall be allowed during inspection or coating or lining or concrete restoration material application.

**E20. SURFACE PREPARATION REQUIREMENTS**

E20.1 General

- (a) All previous coatings (with the exception of residue within cracks or voids) have been removed from both structures with the exception of 4 test patches, each approximately 0.4 square metres, on the roof. The Contractor shall completely remove the coating from these voids, cracks and test patches as a part of the concrete surface preparation.

- (b) All specified surface preparation shall be performed in accordance with the latest version of the SSPC, NACE and ICRI standards referenced herein. Employ methods as specified herein to ensure that the degree of cleanliness and surface profile for all substrates, as specified herein, are attained.
- (c) Perform field quality control inspection and testing as specified herein.
- (d) Remove all debris from the surfaces to be restored, resurfaced, lined or coated by pressure washing and vacuum cleaning. Blow down cleaning will not be acceptable.
- (e) If between final surface preparation work and lining system application, contamination of the prepared and cleaned substrates occurs, or if the prepared substrates' appearances darken or change color, re-cleaning shall be required until the specified degree of cleanliness is reclaimed.
- (f) The Contractor is responsible for dust control and for protection of mechanical, electrical, and all other equipment within, adjacent to and surrounding the work area as specified. The Contractor shall protect existing equipment and structures within the work area as specified.
- (g) Cleaning, surface preparation and material application shall be scheduled so that dust and spray from the cleaning process will not fall on wet, newly resurfaced or coated substrates.
- (h) The Contractor shall be responsible for cleaning of only those surfaces to be resurfaced or coated or those surfaces on which his work has caused contamination.

#### E20.2 Concrete Surface Preparation

- (a) Use methods as specified herein and as delineated in SSPC-SP 13/NACE 6 and ICRI Guideline No. 310.2 to prepare concrete surfaces to produce a sound, clean substrate free of all carbonated concrete, laitance, surface contaminants, loose materials, or substances otherwise deleterious to good lining system adhesion. Leaving shelled over, hidden air voids ("bugholes") beneath the exposed concrete surface will not be acceptable. All bugholes are to be completely opened up by surface preparation.
- (b) Surface preparation (regardless of method chosen) shall produce a minimum uniform and minimum substrate concrete surface profile of CSP 6 in accordance with ICRI 310.2.
- (c) All abandoned, metallic components embedded in the concrete such as small pipes, threaded rods, dowels, etc., with the exception of the exposed reinforcing bar chairs exposed in the roof, shall be torch cut or ground below the existing concrete surface. These metallic components shall be cleaned to the equivalent of an SSPC SP 5 White Metal Blast Cleaning.
- (d) Acceptable surface preparation (regardless of method chosen) must produce a minimum concrete surface pH in accordance with Paragraph E29. If the pH is not acceptable, additional concrete removal will be required to achieve the target pH. Follow Paragraph E7.3 for pH testing requirements.
- (e) All phases of surface preparation work specified herein must be approved by the Contract Administrator before the Contractor proceeds with the subsequent phases of the surface preparation or coating and lining application work.
- (f) Regulators, gauges, filters, and separators will be in good working order for all of the compressor air lines to blasting nozzles at all times during this work.
- (g) The quality, volume, and velocity of life support and ventilation air used during surface preparation shall be in accordance with applicable safety standards to ensure adequate air volume, and dissipation of airborne debris that would adversely affect the health of the public or personnel working for the Contractor, Subcontractors, City, Contract Administrator, or anyone who may be affected by on-site work activities.
- (h) The Contractor must provide adequate ventilation for airborne particulate evacuation and lighting (meeting all pertinent safety standards) to optimize visibility for both blast cleaning and inspection of the substrate during surface preparation work.

#### E20.3 Carbon Steel Surface Preparation

- (a) Pressure wash all surfaces scheduled to be lined using clean, potable water at a minimum of 3,500 psi and a rotating nozzle.
- (b) Power tool clean all welds and weld areas to remove slag, weld spatter, and other surface debris associated with welding. Also, use appropriate power tools to remove all sharp edges and protrusions from welds which could compromise coating coverage or coating film quality.
- (c) Solvent wipe per SSPC-SP 1 to remove all grease or oils if present.
- (d) Initial Blast Cleaning: Prepare all steel surfaces in accordance with SSPC-SP5/NACE 1 White Metal Blast Cleaning Standard and provide a minimum 3.0 mil surface profile.
- (e) Vacuum clean abrasive blast cleaned surfaces. Sweeping or blowing down the surfaces will not be permitted.
- (f) Following initial blast cleaning of the existing steel substrates, test for the presence of soluble chloride and sulfate ions in accordance with Paragraph E7.3. If the soluble salts exceed the limits in E29, apply CHLOR\*RID in strict accordance with the manufacturer's recommendations followed by thorough pressure washing with copious amounts of potable water. Allow substrate to dry and retest for soluble chlorides and sulfates. Once testing gives acceptable results as described above, repeat abrasive blast cleaning to meet the specified degree of cleanliness and surface profile requirements defined above.
- (g) Abrasive blast cleaned surfaces shall be coated prior to the formation of visible rust. If visible rust-back occurs, the Contractor shall be responsible for reclaiming the specified degree of cleanliness at no additional cost to the City.

#### E20.4 Stainless Steel Surface Preparation

- (a) Pressure wash all surfaces scheduled to be lined using clean, potable water at a minimum of 3,500 psi and a rotating nozzle.
- (b) Power tool clean all welds and weld areas to remove slag, weld spatter, and other surface debris associated with welding. Also, use appropriate power tools to remove all sharp edges and protrusions from welds which could compromise coating coverage or coating film quality.
- (c) Solvent wipe per SSPC-SP 1 to remove all grease or oils if present.
- (d) Initial Blast Cleaning: Prepare all stainless steel surfaces in accordance with SSPC-SP 16 Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals Standard and provide a minimum 3.0 mil surface profile.
- (e) Vacuum clean abrasive blast cleaned surfaces. Sweeping or blowing down the surfaces will not be permitted.
- (f) Following initial blast cleaning of the existing steel substrates, test for the presence of soluble chloride and sulfate ions in accordance with Paragraph E7.3. If the soluble salts exceed the limits in E29, apply CHLOR\*RID in strict accordance with the manufacturer's recommendations followed by thorough pressure washing with copious amounts of potable water. Allow substrate to dry and retest for soluble chlorides and sulfates. Once testing gives acceptable results as described above, repeat abrasive blast cleaning to meet the specified degree of cleanliness and surface profile requirements defined above.

#### E20.5 Ductile or Cast Iron Surface Preparation

- (a) Pressure wash all surfaces scheduled to be lined using clean, potable water at a minimum of 3,500 psi and a rotating nozzle.
- (b) Solvent wipe per SSPC-SP 1 to remove all grease or oils if present.
- (c) Initial Blast Cleaning: Prepare all ductile or cast iron surfaces in accordance with NAPF 500-03, NAPF 500-03-04, and NAPF 500-03-05, Standard and provide a minimum 3.0 mil surface profile.
- (d) Vacuum clean abrasive blast cleaned surfaces. Sweeping or blowing down the surfaces will not be permitted.

- (e) Following initial blast cleaning of the existing steel substrates, test for the presence of soluble chloride and sulfate ions in accordance with Paragraph E7.3. If the soluble salts exceed the limits in E29, apply CHLOR\*RID in strict accordance with the manufacturer's recommendations followed by thorough pressure washing with copious amounts of potable water. Allow substrate to dry and retest for soluble chlorides and sulfates. Once testing gives acceptable results as described above, repeat abrasive blast cleaning to meet the specified degree of cleanliness and surface profile requirements defined above.

## **E21. SURFACE PREPARATION METHODS**

### **E21.1 Wet or Dry Abrasive Blast Cleaning:**

- (a) Pressure wash all concrete surfaces to receive lining.
- (b) Used or spent blast abrasive shall not be reused on the work covered by this section.
- (c) The compressed air used for blast cleaning will be filtered free of oil and moisture. Traps will be cleaned at least once every two hours or more frequently as is appropriate.
- (d) Oil separators shall be installed just downstream of compressor discharge valves and at the discharge of the blast pot discharges. Oil separators shall be cleaned at least once every four hours or more frequently as is appropriate.
- (e) A paper blotter test shall be performed by the Contractor when requested by the Contract Administrator to determine if the air is sufficiently free of oil to not produce detrimental effects on coating system adhesion.
- (f) The abrasive blast nozzles used shall be the venturi or other high velocity type supplied with a minimum of 100 psig air pressure and suitable volume to obtain the required blast cleaning production rates and specified degrees of cleanliness.
- (g) Following abrasive blast cleaning, thoroughly pressure wash all concrete and restored concrete surfaces (those to be lined and those not to be lined) to remove all loose dust, dirt, spent abrasive, and all other debris leaving a clean, sound, dust free concrete or repair material substrate. Washing shall start at center of roof and proceed down to side walls and from top to bottom of side walls, and onto all floor surfaces. All debris shall be cleaned and removed from the digester floor prior to the start of relining work. In addition, pressure wash all scaffolding platforms, stair tower surfaces, all pipes and pipe supports, and all other digester and scaffolding surfaces to remove all loose dirt, debris, etc.
- (h) Following pressure washing, thoroughly vacuum clean all concrete surfaces to be lined to remove all loose dust, dirt, and spent abrasive leaving a dust free, sound concrete or concrete repair material substrate. Allow concrete surfaces to dry thoroughly prior to application of any lining materials. Following application, all cementitious concrete repair or restoration materials shall be either wet cured for at least 7 days or cured with two coats of water based curing compounds for the time required by the CSM prior to being abrasive blast cleaned before the application of any lining materials. The curing compounds used must be approved in writing by the CSM. Pigmented curing compounds can be used and when post cure abrasive blast cleaning is performed, all evidence of the pigmented curing compounds must be removed. The restoration materials must be abrasive blast cleaned prior to lining application.

### **E21.2 Water Jetting**

- (a) It is the intent of this Specification that all concrete surface preparation be done with Ultrahigh-Pressure Water Jetting (UHP WJ) at a minimum pressure of 210 MPa.
- (b) UHP WJ shall produce the degree of cleanliness and surface profile as specified.
- (c) Use only clean, potable water. Use of plant service water is strictly prohibited.

## **E22. RESURFACING MATERIAL SURFACE PREPARATION REQUIREMENTS**

- E22.1 In all areas where the Tnemec Series 217 or approved substitute in accordance with B7 is to be topcoated with the Tnemec Series 218-1000 or approved substitute in accordance with B7, after

curing of the Tnemec Series 217 or approved substitute in accordance with B7 and prior to the application of the topcoats, prepare the Tnemec Series 217 or approved substitute in accordance with B7 surfaces by lightly sweep blasting to remove all loose material and laitance and achieve a minimum concrete surface preparation of CSP 3 and thoroughly vacuum clean.

- E22.2 Once installed, resurfacing materials shall be prepared to produce the same degree of cleanliness and surface profile as non-resurfaced concrete surfaces unless cementitious epoxy or epoxy resurfacing materials are used.
- E22.3 Prior to the application of the lining, resurfacing material recoat limitations (if any) shall not be exceeded.
- E22.4 If the thickness of resurfacing required is greater than that indicated herein, such resurfacing shall be provided and installed at no additional cost to the City.

### **E23. GENERAL RESURFACER/COATING APPLICATION REQUIREMENTS**

#### **E23.1 Material Systems**

- (a) Field coats shall consist of one or more prime coats and one or more finish coats to build up the coating to the specified dry film thickness. Unless otherwise specified, coatings shall not be applied until previously applied coats have been inspected.
- (b) Repair materials shall be applied at the thicknesses required to restore surface continuity without interruption or alteration to pitch or slope. Unless otherwise specified, linings shall not be applied until all repair work has been inspected.
- (c) The completed lining work shall provide a satisfactory film and smooth even surface. Materials shall be thoroughly stirred, strained (as required) and kept at a uniform consistency during application. Materials consisting of two or more components shall be mixed in strict accordance with the manufacturer's instructions. The volatile organic content (VOC) of any material (as applied) shall comply with prevailing air pollution control regulations. Unless otherwise specified, materials shall not be thinned or reduced beyond manufacturer recommendations to obtain the proper application characteristics. Thinners (as applicable) shall be as recommended by the specific material manufacturer.

#### **E23.2 General Requirements**

- (a) It is the intent of these specifications that the roof and top 4 metres of the Digester 11 wall where the deep attack (greater than 13 mm of material to restore the concrete's original surface profile) shall be repaired with the Tnemec 217 or approved substitute in accordance with B7 and then the entire surface shall be lined with the 218-1000 or approved substitute in accordance with B7 in accordance with the specifications.
- (b) Products shall not be used until the Contract Administrator has inspected the materials; the CSM's representative has instructed the Contractor and the Contract Administrator in the surface preparation, mixing, and application of products.
- (c) Surfaces not to be coated shall be masked using duct tape or other protection materials to prevent these surfaces from being coated or lined.
- (d) The Contractor must follow the minimum and maximum recoat limitation times and related temperature range restrictions between successive coats for all products specified herein.
- (e) Each spray applied pass of any coating material shall be at 90-degree angles to the prior pass to ensure uniform coverage.
- (f) All equipment used for coating system application shall be as recommended by the CSM.
- (g) Coated or lined surfaces shall be free from runs, drips, ridges, waves, and laps. Coats shall be applied so as to produce an even film of uniform thickness completely coating corners and crevices. Coating work shall be done in accordance with the requirements of SSPC Paint Application Specification No. 1.

- (h) The Contractor's equipment shall be approved by the CSM for application of the materials specified. Spray equipment shall be equipped with mechanical agitators, pressure gages, and pressure regulators, and spray nozzles of the proper sizes.
- (i) Care shall be exercised to avoid over spraying or spattering materials on surfaces not to be lined, coated or sealed.
- (j) Adjacent areas and installations not to be coated shall be protected by taping, drop cloths, or other suitable measures.
- (k) Unless specified elsewhere herein, the Contractor shall comply with the CSM's most recent written instructions with respect to the following:
  - (i) Mixing of all materials.
  - (ii) Protection and handling of all materials.
  - (iii) Recoat limitation and cure times and surface preparation of coatings or lining to be overcoated or recoated.
  - (iv) Minimum ambient and substrate temperatures, substrate's degree of dryness, relative humidity, and dew point of air.
  - (v) Application.
  - (vi) Final curing.
  - (vii) Use of proper application equipment
- (l) If any of the requirements specified herein contradict the CSM instructions, then the Contractor must submit to the Contract Administrator for approval.
- (m) The applied coating and lining systems shall be protected from damage during curing and shall be cured as recommended by the CSM.
- (n) Pay special attention to manufacturer's recommendations with regard to substrate moisture, substrate temperature, moisture vapor emissions and monitoring and testing thereof prior to the installation of coatings, linings, and repair materials. Unless stipulated otherwise by the CSM, allow wetted concrete surfaces (including post rainfall conditions) to dry for a minimum period of 48 hours at 75°F & 50% (or less) relative humidity prior to coating/lining application. Prior to coating application, all concrete substrates must pass testing in accordance with ASTM D4263 as outlined in Paragraph E7.
- (o) Pay special attention to manufacturer's recommendations with regard to minimum and maximum recoat times and cure times at certain temperatures for all materials.
- (p) Install all terminations of the lining system in accordance with the detail drawings attached to this specification section. Refer to schedule in Paragraph E32.2 for required thicknesses.
- (q) Prior to the application of each coat of the specified coating on ferrous metal substrates, all edges, corners, intersections, bolts, nuts, washers, weld seams and other deviation from smooth surface shall be given a stripe coat by brush.
- (r) Under no circumstances shall the breaking-up or partial use of kits of the specified materials be allowed during mixing and application of the lining system materials. Whole kits shall be mixed and applied only to avert off-ratio materials problems.

## **E24. SPECIFIC APPLICATION REQUIREMENTS**

### **E24.1 Crack Repair**

- (a) After initial blast cleaning and prior to any resurfacing or lining work, the Contract Administrator shall mark cracks for repair by the Contractor.
- (b) The crack repair shall be in accordance with the Corrosion Probe, Inc. detail Section 7 on drawing VW0030-S103. The LSA shall include 250 lineal metres of crack repair for the Digester in the tender submission along with the unit price per metre to be used as an add or deduct based on the actual quantity required.
- (c) Recoat Times - Strictly adhere to manufacturer's recommendations with regard to minimum and maximum recoat times and cure times for all materials.

- (d) All crack repair materials will be applied using tools and equipment and methods in strict accordance with the CSM's written instructions.
- (e) Under no circumstances shall the breaking-up or partial use of kits of the specified materials be allowed during mixing and application of the coating or lining system or concrete restoration materials. Only whole kits shall be mixed and applied to avert off-ratio materials problems.

#### E24.2 Void Repair

- (a) This clause refers to areas where embedded items have been removed from the wall and areas of deterioration creating exposed voids in the wall. These areas are generally over 150 cubic cm in size and are scattered over the entire interior digester wall area. The Contractor shall include 5,000 cubic cm of void repair in the base tender. Any additional void repair will be paid at the unit price provided.
- (b) After initial blast cleaning and prior to any resurfacing or lining work, the Contract Administrator shall mark voids for repair by the Contractor.
- (c) The LSA shall remove all loose and deteriorated concrete and aggregate from inside the void. The void area shall be vacuumed prior to repair.
- (d) The concrete substrate surface shall be "pre-wet" or dampened with potable water to a Saturated Surface Dry (SSD) condition; the concrete is darkened by water but there is no pooling of water on the concrete. This can be done by using a Hudson pump-up sprayer or heavy nap roller cover dampened with potable water. Note: Do not over saturate the surface.
- (e) The void shall be completely filled with Tnemec Series 217 cementitious repair mortar or approved substitute in accordance with B7 in lifts that comply with the manufacturer's instructions.
- (f) Recoat Times - Strictly adhere to manufacturer's recommendations with regard to minimum and maximum recoat times and cure times for all materials.
- (g) All repair materials will be applied using tools and equipment and methods in strict accordance with the CSM's written instructions.
- (h) Under no circumstances shall the breaking-up or partial use of kits of the specified materials be allowed during mixing and application of the coating or lining system or concrete restoration materials. Only whole kits shall be mixed and applied to avert off-ratio materials problems.

#### E24.3 Resurfacing of Concrete that has Experienced Deep Attack

- (a) This section will apply to concrete surfaces within the construction limits that, after surface preparation, require an application of surfacing material greater than 13 mm to restore the concrete's original surface profile.
- (b) The concrete substrate surface shall be "pre-wet" or dampened with potable water to a Saturated Surface Dry (SSD) condition; the concrete is darkened by water but there is no pooling of water on the concrete. This can be done by using a Hudson pump-up sprayer or heavy nap roller cover dampened with potable water. Note: Do not over saturate the surface.
- (c) Recoat Times - Strictly adhere to manufacturer's recommendations with regard to minimum and maximum recoat times and cure times for all materials.
- (d) All coating and lining materials will be applied using tools and equipment and methods in strict accordance with the CSM's written instructions.
- (e) All abandoned metallic embedments (with the exception of the exposed reinforcing chairs in the roof of the Digester) shall be torch cut or ground below the existing concrete surface and be coated with Tnemec Series 215 or approved substitute in accordance with B7 prior to resurfacing application.
- (f) Refer to schedule in Paragraph E32.2 for required thicknesses.

- (g) Under no circumstances shall the breaking-up or partial use of kits of the specified materials be allowed during mixing and application of the coating or lining system or concrete restoration materials. Only whole kits shall be mixed and applied to avert off-ratio materials problems.

#### E24.4 Surfacing Prepared Concrete and Prepared Resurfacing Material

- (a) This section will apply to concrete surfaces within the limits of construction that, after surface preparation, require an application of surfacing material less than or equal to 13 mm to restore the concrete's original surface profile even if previously resurfaced with the Tnemec 217 or approved substitute in accordance with B7 resurfacing mortar.
- (b) The concrete substrate surface shall be "pre-wet" or dampened with potable water to a Saturated Surface Dry (SSD) condition; the concrete is darkened by water but there is no pooling of water on the concrete. This can be done by using a Hudson pump-up sprayer or heavy nap roller cover dampened with potable water. Note: Do not over saturate the surface.
- (c) Recoat Times - Strictly adhere to manufacturer's recommendations with regard to minimum and maximum recoat times and cure times for all materials.
- (d) All coating and lining materials will be applied using tools and equipment and methods in strict accordance with the CSM's written instructions.
- (e) All abandoned metallic embedments (with the exception of the exposed reinforcing chairs in the roof of the Digester) shall be torch cut or ground below the existing concrete surface and be coated with Tnemec Series 215 or approved substitute in accordance with B7 prior to resurfacing application.
- (f) The filler/surfacers (Tnemec Series 218 or approved substitute in accordance with B7) shall be applied to all interior corners (i.e. the roof to shell intersection) such that the corner is smoothed with a 19 mm cove in accordance with Section 4 Inside Corner Transitions of the attached drawings.
- (g) Refer to schedule in Paragraph E32.2 for required thicknesses.
- (h) Under no circumstances shall the breaking-up or partial use of kits of the specified materials be allowed during mixing and application of the coating or lining system or concrete restoration materials. Only whole kits shall be mixed and applied to avert off-ratio materials problems.

#### E24.5 Lining All Cementitious Surfaces

- (a) This section will apply to the top 4 metres of the Digester wall, roof, column capitals and gas dome after surface preparation and resurfacing.
- (b) Recoat Times - Strictly adhere to manufacturer's recommendations with regard to minimum and maximum recoat times and cure times for all materials.
- (c) All coating and lining materials will be applied using tools and equipment and methods in strict accordance with the CSM's written instructions.
- (d) Refer to schedule in Paragraph E32.2 for required thicknesses.
- (e) Under no circumstances shall the breaking-up or partial use of kits of the specified materials be allowed during mixing and application of the coating or lining system or concrete restoration materials. Only whole kits shall be mixed and applied to avert off-ratio materials problems.

#### E24.6 Lining Metallic Surfaces

- (a) This section will apply to all metallic surfaces required to be lined as a part of the termination details required in the drawings.
- (b) Recoat Times - Strictly adhere to manufacturer's recommendations with regard to minimum and maximum recoat times and cure times for all materials.
- (c) All coating and lining materials will be applied using tools and equipment and methods in strict accordance with the CSM's written instructions.

- (d) Refer to schedule in Paragraph E32.2 for required thicknesses.
- (e) Under no circumstances shall the breaking-up or partial use of kits of the specified materials be allowed during mixing and application of the coating or lining system or concrete restoration materials. Only whole kits shall be mixed and applied to avert off-ratio materials problems.

## **E25. MATERIAL PROPERTIES, MIXING AND THINNING**

- E25.1 The completed coating or lining work shall provide a satisfactory film and smooth even surface. Materials shall be thoroughly stirred, strained (as required) and kept at a uniform consistency during application. Materials consisting of two or more components shall be mixed in strict accordance with the CSM's instructions. The volatile organic content (VOC) of any material (as applied) shall comply with prevailing air pollution control regulations. Unless otherwise specified, materials shall not be thinned or reduced beyond CSM recommendations to obtain the proper application characteristics. Thinners (as applicable) shall be as recommended by the specific CSM.

## **E26. ATMOSPHERIC AND SUBSTRATE CONDITIONS**

- E26.1 Materials shall be applied only to surfaces that are dry (other than specific requirements for a SSD condition), and only under conditions of evaporation rather than condensation. Materials shall not be applied during rainy, misty weather, or to surfaces upon which there is frost or moisture condensation. During material application and curing, the temperature of the surfaces treated shall be maintained at or above the minimum requirements of the manufacturer relative to temperature, humidity and dew point. Maximum temperature limits must also be maintained during lining application. Fans or heaters shall be used inside enclosed areas where conditions causing condensation are severe.

## **E27. VENTILATION REQUIREMENTS**

- E27.1 Requirements for ventilation shall be in accordance with SSPC Paint Application Guide No. 3 and all Canadian, Provincial, and local regulations standards.

## **E28. FIELD QUALITY CONTROL INSPECTION AND TESTING**

- E28.1 Inspection by the Contract Administrator or others does not limit the Contractor's responsibilities for quality control inspection and testing as specified herein or as required by the CSM's written instructions and recommendations.
- E28.2 All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator, including all operations from the selection and production of materials, through to final acceptance of the Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or Works that are not in accordance with the requirements of this Specification.

## **E29. ACCEPTANCE CRITERIA**

- E29.1 Surface Preparation Work
- (a) All surfaces shall be prepared in accordance with the specification and referenced standards herein.
  - (b) The pH of the concrete shall be a minimum of 10.0 prior to coating application.
  - (c) The target threshold or tolerance level for soluble salt contamination on metallic surfaces is 30 micro siemens/cm in accordance with current US Coast Guard requirements.
- E29.2 Material System Application Work

- (a) Dry Film Thickness (DFT) by individual coats or layers must meet the requirements as detailed in Paragraph E32.2.
- (b) Film thickness tolerance variations in Dry Film Thickness for this work shall be as follows:  
In accordance with SSPC PA-2 and SSPC PA-9 – Restriction Level 2.
- (c) Acceptable work will be based upon the following:
  - (i) Complete hiding of previously applied coats.
  - (ii) No excessive runs, sags, sloughs ridges, trowel marks, protrusions, or depressions.
  - (iii) No pinholes or holidays in either size or frequency.
  - (iv) Specified film thickness within specified tolerances.
  - (v) No intercoat bond failures between coats.
  - (vi) No dry spray.
  - (vii) Proper curing.
  - (viii) Finish texture shall be uniform.
  - (ix) No show-through of substrate cracks or resurfacing materials in finishes.
  - (x) ASTM C1538 - Acceptable adhesion test results. The average of the three tests (excluding cohesive failure of the concrete) shall be reported as a single value. If the average of each three-test group shall be a minimum of 1.4 MPa (and at least 85% of the failure plane within the resurfacing mortar or concrete).
  - (xi) ASTM D7234 - Acceptable adhesion test results. The average of the three tests (excluding cohesive failure of the concrete) shall be reported as a single value. If the average of each three-test group does not meet or exceed 1.4 MPa (and at least 85% of the failure plane within the resurfacing mortar or concrete), additional testing may be performed to determine the extent of the adhesion problem area.
- (d) The Contract Administrator will inspect the following aspects of all resurfacing, prime coat, intermediate coat and finish coat work.
  - (i) Profile and degree of cleanliness of substrate.
  - (ii) Wet or dry film thickness.
  - (iii) Ambient temperature, humidity requirements, and substrate temperature.
  - (iv) Curing and recoat times.
  - (v) Proper curing.
- (e) Rework required on any holidays or any other inadequacies found by the Contract Administrator in the quality of the coating work shall be marked. Such areas shall be recleaned and recoated by the Contractor according to these specifications and the manufacturer's recommendations at no additional cost to the City.
- (f) The Contractor is responsible for keeping the Contract Administrator informed of all progress so that inspection for quality can be achieved in a productive and supportive manner.
- (g) No embedded dirt or debris will be allowed in the applied coatings. Any show-through of such dirt, etc. must be removed and the area recoated until the finish coating meets acceptance criteria. Any such required rework shall not result in additional cost to the City and the Contractor will not be entitled to schedule relief.

### **E30. CLEAN UP**

- E30.1 Upon completion of coating, the Contractor shall remove surplus materials, equipment, protective coverings, and accumulated rubbish, and thoroughly clean all surfaces and repair any overspray, spatter or other related damage. The surrounding surface areas including and all other surfaces shall be restored to their pre-project condition.

**E31. FINAL INSPECTION**

E31.1 Perform a final inspection to determine whether the material system work meets the requirements of these specifications. The Contract Administrator will conduct final inspection with the Contractor.

E31.2 If repair work is required, there will be a new inspection required of the repairs.

**E32. SYSTEM THICKNESS REQUIREMENTS AND COATING SCHEDULE**

E32.1 The Contractor is required to attain the total thickness (DFT) regardless of substrate condition, application method or number of coats required.

E32.2 Protective Lining System Thickness Requirements are as follows:

Surface	Coating*	Dry Film Thickness
Roof and Top 3 Metres of the Wall	Tnemec Series 217	Scrub Coat
	Tnemec Series 217	As required to build up to the original concrete contour
	Tnemec Series 218-1000	2mm to 13 mm Max 7 mm lifts
	Tnemec Series 436	80 mils to 100 mils in one (1) or two (2) coats

Surface	Coating*	Dry Film Thickness
Deeply Deteriorated Concrete (more than 13 mm of surfacer required)	Tnemec Series 215	2 mm to 3 mm on abandoned metallic embedments
	Tnemec Series 217	Scrub Coat
	Tnemec Series 217	As required to build up the deteriorated area to the original concrete contour
	Tnemec Series 436	80 mils to 100 mils in one (1) or two (2) coats

Surface	Coating*	Dry Film Thickness
Mildly Deteriorated or Original Concrete (less than 13 mm)	Tnemec Series 215	2 mm to 3 mm on abandoned metallic embedments
	Tnemec Series 218-1000	2 mm to 13 mm Max 7 mm lifts
	Tnemec Series 436	80 mils to 100 mils in one (1) or two (2) coats

Surface	Coating*	Dry Film Thickness
Metallic Surfaces (in accordance with Contract Administrator's coating termination drawings)	Tnemec Series 435 – Glaze Coat	20 mils to 30 mils

\*All specified products in this table may be replaced by an approved substitute in accordance with B7.